

# **DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**For**

**Proposed Barley based distillery for production of 30KLPD of Malt Spirit and 2  
KLPD Craft Gin and bottling plant of 1000 cases per day of IMFL/ Bottling in  
India/Blended Scotch Whisky**

**M/s ANGUS DUNDEE INDIA PRIVATE LIMITED**

**Mohal Parei Village- Salol, Tehsil & Distt. Kangra Himachal Pradesh  
[ Project or Activity of schedule 5(g), Distilleries, Cat-B1]  
Project Area- 34529 Sqm.  
[TOR letter no: T025B2504HP5890978N dated 26<sup>th</sup> May, 2025]  
Study Period: 15<sup>th</sup> March- 15<sup>th</sup> June, 2025**



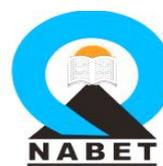
**PREPARED BY**

**M/s JMS ENVIRO CARE & INNOVATIVE CENTRE**

**(QCI/NABET Certificate: NABET/EIA/24-27/ IA 0142) Valid upto 20.06.2027)**

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**16<sup>th</sup> JUNE, 2025**



## DECLARATION BY CONSULTANT



### JMS Enviro Care and Innovative Centre

NABET Accredited EIA Consultant

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Date: 16.06.2025

### TO WHOMSOEVER IT MAY CONCERN

This is to confirm that the EIA report and EMP for the project “Proposed Barley-based Distillery for production of capacity 30 KLPD of Malt Spirit and 2 KLPD Craft Gin Plant and Bottling plant of 1000 Cases per day of IMFL/ Bottling in India/Blended Scotch Whisky namely M/s Angus Dundee India Private Limited located in the revenue estate of Mohal Parei Village Salol, Tehsil & Distt. Kangra Himachal Pradesh” has been prepared by JMS Enviro Care & Innovative Centre located at SCO 6, Motia Plaza, Block B, Baddi, District Solan (H.P.) - 173212. The TORs prescribed by SEIAA, Himachal Pradesh dated 26.05.2025 has been fully complied for preparing the EIA report and EMP. We also confirm that the EIA report prepared is based on project-related factual data as submitted by client to us & baseline studies conducted by NABL accredited and CPCB, recognized Laboratory namely Chandigarh Pollution Testing Laboratory.

Mr. Jagir Singh

(Managing Partner, JMS Enviro Care & Innovative Centre)

NABET Certificate: NABET/EIA/24-27/IA 0142 Dated 1<sup>st</sup> October, 2024 and valid upto 20<sup>th</sup> June, 2027.



## UNDERTAKING BY PP

Angus Dundee  
INDIA PVT LTD



### UNDERTAKING

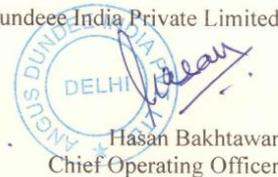
(As per MoEF Office Memorandum No. 11013/41/2006-IA.II (I) dtd. 05.10.2011)

I, Hasan Bakhtawar, Chief Operating Officer of M/s Angus Dundee India Private Limited located in the revenue estate of Mohal Parei, Village Salol, Tehsil & District Kangra, Himachal Pradesh, do hereby solemnly affirm and declare that:

- M/s JMS Enviro Care & Innovative Centre located at SCO 6, Motia Plaza, Block B, Baddi, District Solan (H.P.) - 173212, has been engaged by the company for obtaining ToR and carrying out the EIA Study for obtaining the Environmental Clearance from SEIAA, Himachal Pradesh, under the EIA Notification, 2006 as amended till date, for proposed Barley-based Distillery for production of capacity 30 KLPD of Malt Spirit and 2 KLPD Craft Gin Plant and Bottling plant of 1000 Cases per day of IMFL/ Bottling in India/Blended Scotch Whisky.
- The present EIA Study Report of the proposed project has been prepared in accordance with the TORs issued by SEIAA, Himachal Pradesh.
- I endorse all the contents (data & information) of the EIA Report, as prepared by the EIA consultant (M/s JMS Enviro Care & Innovative Centre), to be accurate, true and correct and I own the responsibility for the same.

Date:- 15.06.2025

For M/s Angus Dundee India Private Limited

  
Hasan Bakhtawar  
Chief Operating Officer

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## PLAGIARISM CERTIFICATE



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<b>ABBREVIATIONS</b>	
APCD	Air Pollution Control Devices
cm	Centimeter
CPCB	Central Pollution Control Board
dB	Decibel
DG	Diesel Generator
EIA	Environmental Impact Assessment
EMC	Environmental Management Cell
EMP	Environmental Management Plan
ETP	Effluent treatment plant
IMD	Indian Meteorological Department
KLD	Kilo Litre Per Day
Km	Kilometer
KVA	Kilo Volt Ampere
KW	Kilo Watt
m	Meter
M bgl	Meter Below Ground Level
mg	Milligram
MoEF & CC	Ministry of Environment, Forest & Climate Change
MT	Metric Tons
MTPA	Million Tons Per Annum
N	North
NE	North-East
NH	National Highway
NO <sub>2</sub>	Nitrogen Dioxides
NTU	Naphelo Turbidity Unit
NW	North-West
OHSAS	Occupational Health & Safety Assessment
SPCB	State Pollution Control Board
PPE	Personal Protective Equipment
PPM	Part Per Million
Pvt.	Private
R&R	Rehabilitation & Resettlement
RDS	Respirable Dust Sampler
RPM	Respirable Particulate Matter
RSPM	Respirable Suspended Particulate Matter
SE	South- East
SEIAA	State Level Environmental Impact Assessment Authority
SO <sub>2</sub>	Sulphur-dioxide
SOI	Survey Of India
SOPs	Standard Operating Procedures
SPM	Suspended Particulate Matter
STP	Sewage Treatment plant



<b>ABBREVIATIONS</b>	
TPA	Tone Per Annum
TPD	Tone Per Day
TDS	Total Dissolved Solids
TOR	Terms of Reference
TPH	Tones Per Hour
US EPA	United State Environmental Protection Agencies
ug/m <sup>3</sup>	Micro gram per meter cube
VOC	Volatile organic matter
w.e.f.	With Effective From
w.r.t.	With Reference To
W/W	Weight By Weight
IMFL	Indian Made Foreign Liquor
TSDf	Treatment, Storage, and Disposal Facilities
HWM	Hazardous Waste Management

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### PROJECT AT A GLANCE

S. No.	Particulars	Details
	Name of Project	M/s Angus Dundee India Private Limited
	Type of Project	Proposed 30 KLPD Malt Spirit and 2 KLPD Craft Gin Plant along with 1000 cases per day of IMFL Bottling Plant
	Address of the Project	Mohal Parei Village- Salol, Tehsil, District Kangra, Himachal Pradesh
<b>Location details</b>		
1.	Location	
2.	Village/ Town/Plot No.	Mohal Parei Village- Salol
3.	Tehsil	Kangra
4.	District	Kangra
5.	State	Himachal Pradesh
6.	Toposheet No.	I43W4, I43W8
7.	Project Area	Total Area = 34,529 sqm
<b>Production Capacity</b>		<b>Product</b> Malt Distillery Plant: 30 KLPD Craft Gin Plant: 2KLPD IMFL Bottling Plant: 1000 cases per day Pilot plant for fermentation and bottling plant <b>By- product</b> DWGS: 65TPD CO <sub>2</sub> :7TPD
<b>Cost Details</b>		
Capital Cost of the project		Rs. 297 Cr.
Total cost for Environmental Management Plan (EMP)		Capital cost: Rs 4.12 Cr Recurring cost: Rs 0.94 Cr.
Total Land		34529 Sqm.
Power Requirement (MW)		1.5 MW
Source of power		H.P.S.E. B
Total Water Consumption (KLD)		900
Fresh Water Consumption (KLD)		504
Source of Water		Ground water: Tube-well
Generation of Domestic Effluent & Wastewater Generation (KLD)		400 (396 Wastewater + 4 Domestic Effluent)



<p>Treatment Facility</p>	<ul style="list-style-type: none"> <li>➤ 4 KLD Domestic wastewater will be generated and will be treated in a proposed Sewage Treatment Plant (STP) with a capacity of 10 KLD based on MBBR technology.</li> <li>➤ 396 KLD of wastewater will be treated in condensate polishing unit of capacity 425 KLD and the treated wastewater will be used in the process as well as utility.</li> </ul>
<p>Management of Air Pollution</p>	<ul style="list-style-type: none"> <li>➤ Bag Filter with a stack of adequate height of 31 m will be installed with the proposed boiler (15 TPH), based on Biomass/Wood Chips/Briquettes, to control the concentrations of particulate matter.</li> <li>➤ Predicted GLC in terms of particulate matter has been found as 2.28 ug/m<sup>3</sup>. Since at present, as per baseline study, the PM<sub>10</sub> in the ambient air has been found as 71.5 ug/m<sup>3</sup>. Therefore, even after the operation of the unit the value of PM<sub>10</sub> will become 73.78 ug/m<sup>3</sup>, which is well below the prescribed standards of 100 ug/m<sup>3</sup>.</li> </ul>



<p>Solid Waste Management</p>	<ul style="list-style-type: none"> <li>➤ Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> <li>➤ Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.</li> <li>➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in Multiple Effect Evaporator (MEE) to produce DDGS.</li> <li>➤ DDGS @ 19 TPD will be sold as cattle feed.</li> <li>➤ ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.</li> <li>➤ Paper waste and Glass Culletts @ 300 Kg/day will be sold to local supplier for recycling.</li> </ul>
<p>Hazardous Waste Management</p>	<ul style="list-style-type: none"> <li>• Used oil/spent oil @ 0.5 Kl/annum will be sent to HPSPCB authorized recyclers.</li> </ul>



**TOR COMPLIANCE**

S. No.	TOR Point	Compliance	Reference														
1	Executive Summary																
1.1	Executive Summary	<p><b>M/s Angus Dundee India Private Limited</b> proposes to setup a new distillery unit for production of 30 KLD Malt Spirit Plant and 2 KLD Craft Gin Plant along with a Pilot Plant for fermentation as well as maturation and bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village-Salol, Tehsil &amp; Distt. Kangra, Himachal Pradesh.</p> <ul style="list-style-type: none"> <li>▪ The total project area is 34,529 sqm, of which 12730 sqm (36.8%) will be developed as greenbelt.</li> <li>▪ The project site already has existing infrastructure, including                             <ul style="list-style-type: none"> <li>- Cold store building</li> <li>- ETP Tank</li> <li>- Admin Block</li> <li>- Semi Furnished Structure</li> <li>- 1 lakh Ltr. RCC water Tank</li> <li>- Poly-shed</li> <li>- Bore well.</li> </ul> </li> <li>▪ As per EIA Notification dated 14th Sept., 2006 and its subsequent amendments, the project falls under Category “B”, Project or Activity ‘5(g)’ Distilleries (Non-Molasses based distilleries ≤ 200 KLPD).</li> </ul>	Executive summary of the project is given at page no. 1-9 of DEIA Report and EMP.														
2	Introduction																
2.1	Details of the EIA Consultant including NABET accreditation	<p><b>Name of consultancy firm:</b> JMS Enviro Care &amp; Innovative Centre (QCI-NABET Certificate No: NABET/EIA/24-27/IA 0142 Valid upto 20.06.2027)</p> <p><b>Name of the Laboratory:</b> Chandigarh Pollution Testing Laboratory</p> <p><b>NABL accreditation:</b> TC-6728 Valid Until: 08/11/2028</p> <p><b>MoEF&amp;CC Recognition:</b> LB/99/7/2021-Inst LAB-HO-CPCB-HO/Pvt/2355 dated 10 March, 2025 and valid up to 08-03-2028.</p> <p>Accreditation certificates of the firm approved by the National Accreditation Board for Education and Training (NABET) and the laboratory approved by the National Accreditation Board for Testing and Calibration Laboratories (NABL) are attached as Annexure XII and XIII</p>	NABET certificate of the firm and NABL certificate of Laboratory is attached as Annexure XII and XIII.														
2.2	Information about the project proponent	<p>M/s Angus Dundee India Private Limited is located in the revenue estate of Mohal Parei Village-Salol, Tehsil and District Kangra, Himachal Pradesh.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">PARTICULARS</th> <th style="width: 60%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>Name of Company</td> <td><b>M/s Angus Dundee India Private Limited</b></td> </tr> <tr> <td>Project site Location</td> <td>Mohal Parei, Village Salol, Tehsil &amp; District- Kangra, Himachal Pradesh</td> </tr> <tr> <td colspan="2"><b>MANAGEMENT:</b></td> </tr> <tr> <td>Ms. Tania Hillman</td> <td></td> </tr> <tr> <td>Mr. Aaron Nicholas Hillman</td> <td></td> </tr> <tr> <td>Mr. Brian John Megson</td> <td></td> </tr> </tbody> </table>	PARTICULARS	DESCRIPTION	Name of Company	<b>M/s Angus Dundee India Private Limited</b>	Project site Location	Mohal Parei, Village Salol, Tehsil & District- Kangra, Himachal Pradesh	<b>MANAGEMENT:</b>		Ms. Tania Hillman		Mr. Aaron Nicholas Hillman		Mr. Brian John Megson		Details about PP have been provided in Chapter -1 of DEIA Report and EMP at page no. 12.
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		Mr. Sanjeev K Puri																									
		<b>Authorized Signatory:</b> Mr. Hasan Bakhtawar																									
		<b>Designation:</b> Chief Operating Officer																									
		<b>Email ID:</b> angushp2025@gmail.com																									
		<b>Phone no.:</b> 9810018896																									
<b>3</b>	<b>Project Description</b>																										
<b>3.1</b>	Cost of project and time of completion.	<p><b>Capital Cost of the Project-</b> Rs. 297 Crores</p> <p><b>Time of Completion</b> - The proposed project will be executed within 12 months after grant of Environment Clearance and other statutory clearances. The project timeline is outlined in the PERT chart provided in Chapter 2 of the DEIA Report and EMP.</p>	Details regarding with cost of the project and time of completion have been provided in Chapter 2 of DEIA Report and EMP at page no. 61.																								
<b>3.2</b>	Products with capacities for the proposed project. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.	<p><b>Details of proposed products:</b></p> <table border="1"> <thead> <tr> <th>Particulars</th> <th>Units</th> <th>Capacity</th> </tr> </thead> <tbody> <tr> <td colspan="3"><b>Products</b></td> </tr> <tr> <td>Malt Spirit</td> <td>KLD</td> <td>30</td> </tr> <tr> <td>IMFL Bottling</td> <td>Cases/day</td> <td>1000</td> </tr> <tr> <td>Craft Gin</td> <td>KLD</td> <td>2</td> </tr> <tr> <td colspan="3"><b>By- Products</b></td> </tr> <tr> <td>DWGS</td> <td>TPD</td> <td>65</td> </tr> <tr> <td>CO<sub>2</sub></td> <td>TPD</td> <td>7</td> </tr> </tbody> </table>	Particulars	Units	Capacity	<b>Products</b>			Malt Spirit	KLD	30	IMFL Bottling	Cases/day	1000	Craft Gin	KLD	2	<b>By- Products</b>			DWGS	TPD	65	CO <sub>2</sub>	TPD	7	Proposed Products are detailed in Chapter 2 of DEIA Report and EMP at page no. 34.
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<p><b>3.5</b> Details of Emission, effluents, hazardous waste generation and their management. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)</p>	<p><b>Particulars</b></p>	<p><b>Mitigation measures to be adopted</b></p>	<p>Regarding emissions, effluents, hazardous waste generation and their management are provided Chapter 2 of DEIA Report and EMP at page no. 62.</p>
	<p><b>Air Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Bag filter with a stack of height of 31 m will be installed with the proposed (15 TPH) boiler to control the particulate matter emissions below 50 mg/m<sup>3</sup>.</li> <li>➤ In proposed distillery, CO<sub>2</sub> generated from the fermenter will be scrubbed, liquified and sold to vendors engaged in manufacture of carbonated drinks.</li> <li>➤ DG Set (2X750 KVA) will have adequate stack height (15 m above the canopy) as per CPCB guidelines.</li> <li>➤ All internal roads will be paved and mechanically swept to control the generation of fugitive emissions.</li> <li>➤ Adequate greenbelt will be developed in the plant area.</li> <li>➤ Continuous Emission Monitoring System (CEMS) will be installed on stacks and connected to the server of CPCB/SPCB for real time monitoring.</li> <li>➤ The overall quality of the ambient air will be monitored and maintained within the limits prescribed under NAAQS-2009 prescribed by CPCB.</li> </ul>	
	<p><b>Water Environment</b></p>	<ul style="list-style-type: none"> <li>➤ The distillery will be based on “ZERO LIQUID DISCHARGE”.</li> <li>➤ Domestic effluent will be treated in STP of 10 KLD based on MBBR technology and reused for plantation within the premises.</li> <li>➤ Treated wastewater from the ETP will be used in the process as well as utility.</li> <li>➤ Spent wash will be generated from the distillation after passing through centrifugal decanter and separation of solids as DWGS/ Wet cake will be treated in ETP/CPU.</li> </ul>	
	<p><b>Solid/Hazardous Waste Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> <li>➤ Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.</li> <li>➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in Multiple Effect Evaporator (MEE) to produce DDGS.</li> <li>➤ DDGS @ 19 TPD will be sold as cattle feed.</li> <li>➤ ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.</li> <li>➤ Paper waste and Glass Culletts @ 300 Kg/day will be sold to local supplier for recycling.</li> <li>➤ Used oil/spent oil @ 0.5 Kl/annum will be sent to HPSPCB authorized recyclers.</li> </ul>	
<p><b>Noise Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.</li> <li>➤ Personal Protective Equipment like earplugs and earmuffs will be provided to the workers exposed to high noise level.</li> <li>➤ D.G sets will be provided with acoustic to control the noise level within the prescribed limit.</li> <li>➤ Greenbelt inside the plant premises and at the plant boundary will be developed.</li> <li>➤ Regular monitoring of noise level will be carried out.</li> </ul>		



<b>Odour management</b>	<ul style="list-style-type: none"> <li>➤ Adequate greenbelt will be developed &amp; maintained all around the periphery of the plant</li> <li>➤ Regular housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment.</li> <li>➤ Longer storages of any product will be avoided &amp; use of efficient biocides to control bacterial contamination.</li> <li>➤ Regular use of eco-friendly disinfectants in the drains to avoid generation of putrefying micro-organisms.</li> </ul>
<b>Flue gas Management</b>	During combustion of fuel in the boiler furnace, there will be generation of flue gas emissions and to contain the concentration of particulate matter within the prescribed standards of 50 mg/Nm <sup>3</sup> , Bag filter will be installed as APCD.

**Water Requirement:** Total water consumption for the grain-based distillery will be 900 KLPD which will be sourced from groundwater. Diagram of water balance for 30 KLD malt spirit and 2 KLD Craft Gin Plant is given in Figure 2.7 and 2.8 of Chapter 2 of DEIA Report and EMP.

**Breakup of water requirement**

S No.	Particulars	Fresh Water (KLD)	Wastewater Generation (KLD)	Reuse of treated wastewater (KLD)	Total Water Requirement (KLD)
1.	Malt spirit distillery (30 KLD)	498	392	390	888
2.	Craft Gin Plant (2.0 KLD)	1	4	6	7
	<b>Total</b>	499	396	396	895
	Domestic	5	4	4	5
	Grand Total	504			900

**I. Power Requirement**

The power requirement will be 1.5 MW, which will be sourced from Himachal Pradesh State Electricity Board.

**II. Manpower Requirement**

The proposed project shall generate direct employment to 100 persons.

<b>3.6</b>	Process description along with major equipments and machineries, process flow sheet (quantitative) from raw material to products to be provided.	Process description and process flow sheet from raw material to product is incorporated in Chapter-2 of Draft EIA report and EMP	Process description and process flow sheet are given in Chapter 2 of Draft EIA report and EMP at page no 41-43.
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3.7	Hazard identification and details of proposed safety systems.	Hazard identification and details of proposed safety systems is provided in chapter- 7 of DEIA report and EMP.	Details of hazard identification and safety systems are incorporated in Chapter 2 of Draft EIA report and EMP at page no. 178.
3.8	<b>Expansion/modernization proposals:</b>		
a.	Copy of all the Environmental Clearance(s) including Amendments there to obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 08 <sup>th</sup> June, 2022 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report.	Not applicable as this is a green field project.	--



b.	In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.	Not applicable as this is a green field project.	--
4	<b>Site Details</b>		
4.1	Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.	<p>The project is located in the revenue estate of Mohal Parei Village- Salol, Tehsil &amp; Distt. Kangra, Himachal Pradesh. The industry has obtained Letter of Intent (LOI) vide letter no. 7-6/2025 EXN-5093 dated 24/03/2025. Additionally, the project has been granted an Essentiality Certificate by the Directorate of Industries (DOI) through the Single Window Clearance System, vide certificate number EC/45/111325/2025 dated 03.05.2025.</p> <p><b>Justification of selecting the site:</b></p> <p><b>a) Availability of Raw Materials:</b> The required raw materials such as grain/barley malt is abundantly available in the neighbouring states of Haryana, UP and Rajasthan. The transportation is readily available and cost effective.</p> <p><b>b) Availability of Water &amp; Power:</b> Required water will be available from the source and adequate power made available by HPSEB.</p> <p><b>c) Availability of Infrastructure:</b> Industrial infrastructure facilities such as roads, transport, securely administrations are available in the area. The proposed site is well connected with NH-503 &amp; SH-23 which are adequate to meet the transportation needs.</p> <p><b>d) Availability of Manpower:</b> The proposed project is located in the rural area where manpower will be sufficiently available.</p>	Details regarding justification of selecting the site is given in Chapter 5 of DEIA Report and EMP at page no. 171.



4.2	A toposheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (Including all eco-sensitive areas and environmentally sensitive places).	Toposheet map of the study area of radius 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. is given in Chapter-1 of DEIA Report and EMP. The project falls under toposheet no. I43W4, I43W8. Toposheet map of 10 km buffer area is provided in Chapter-1 of DEIA Report and EMP.	Provided in Chapter 1 of DEIA Report and EMP at page no. 18.																											
4.3	Co-ordinates (lat-long) of all four corners of the site. Google map-Earth downloaded of the project site. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.	<p><b>Co-ordinate of the Project Site:</b></p> <table border="1"> <thead> <tr> <th>POINT</th> <th>LATITUDE</th> <th>LONGITUDE</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>32°7'13.64"N</td> <td>76°10'46.34"E</td> </tr> <tr> <td>B</td> <td>32°7'14.35"N</td> <td>76°10'49.24"E</td> </tr> <tr> <td>C</td> <td>32°7'10.61"N</td> <td>76°10'53.00"E</td> </tr> <tr> <td>D</td> <td>32°7'7.53"N</td> <td>76°10'47.91"E</td> </tr> <tr> <td>E</td> <td>32°7'9.09"N</td> <td>76°10'41.83"E</td> </tr> <tr> <td>F</td> <td>32°7'11.15"N</td> <td>76°10'42.70"E</td> </tr> <tr> <td colspan="2"><b>ELEVATION</b></td> <td>630 m</td> </tr> <tr> <td colspan="2"><b>Source</b></td> <td>Google Earth</td> </tr> </tbody> </table> <p>Location map of project site showing different features within buffer area is given in Chapter-1 of DEIA Report and EMP. Layout map of project site showing different features is given in fig. 2.4, Chapter 2 of DEIA Report and EMP.</p>	POINT	LATITUDE	LONGITUDE	A	32°7'13.64"N	76°10'46.34"E	B	32°7'14.35"N	76°10'49.24"E	C	32°7'10.61"N	76°10'53.00"E	D	32°7'7.53"N	76°10'47.91"E	E	32°7'9.09"N	76°10'41.83"E	F	32°7'11.15"N	76°10'42.70"E	<b>ELEVATION</b>		630 m	<b>Source</b>		Google Earth	Location Map of the project site is given in Chapter 1 of DEIA Report and EMP at page no. 17. Layout Map of the project site is given in Chapter 2 of DEIA Report and EMP at page no. 33.
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4.4	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.	Photographs of the proposed project site is incorporated in the Chapter 1 at Fig. 1.3 of DEIA Report and EMP.	Photographs of the project site is provided in Chapter 1 of DEIA Report and EMP at page no. 19 and 20.																											
4.5	Land use break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc	<p>Land use break-up of total land of the project site is given below:</p> <table border="1"> <thead> <tr> <th>Land Use/Land Cover</th> <th>Area (Ha)</th> <th>Area Percentage</th> </tr> </thead> <tbody> <tr> <td>Built-up Land</td> <td>1115.35</td> <td>3.46</td> </tr> <tr> <td>Agricultural Land</td> <td>5119.16</td> <td>15.90</td> </tr> <tr> <td>Agricultural Fallow Land</td> <td>8786.09</td> <td>27.29</td> </tr> </tbody> </table>	Land Use/Land Cover	Area (Ha)	Area Percentage	Built-up Land	1115.35	3.46	Agricultural Land	5119.16	15.90	Agricultural Fallow Land	8786.09	27.29	Land use break-up of total land of the project site is given in Chapter 3 of DEIA Report and EMP at page no.															
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4.6	A list of major industries with name and type within study area (10km radius) shall be incorporated.	<p>List of Industries within 10km of the study area:</p> <table border="1"> <thead> <tr> <th>S.No.</th> <th>Name of Industries</th> <th>Distance and Direction</th> <th>Address</th> <th>Type of Industries</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>M/s Himachal Metal Industry</td> <td>9.36 Km, SE</td> <td>Industrial area Kangra, Natehr, Himachal Pradesh 176001.</td> <td>Home Goods Store</td> </tr> <tr> <td>2.</td> <td>M/s Raina Furniture Industry</td> <td>8.07 Km, NE</td> <td>45 Miles Himachal Pradesh 176208</td> <td>Furniture Manufacturer</td> </tr> <tr> <td>3.</td> <td>M/s Kangra Shoes Industry</td> <td>7.28 Km, NE</td> <td>Rait, Thiridi, Himachal Pradesh 176208</td> <td>Shoe Factory Ward 5</td> </tr> <tr> <td>4.</td> <td>M/s Khalsa Dairy Kangra</td> <td>9.38 Km, SE</td> <td>RPGMC Rd Pushp Vihar Colony Kangra, Himachal Pradesh 176001</td> <td>Milk Delivery</td> </tr> <tr> <td>5.</td> <td>M/s Kaku Dairy Gaggal</td> <td>9.45 Km, NE</td> <td>Kaku Dairy Main Chowk District Gaggal, Himachal Pradesh 176209</td> <td>Dairy Store</td> </tr> <tr> <td>6.</td> <td>Kohli poultry farm kangra</td> <td>9.05 Km, W</td> <td>Vill sevvara post office distt, Talpura Kangra, Natehr, Himachal Pradesh 176001</td> <td>Poultry farm</td> </tr> </tbody> </table>			S.No.	Name of Industries	Distance and Direction	Address	Type of Industries	1.	M/s Himachal Metal Industry	9.36 Km, SE	Industrial area Kangra, Natehr, Himachal Pradesh 176001.	Home Goods Store	2.	M/s Raina Furniture Industry	8.07 Km, NE	45 Miles Himachal Pradesh 176208	Furniture Manufacturer	3.	M/s Kangra Shoes Industry	7.28 Km, NE	Rait, Thiridi, Himachal Pradesh 176208	Shoe Factory Ward 5	4.	M/s Khalsa Dairy Kangra	9.38 Km, SE	RPGMC Rd Pushp Vihar Colony Kangra, Himachal Pradesh 176001	Milk Delivery	5.	M/s Kaku Dairy Gaggal	9.45 Km, NE	Kaku Dairy Main Chowk District Gaggal, Himachal Pradesh 176209	Dairy Store	6.	Kohli poultry farm kangra	9.05 Km, W	Vill sevvara post office distt, Talpura Kangra, Natehr, Himachal Pradesh 176001	Poultry farm	List of major industries, distance & direction, address is given in Chapter 3 of DEIA Report and EMP at page no. 123.
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4.7	Details of Drainage of the project up to 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of	<p>The project site is located at the following distances from nearby water bodies:</p> <ul style="list-style-type: none"> <li>- Ghaj Khad: 0.54 Km</li> <li>- Baner khad: 6.91 Km</li> <li>- Chambi Khad: 6.22 Km</li> <li>- Manuni Khad: 8.43 Km</li> </ul> <p>Drainage map of the project area is given in Figure 3.24 of Chapter 3 of DEIA Report and EMP at page no. 86.</p>			Details of surface water bodies are given in Chapter 3 of DEIA Report and EMP at page no. 86.																																			



	Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects).		
4.8	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	<p>The project is located in the revenue estate of Mohal Parei Village- Salol, Tehsil &amp; Distt. Kangra, Himachal Pradesh. The land area, in which proposed unit is to be established, measuring 34529 sqm has been purchased from Mr. Madan Lal Kapoor S/o Ranjha Ram vide agreement to sell executed between Mr. Madan Lal Kapoor S/o Ranjha Ram and M/s Angus Dundee India Private Limited on 28.10.2024. In the agreement to sell, it has been mentioned as under:</p> <p>a) In para (c) of this agreement it has been mentioned that this land was mortgaged by Shri Ranjha Ram to J&amp;K Bank, Dharamshala as a security against a loan facility availed by M/s Great Himalayan Farm Fresh. Shri Ranjha Ram was the sole proprietor of the said firm.</p> <p>b) In schedule I of this agreement it has been mentioned that there is an existing industrial shed and machinery of the unit namely M/s Great Himalayan Farm Fresh.</p> <p>Now, this land is under the title of M/s Angus Dundee India Private Limited and this unit has already taken possession of the land.</p> <p>The industry has obtained Letter of Intent (LOI) vide letter no. 7-6/2025 EXN-5093 dated 24/03/2025. Additionally, the project has been granted an Essentiality Certificate by the Directorate of Industries (DOI) through the Single Window Clearance System, vide certificate number EC/45/111325/2025 dated 03.05.2025. Copy of the same is attached as Annexure IV and Annexure VII.</p>	Land Papers for the same is attached as Annexure I at page no. 234.
4.9	R&R details in respect of land in line with state Government policy.	Not applicable as the land is already under the possession of project proponent.	--
5	<b>Forest and wildlife related issues (if applicable)</b>		
5.1	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)	Not applicable as the land is already under the possession of proponent & free from any forest land.	--
5.2	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland was plotted using Landsat 8 Satellite Imagery.	LULC map for the same is given in figure 3.25 of DEIA report and EMP at



	case of projects involving forest land more than 40 ha)		page no. 120
5.3	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	Not applicable	--
5.4	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	Not applicable, as the site located 10.7 Km from the Pong Dam Wildlife sanctuary.	--
5.5	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area	Not applicable.	--
5.6	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National	Not applicable.	--



	Board for Wildlife.																																							
<b>6</b>	<b>Environmental Status</b>																																							
<b>6.1</b>	Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.	<p><b>Micro-Meteorology at Site</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Month</th> <th colspan="2">Temperature (° C)</th> <th>Relative Humidity (%)</th> </tr> <tr> <th>Max.</th> <th>Min.</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>March, 2025</td> <td>34°C</td> <td>10°C</td> <td>21°C</td> </tr> <tr> <td>April, 2025</td> <td>38°C</td> <td>14°C</td> <td>27°C</td> </tr> <tr> <td>May, 2025</td> <td>38°C</td> <td>20°C</td> <td>28°C</td> </tr> <tr> <td>June, 2025</td> <td>39°C</td> <td>18°C</td> <td>28°C</td> </tr> </tbody> </table> <p><b>Summary of site-specific wind pattern</b></p> <table border="1"> <tbody> <tr> <td>Season</td> <td>January-December, 2024</td> </tr> <tr> <td>First Predominant Wind Direction</td> <td>SW</td> </tr> <tr> <td>Avg. Wind Speed (m/s)</td> <td>0.81 m/sec</td> </tr> <tr> <td>Maximum Speed</td> <td>2.7 m/sec</td> </tr> <tr> <td>Calm Percentage</td> <td>21.31 %</td> </tr> <tr> <td>Peroid</td> <td>01/01/2024-31/12/2024</td> </tr> <tr> <td>Plot Date</td> <td>26/05/2025 (16:18)</td> </tr> </tbody> </table>	Month	Temperature (° C)		Relative Humidity (%)	Max.	Min.	Average	March, 2025	34°C	10°C	21°C	April, 2025	38°C	14°C	27°C	May, 2025	38°C	20°C	28°C	June, 2025	39°C	18°C	28°C	Season	January-December, 2024	First Predominant Wind Direction	SW	Avg. Wind Speed (m/s)	0.81 m/sec	Maximum Speed	2.7 m/sec	Calm Percentage	21.31 %	Peroid	01/01/2024-31/12/2024	Plot Date	26/05/2025 (16:18)	Wind rose diagram is given in Figure 3.4 at page no. 73.
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<b>6.2</b>	AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre dominant wind direction, population zone and sensitive	The monitoring stations are selected based as per in IS – 5182 part 14, 2000 and CPCB guidelines. Nearest populated habitat, water body, protected/reserved forest are also been considered. The following stations were chosen for Ambient Air Monitoring:	AAQ data at 8 locations are given in Chapter 3 of DEIA Report and EMP at page no. 76.																																					



	receptors including reserved forests.	8. Bhandrel																																																																		
6.3	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQPM Notification of Nov. 2009 along with min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should provide as an annexure to the EIA report.	<p>The minimum, maximum, Averages, P98 of the same is given below: (15<sup>th</sup> March to 15<sup>th</sup> June, 2025)</p> <table border="1"> <thead> <tr> <th>Pollutants</th> <th>Maximum (µg/m<sup>3</sup>)</th> <th>Minimum(µg/m<sup>3</sup>)</th> <th>Average(µg/m<sup>3</sup>)</th> <th>P98(µg/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>PM<sub>10</sub></td> <td>71.5</td> <td>60.4</td> <td>62.6-67.8</td> <td>70.4</td> </tr> <tr> <td>PM<sub>2.5</sub></td> <td>35.8</td> <td>30</td> <td>30.9-34.0</td> <td>35.2</td> </tr> <tr> <td>SO<sub>2</sub></td> <td>6.0</td> <td>5.0</td> <td>5.2-5.5</td> <td>5.9</td> </tr> <tr> <td>NO<sub>2</sub></td> <td>12.4</td> <td>10.0</td> <td>10.2-11.2</td> <td>12.2</td> </tr> <tr> <td>CO</td> <td>0.56</td> <td>0.50</td> <td>0.51-0.53</td> <td>0.55</td> </tr> <tr> <td>O<sub>3</sub></td> <td>26.60</td> <td>20.10</td> <td>20.85-23.40</td> <td>25.95</td> </tr> <tr> <td>NH<sub>3</sub></td> <td>BDL</td> <td>BDL</td> <td>BDL</td> <td>0</td> </tr> <tr> <td>Benzene</td> <td>BDL</td> <td>BDL</td> <td>BDL</td> <td>0</td> </tr> <tr> <td>BaP</td> <td>BDL</td> <td>BDL</td> <td>BDL</td> <td>0</td> </tr> <tr> <td>Pb</td> <td>BDL</td> <td>BDL</td> <td>BDL</td> <td>0</td> </tr> <tr> <td>Ni</td> <td>BDL</td> <td>BDL</td> <td>BDL</td> <td>0</td> </tr> <tr> <td>As</td> <td>BDL</td> <td>BDL</td> <td>BDL</td> <td>0</td> </tr> </tbody> </table>	Pollutants	Maximum (µg/m <sup>3</sup> )	Minimum(µg/m <sup>3</sup> )	Average(µg/m <sup>3</sup> )	P98(µg/m <sup>3</sup> )	PM <sub>10</sub>	71.5	60.4	62.6-67.8	70.4	PM <sub>2.5</sub>	35.8	30	30.9-34.0	35.2	SO <sub>2</sub>	6.0	5.0	5.2-5.5	5.9	NO <sub>2</sub>	12.4	10.0	10.2-11.2	12.2	CO	0.56	0.50	0.51-0.53	0.55	O <sub>3</sub>	26.60	20.10	20.85-23.40	25.95	NH <sub>3</sub>	BDL	BDL	BDL	0	Benzene	BDL	BDL	BDL	0	BaP	BDL	BDL	BDL	0	Pb	BDL	BDL	BDL	0	Ni	BDL	BDL	BDL	0	As	BDL	BDL	BDL	0	Statistical ambient air quality abstract is given in Chapter 3 of DEIA Report and EMP at page no. 78.
Pollutants	Maximum (µg/m <sup>3</sup> )	Minimum(µg/m <sup>3</sup> )	Average(µg/m <sup>3</sup> )	P98(µg/m <sup>3</sup> )																																																																
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6.4	Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/ MoEF&CC guidelines.	<p>Surface water sample was taken from two surface water bodies namely Baner Khad &amp; Ghaj Khad.</p> <table border="1"> <thead> <tr> <th>Station</th> <th>Sampling Location</th> <th>Aerial Distance (Km) and Direction from Project Site</th> <th>Sampling Location</th> </tr> </thead> <tbody> <tr> <td>SW-1</td> <td>Baner Khad</td> <td>6.91 Km, East</td> <td rowspan="2">Surface water sampling location.</td> </tr> <tr> <td>SW-2</td> <td>Ghaj Khad</td> <td>0.54 Km, West</td> </tr> <tr> <td>SW-3</td> <td>Chambi Khad</td> <td>6.22 Km, North</td> <td rowspan="2">Due to their seasonal nature, these water bodies were dry at the time of sampling.</td> </tr> <tr> <td>SW-4</td> <td>Manuni Khad</td> <td>8.43 Km, East</td> </tr> </tbody> </table> <p>Results of surface water quality for Baner Khad and Ghaj Khad is given in Chapter-3 of DEIA Report and EMP.</p>	Station	Sampling Location	Aerial Distance (Km) and Direction from Project Site	Sampling Location	SW-1	Baner Khad	6.91 Km, East	Surface water sampling location.	SW-2	Ghaj Khad	0.54 Km, West	SW-3	Chambi Khad	6.22 Km, North	Due to their seasonal nature, these water bodies were dry at the time of sampling.	SW-4	Manuni Khad	8.43 Km, East	Results of Surface water quality of nearest water bodies are given in Chapter 3 of DEIA Report and EMP at page no. 97.																																															
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6.5	Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give	The proposed project falls at a distance of 6.91 Km from Baner Khad, 0.54 Km from Ghaj Khad. These water bodies are not identified as the polluted river stretch by CPCB.	--																																																																	



	details		
6.6	Ground water monitoring at minimum at 8 locations shall be included.	<p>The following stations were selected for ground water monitoring:</p> <ol style="list-style-type: none"> <li>1. Project Site</li> <li>2. Salwana Tatwani</li> <li>3. Jhajhroli</li> <li>4. Jheer Balla</li> <li>5. Bhohar Kawalu</li> <li>6. Bharth</li> <li>7. Korian</li> <li>8. Bhandrel</li> </ol> <p>Results for the ground water quality is given in Chapter-3 of DEIA Report and EMP.</p>	Groundwater monitoring locations and results are given in Chapter 3 of DEIA Report and EMP at page no. 97.
6.7	Noise levels monitoring at 8 locations within the study area.	<p>The following stations were selected for noise quality monitoring:</p> <ol style="list-style-type: none"> <li>1. Project Site</li> <li>2. Salwana Tatwani</li> <li>3. Jhajhroli</li> <li>4. Jheer Balla</li> <li>5. Bhohar Kawalu</li> <li>6. Bharth</li> <li>7. Korian</li> <li>8. Bhandrel</li> </ol> <p>Results for the noise quality is given in Chapter-3 of DEIA Report and EMP.</p>	Noise level monitoring locations and results are given in Chapter 3 of DEIA Report and EMP at page no. 104.
6.8	Soil Characteristic as per CPCB guidelines.	For studying the soil types and soil characteristics, 8 sampling locations were selected to assess the existing soil conditions representing various land use conditions and geological features and soil quality monitoring report is given in Chapter-3 of DEIA report and EMP.	Results of soil types and quality are given in Chapter 3 of DEIA Report and EMP at page no. 110.
6.9	Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project,	Detailed traffic study of the area along with type & frequency of the heavy vehicles and additional traffic due to proposed project has been carried out and incorporated in Chapter-3 of DEIA report and EMP.	Traffic study of the area is given in Chapter 3 of DEIA Report and EMP at page no. 145-147.



	parking arrangement etc.		
6.10	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a wildlife conservation plan shall be prepared and furnished.	Detailed description of flora and fauna found in the study area is furnished in the Chapter-3 of DEIA report and EMP.	Detailed description of flora and fauna in the study area is incorporated in Chapter 3 of DEIA Report and EMP at page no. 126.
6.11	Socio-economic status of the study area.	Socio-economic status of the study area in detail is given in Chapter-3 of DEIA report and EMP.	Socioeconomic details of the study area are given at page no. 135.
7	<b>Impact and Environment Management Plan</b>		
7.1	Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modelling shall also be	The 24-hourly average ground level concentration (GLC) values from proposed project have been computed for SPM considering topographical featured around the proposed project and applicable stability classes.  It is predicted that the maximum contribution in GLC's, with units' operation are 2.28 $\mu\text{g}/\text{m}^3$ for $\text{PM}_{10}$ at 701 m in South direction from stack.	Isopleths for the proposed project is given in Figure 4.1. of Chapter 4 of DEIA Report and EMP at page no. 151.



	provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.		
7.2	Water Quality modelling - in case of discharge in water body	Not Applicable as it is based on ZERO LIQUID DISCHARGE Technology.	--
7.3	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, option for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor cum rail transport shall be examined.	<p><b>Impacts of the transport of the raw materials and end products on Air Quality:</b> Due to the movement on road there is very little load of increase in particulate emission due to surface particles lifting by trucks and their resultant air borne by strong air currents. The air pollution in the project area is primarily due to vehicles used for transportation. However, their generation is limited to project premises and for short duration. The impact of project operations including vehicular has already been included in air quality modelling as per details given in DEIA Report and EMP.</p> <p><b>Impact of the transport of the raw materials and end products on Noise Quality:</b> Noise pollution is one of the major air pollutants that are encountered in daily life and which has direct bearing on human performance. Highway noise is the sum total of noise produced at that point of observation by all moving vehicles on the road which further depend on the type of vehicle and its mode of operational characteristics of vehicle flow &amp; the relative proportion of vehicles types in the flow. Noise levels in the study area including the project site have already been provided in the baseline study w.r.t noise.</p> <p>The project site is adjacent to Gaggal road in N direction at a distance of 410 meters and the same will be used for all its transportation needs. The vehicle traffic noise within the facility is limited to 100 m distance from the source and the same being localized will be assimilated to the atmosphere. Hence there is no foreseen appreciable impact on noise quality of the surrounding population due to transportation of materials.</p> <p><b>Traffic Management Measures</b> The following measures will be in place</p> <ul style="list-style-type: none"> <li>▪ All the incoming and outgoing vehicles will be managed by efficient security personal.</li> <li>▪ Proper Signage on road to guide the employees, drivers and the contract staff as per IRC &amp; Institute of Transportation Engineers (USA).</li> <li>▪ Road marking, parking's etc. will be clearly marked to guide the drivers.</li> <li>▪ No vehicle parking outside the project premises.</li> <li>▪ Adequate street lighting for vehicular parking during night.</li> <li>▪ No parking signage at vulnerable locations.</li> <li>▪ Overtaking prohibitory sign boards installation for both coming and going vehicles.</li> <li>▪ Limiting vehicles speed to 20 KMH within the perfect premises.</li> <li>▪ Provision will be mode for calming down the traffic within the industrial premises.</li> </ul>	--



		<ul style="list-style-type: none"> <li>Adequate turning radius will be provided for loaded vehicle to turn safely to the extent of 1.5 times the length of vehicles.</li> </ul>																																	
7.4	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) rules.	<p>Condensate/wastewater generated from different sections will be treated in condensate polishing unit of capacity 425 KLD and the treated wastewater will be used in the process as well as utility. Detailed wastewater generation from different sections and reuse of treated wastewater from Malt spirit and Craft Gin Plant is given in Chapter-2 of DEIA Report and EMP.</p> <p>Complete scheme of effluent treatment is given in Chapter-2 of DEIA Report and EMP.</p>	Complete details regarding water consumption, wastewater generation and reused is given in Chapter-2 of DEIA Report and EMP at page no. 56.																																
7.5	Details of stack emission and action plan for control of emissions to meet standards	<p><b>Details of stack emission is given below:</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Particulars</th> <th>Values</th> </tr> </thead> <tbody> <tr> <td colspan="2"><b>For Boiler (1X15 TPH)</b></td> </tr> <tr> <td>Type of Fuel</td> <td>Biomass/Wood Chips/Briquettes</td> </tr> <tr> <td>Fuel Consumption (TPD)</td> <td>80 TPD</td> </tr> <tr> <td>No. of Stacks</td> <td>1</td> </tr> <tr> <td>Height of stack (m)</td> <td>31 m</td> </tr> <tr> <td>Stack diameter</td> <td>0.9 m</td> </tr> <tr> <td>Temperature of stack gas</td> <td>443°K</td> </tr> <tr> <td>Velocity of gases</td> <td>15 m/sec</td> </tr> <tr> <td>Gas Volume (m<sup>3</sup>/Hr)</td> <td>28837 m<sup>3</sup>/Hr</td> </tr> <tr> <td>Load of Particulate Matter as PM (kg/day)</td> <td>22.464 kg/day</td> </tr> <tr> <td>PM Standard</td> <td>50 µg/m<sup>3</sup></td> </tr> <tr> <td>Emission rate of PM</td> <td>0.26 g/sec</td> </tr> <tr> <td colspan="2"><b>For DG Sets</b></td> </tr> <tr> <td>Fuel</td> <td>HSD @1000 liters</td> </tr> <tr> <td>APCD</td> <td>Adequate stack height and acoustic will be provided</td> </tr> </tbody> </table>	Particulars	Values	<b>For Boiler (1X15 TPH)</b>		Type of Fuel	Biomass/Wood Chips/Briquettes	Fuel Consumption (TPD)	80 TPD	No. of Stacks	1	Height of stack (m)	31 m	Stack diameter	0.9 m	Temperature of stack gas	443°K	Velocity of gases	15 m/sec	Gas Volume (m <sup>3</sup> /Hr)	28837 m <sup>3</sup> /Hr	Load of Particulate Matter as PM (kg/day)	22.464 kg/day	PM Standard	50 µg/m <sup>3</sup>	Emission rate of PM	0.26 g/sec	<b>For DG Sets</b>		Fuel	HSD @1000 liters	APCD	Adequate stack height and acoustic will be provided	Details of stack emissions and action plan for the same is given in Chapter 4 of DEIA Report and EMP at page no. 166.
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7.6	Measures for fugitive emission control	<p><b>Mitigation Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Emphasis will be given for proper handling and storage of chemicals, product, fuel and raw material to minimize the chances of any dust or fugitive emissions.</li> <li>▪ It will be ensured that the vehicle owners must have valid PUC Certificate.</li> <li>▪ Dust suppression on haul roads will be done at regular intervals.</li> <li>▪ Odour generation is also a problem in the distillery plant due to typical odour bearing compounds like grain skin, alcohol, fuel oils &amp; aldehydes, ketones and esters formed in the fermentation process. Flower and fruit bearing plants will be planted for good aroma around the maturation warehouses. Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment. Longer storages of any product will be avoided &amp; use of efficient biocides to control bacterial contamination</li> <li>▪ Development of greenbelt in and around the plant premises helps to obstruct the PM from fugitive emissions.</li> </ul>	--
7.7	Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.	<p><b>The industry shall generate the solid waste, which are hazardous and non-hazardous in nature, and the details of the same with regard to quantum of generation and scientific disposal is given as under:</b></p> <ul style="list-style-type: none"> <li>➤ Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> <li>➤ Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.</li> <li>➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in Multiple Effect Evaporator (MEE) to produce DDGS.</li> <li>➤ DDGS @ 19 TPD will be sold as cattle feed.</li> <li>➤ ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.</li> <li>➤ Paper waste and Glass Cullets @ 300 Kg/day will be sold to local supplier for recycling.</li> <li>➤ Used oil/spent oil @ 0.5 Kl/annum will be sent to HPSPCB authorized recyclers.</li> </ul> <p><b>The detail with regard to waste minimization/ recycle/reuse/recover techniques/Energy conservation and natural resource conservation, is given as under:</b></p> <ul style="list-style-type: none"> <li>▪ Since, there is a proposal to use the boiler ash for manufacturing of bricks, it will save the brick earth, which is natural mineral, to the tune of 15-25 %. Thus, there will be conservation of natural resources.</li> <li>▪ The soil fertility depends upon many factors including carbon and silica content in the soil. The ash to be generated shall be containing carbon as well as silica oxide which will help to enrich the soil, thereby increasing the fertility of soil and decreasing the various chemicals inputs required to improve upon the health of the soil. This will also help to conserve the natural resources.</li> <li>▪ The biodegradable component of the solid waste shall be converted into compost, which will be used manure in the plantation area, thereby reducing the addition of input of various chemical fertilisers.</li> <li>▪ The DDGS to be produced shall be very rich in protein, which will be given to Cattle feed manufacturing units to use it as additive, which will replace the use of ingredients required to maintain protein component of the field.</li> </ul>	Details regarding hazardous waste generation, their storage and utilization and management is given in Chapter 4 of DEIA Report and EMP.



		<ul style="list-style-type: none"> <li>Sludge of the ETP shall be containing micronutrients and it shall be given to farmers to use as manure and it will be a substitute of chemical fertilisers. This will help the farmers to produce organic vegetable/cereals/grains.</li> <li>The waste paper shall be given to paper mills for recycling of the same for producing writing printing paper/ craft paper.</li> <li>The used oil to be generated from DG Sets shall be given to recycling units, which will produce lubricants from the used oil.</li> </ul>																			
7.8	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	<ul style="list-style-type: none"> <li>Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> </ul>	--																		
7.9	Action plan for the green belt development plan in 33 % area. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.	<p>12,730 sqm i.e. 36.8% will be developed under greenbelt &amp; plantation. Planning schedule of greenbelt to be developed is given below:</p> <table border="1"> <thead> <tr> <th>Planning Schedule</th> <th>Approx. number of saplings</th> <th>Area (Ha)</th> <th>Width of greenbelt (along the boundary of plant)</th> <th>Fund allocation</th> </tr> </thead> <tbody> <tr> <td>1<sup>st</sup> Year</td> <td>1591</td> <td>0.6365</td> <td>10 m</td> <td rowspan="3">Funds to be allocated for greenbelt development and all miscellaneous requirement will be 32.0 lakhs as capital cost for 2 years.</td> </tr> <tr> <td>2<sup>nd</sup> Year</td> <td>1591</td> <td>0.6365</td> <td>10 m</td> </tr> <tr> <td><b>Total</b></td> <td>3182</td> <td>1.273</td> <td></td> </tr> </tbody> </table>	Planning Schedule	Approx. number of saplings	Area (Ha)	Width of greenbelt (along the boundary of plant)	Fund allocation	1 <sup>st</sup> Year	1591	0.6365	10 m	Funds to be allocated for greenbelt development and all miscellaneous requirement will be 32.0 lakhs as capital cost for 2 years.	2 <sup>nd</sup> Year	1591	0.6365	10 m	<b>Total</b>	3182	1.273		Action plan for development of greenbelt is given in Chapter 6 of DEIA Report and EMP at page no. 173-176.
Planning Schedule	Approx. number of saplings	Area (Ha)	Width of greenbelt (along the boundary of plant)	Fund allocation																	
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2 <sup>nd</sup> Year	1591	0.6365	10 m																		
<b>Total</b>	3182	1.273																			
7.10	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from the sources.	<ul style="list-style-type: none"> <li>The industry has a roof top area of 11320 sqm &amp; proposes 1 no. of storage tank of with 250 KLD capacity. Detailed calculations are provided in Chapter-3 of DEIA Report and EMP.</li> <li>Also, the industry has adopted pond in village Bohad Kwallu for ground water recharge. The Ponds get filled up during rainy days by surface runoff generated from catchment area. After desilting of ponds, 50% water will seep down to form part of ground water. The company having the detailed calculations for rain water harvesting through village ponds are given in Chapter-3 of DEIA Report and EMP.</li> </ul>	Calculation of rain water harvesting are given in Chapter 3 of DEIA Report and EMP at page no. 98.																		
8	<b>Occupational health</b>																				



8.1	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers	Details with regard to plan to ensure occupational health and safety of all contract and casual workers are given in Chapter -7 of DEIA Report and EMP.  Rs. 15.0 lacs (as capital cost) will be kept aside by project proponent for occupational health and safety under EMP budget.	Chapter 7 of DEIA Report and EMP at page no. 205.
8.2	Details of exposure specific health status evaluation of worker, If the workers is being evaluated by pre designed format, chest X- ray, Audiometry, Spirometry, Vision testing (Far & Near Vision, colour vision and any other ocular defect) ECG, during preplacement and periodical examinations give the details of the same. Details regarding last month analysed data of above-mentioned parameters as per age sex duration of exposure and department wise.	<b><u>Specific health status evaluation</u></b>  Bi-annual medical health check-up of workers will be done and the records maintained this includes:  A pre designed format, for chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision. Color vision and any other ocular defect) ECG, during pre-placement and periodical examinations, details given in Chapter-7 of EIA Report.	Chapter 7 of DEIA Report and EMP at page no. 205.
8.3	Details of existing Occupational & Safety Hazards. What are the exposure levels of above-mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the Firm has adopted to keep them within PEL so that health of the workers can be preserved.	Detail with regard to exposure levels of hazards and measures to be adopted for preservation of health of the worker is given in Chapter-7 of the DEIA Report and EMP.	Chapter 7 of DEIA Report and EMP at page no. 185.



8.4	Annual report of health status of workers with special reference to Occupational Health and Safety.	The same shall be proposed and documented after the project comes into operation.	Chapter 7 of DEIA Report and EMP at page no. 205.
9	<b>Corporate Environment Policy</b>		
9.1	Does the Firm have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	Yes, the company has a well laid Environment Policy.	Chapter 10 of DEIA Report and EMP at page no. 220.
9.2	Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.	Yes, details with regard to environment policy is given in Chapter-10 of DEIA Report and EMP.	Chapter 10 of DEIA Report and EMP at page no. 220.



<p><b>9.3</b></p>	<p>What is the hierarchical system or administrative order of the Firm to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.</p>	<p>The hierarchical system or administrative order of the firm to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions is given below:</p> <pre> graph TD     DIRECTORS[DIRECTORS] --&gt; Tania[Ms. Tania Hillman]     DIRECTORS --&gt; Aaron[Mr. Aaron Nicholas Hillman]     DIRECTORS --&gt; Brian[Mr. Brian John Megson]     DIRECTORS --&gt; Sanjeev[Mr. Sanjeev K Puri]     Tania --&gt; GM[General Manager (Works)]     Aaron --&gt; GM     Brian --&gt; GM     Sanjeev --&gt; GM     GM --&gt; Manager[Manager]     GM --&gt; HOD[HOD (Section In-)]     Manager &lt;--&gt; AC[Advisor/ Consultant]     HOD &lt;--&gt; PFS[Plant/Field Staff]     </pre>	<p>Chapter 10 of DEIA Report and EMP at page no. 221.</p>
<p><b>9.4</b></p>	<p>Does the Company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Firm and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.</p>	<p>The system of reporting of non-conformances/ violation of any Environmental Law/Policy has been incorporated in the policy.</p>	<p>Chapter 10 of DEIA Report and EMP at page no. 220.</p>
<p><b>10. Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.</b></p>			
<p><b>10.1</b></p>	<p>Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as</p>	<p>Details regarding infrastructure facilities such as sanitation, fuel, restroom will be given after the grant of EC.</p>	<p>Chapter 10 of DEIA Report and EMP at page no. 220</p>



	well as to the casual workers including truck drivers during operation phase.		
<b>11. Enterprise Social Commitment (ESC)</b>			
<b>11.1</b>	Adequate funds (at least 2.5 % of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.	DEIA Report is prepared for the conduction of public consultation & issues raised in public consultation will be incorporated at the time of submission of FEIA report.  Socio-economic activities such as education, health and family welfare, veterinary healthcare, water conservation activities, greenbelt development, promotion of sports and sustainable livelihood shall be undertaken around the project area.	Chapter 8 of DEIA Report and EMP at page no. 208.
<b>11.2</b>	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	Not Applicable. It is a new project.	--
<b>11.3</b>	'A tabular chart with index for points wise compliance of above TOR.	Compliance of TOR points are complied.	<b>Complied</b>



12. SPECIFIC TERMS OF REFERENCE																								
12.1	List of existing distillery units in the study area along with their capacity and sourcing of raw material.	No distillery plant is existing in the study area.	--																					
12.2	Number of working days of distillery unit.	The number of working days will be 320.	--																					
12.3	Details of raw materials such as molasses/grains, their source with availability.	<p>The basic raw material for the manufacturing of Malt spirits will be Grain/Barley Malt. In the present scenario, all the raw materials are easily available in the nearby area. Details of raw material are given below:</p> <p style="text-align: center;"><b>Raw Material Requirement</b></p> <table border="1"> <thead> <tr> <th>Particulars</th> <th>Quantity (TPD)</th> <th>Storage Capacity</th> <th>Source &amp; Mode of transportation of raw material</th> </tr> </thead> <tbody> <tr> <td>Grain/Barley Malt</td> <td>60</td> <td>1200 MT</td> <td>Grain/Barley shall be procured from local market and will be transported through trucks.</td> </tr> <tr> <td>CIP Chemicals</td> <td>6 Kg/day</td> <td>180 Kg</td> <td rowspan="4">These chemicals shall be procured from local market and will be transported through trucks.</td> </tr> <tr> <td>Caustic soda</td> <td>6 Kg/day</td> <td>180 Kg</td> </tr> <tr> <td>Enzyme</td> <td>12 Ltr/day</td> <td>600 Ltr.</td> </tr> <tr> <td>Yeast</td> <td>75 Kg/day</td> <td>1000Kg</td> </tr> </tbody> </table>	Particulars	Quantity (TPD)	Storage Capacity	Source & Mode of transportation of raw material	Grain/Barley Malt	60	1200 MT	Grain/Barley shall be procured from local market and will be transported through trucks.	CIP Chemicals	6 Kg/day	180 Kg	These chemicals shall be procured from local market and will be transported through trucks.	Caustic soda	6 Kg/day	180 Kg	Enzyme	12 Ltr/day	600 Ltr.	Yeast	75 Kg/day	1000Kg	Chapter 2 of DEIA Report and EMP at page no. 34.
Particulars	Quantity (TPD)	Storage Capacity	Source & Mode of transportation of raw material																					
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12.4	Details of the use of steam from the boiler.	<p><b>Boiler Details:</b> Bag filter with a stack of height of 31 m will be installed with the proposed (15 TPH) boiler to control the particulate matter emissions.</p> <p style="text-align: center;"><b>Details of use of steam from the boiler</b></p> <table border="1"> <thead> <tr> <th>S.No.</th> <th>Process/Section</th> <th>Steam Requirement</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Mash Tun</td> <td>30 TPD</td> </tr> <tr> <td>2</td> <td>Wash Still</td> <td>240 TPD</td> </tr> <tr> <td>3</td> <td>MEE</td> <td>32.8 TPD</td> </tr> <tr> <td>4</td> <td>Drier</td> <td>7.2 TPD</td> </tr> <tr> <td></td> <td>Total</td> <td>310 TPD</td> </tr> </tbody> </table>	S.No.	Process/Section	Steam Requirement	1	Mash Tun	30 TPD	2	Wash Still	240 TPD	3	MEE	32.8 TPD	4	Drier	7.2 TPD		Total	310 TPD	Chapter 2 of DEIA Report and EMP at page no. 59			
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12.5	Surface and Ground water quality around proposed spent wash storage lagoon, and compost yard.	Not applicable as spent wash will be processed along with its generation.	--																					



12.6	Plan to reduce spent wash generation within 6-8 KL/KL of alcohol produced.	Noted and complied.	Chapter 2 of DEIA Report and EMP at page no. 50.						
		<table border="1"> <thead> <tr> <th>S No.</th> <th>Spent wash to be generated from 30 KLD Malt spirit Plant</th> </tr> </thead> <tbody> <tr> <td>Spent wash to be generated</td> <td>181 KLD</td> </tr> <tr> <td></td> <td>6.03 Kl/Kl of alcohol produced</td> </tr> </tbody> </table>		S No.	Spent wash to be generated from 30 KLD Malt spirit Plant	Spent wash to be generated	181 KLD		6.03 Kl/Kl of alcohol produced
		S No.		Spent wash to be generated from 30 KLD Malt spirit Plant					
Spent wash to be generated	181 KLD								
	6.03 Kl/Kl of alcohol produced								
12.7	Proposed Effluent treatment system for molasses/grain-based distillery (spent wash, spent lees, condensate and utilities) as well as domestic sewage and scheme for achieving zero water conservation.	Wastewater generated from the industrial process will be treated in the ETP of capacity 425 KLD. The distillery will be based on “ZERO LIQUID DISCHARGE”. Detailed schemes for achieving zero water conservation are given in Chapter-2 of the DEIA Report and EMP.	Chapter 2 of DEIA Report and EMP at page no. 55.						
12.8	Proposed action to restrict fresh water consumption within 10 KL/KL of alcohol production.	Proposed plan to reduce freshwater demand proposed in Chapter 2 of DEIA Report and EMP.	Chapter 2 of DEIA Report and EMP at page no. 47-48.						
12.9	Details about capacity of spent wash holding tank, material used, design consideration. No. of piezometers to be proposed around spent wash holding tank.	<p>Details of Spent Wash Holding Tank:</p> <p>Capacity: 60 KL</p> <p>MOC: SS304,</p> <p>Type: Cylindrical Vertical Shell with Dish Top and Bottom</p>	Chapter 2 of DEIA Report and EMP at page no. 37-42.						
12.10	Details of solid waste management including management of boiler ash, yeast, etc. Details of incinerated spent wash ash generation and its disposal.	<ul style="list-style-type: none"> <li>➤ Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> <li>➤ Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.</li> <li>➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in Multiple Effect Evaporator (MEE) to produce DDGS.</li> <li>➤ DDGS @ 19 TPD will be sold as cattle feed.</li> <li>➤ ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.</li> <li>➤ Paper waste and Glass Cullets @ 300 Kg/day will be sold to local supplier for recycling.</li> </ul>	Chapter 2 of DEIA Report and EMP at page no. 58.						
12.11	Details of bio-composting yard (if applicable).	It is a grain-based malt and craft gin manufacturing unit and the wastewater to be generated shall be treated in the CPU/ETP and the entire treated wastewater shall be reused in the process/utility. Further, the spent wash to be generated shall be passed through decanter to get wet cake and thin slope.	--						



		The thin slope so produced shall be passed through MEE to increase the solid concentration. After MEE there will be two streams, out of which one will be concentrate and other will be condensate. The concentrate after mixing with wet cake shall be passed through drier to get DDGS, which will be sold out to the cattle feed manufacturing unit being rich in proteins. The condensate of MEE and drier shall be treated in the CPU/MEE and to make it fit for recycling in the process/utility. Therefore, there shall not be any bio-compost yard.	
12.12	Action plan to control odour pollution.	<ul style="list-style-type: none"> <li>➤ Adequate greenbelt will be developed &amp; maintained all around the periphery of the plant.</li> <li>➤ Flower and fruit bearing plants will be planted for good aroma around the maturation warehouses.</li> <li>➤ Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment.</li> <li>➤ Longer storages of any product/by products will be avoided &amp; use of efficient biocides to control bacterial contamination.</li> <li>➤ Regular use of eco-friendly disinfectants in the drains to avoid generation of putrefying micro-organisms.</li> </ul>	--
12.13	Arrangements for installation of continuous online monitoring system (24x7 monitoring device)	Noted and will be complied after the grant of EC.	--
12.14	If Sugar and distillery will have integrated effluent treatment facilities. Details regarding the same.	Noted and Complied in Chapter 2 of DEIA Report and EMP.	--
12.15	The project proponent shall obtain and submit NOC from State Biodiversity Board.  The project proponent shall obtain 118 permissions before submission the case for EC.	Noted & will be complied in Final EIA report.	--



# EXECUTIVE SUMMARY



**I. Project Name and Location**

M/s Angus Dundee India Pvt. Ltd. was established in the year 2012, for carrying out the business of imports and redistributes bulk malt spirits and assorted bottled liquors to airport duty-free shops and select domestic markets. This company is also doing the business of bottling of blended scotch whisky namely “Macroys” in India, which is now available in 10 Indian States. The company has proposal to setup a new distillery unit for production of 30 KLD Malt Spirit Plant and 2 KLD Craft Gin Plant along with Pilot Plant for fermentation as well as maturation and bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village- Salol, Tehsil & Distt. Kangra, Himachal Pradesh.

**II. Site Details:**

The proposed project site is located in the revenue estate of Mohal Parei Village- Salol, Tehsil & Distt. Kangra, Himachal Pradesh is having its global coordinates as latitude 32°7'13.64"N 32°7'14.35"N 32°7'10.61"N 32°7'7.53"N 32°7'9.09"N 32°7'11.15"N & longitude 76°10'46.34"E 76°10'49.24"E 76°10'53.00"E 76°10'47.91"E 76°10'41.83"E 76°10'42.70"E. Nearest City Kangra, 8.43 Km in North East direction & Dharamshala, 16.72 km in North direction from the project site. Nearest railway station is Kangra, approx. 8.52 km in South East direction from the project site and nearest airport is Kangra (Gaggal), Airport approx. 9.05 km in North East direction from the project site. No National Parks/ Wildlife Sanctuaries/ Biosphere Reserves/ Reserved Forests exist within 10 km radius of project site.

**III. Products & Capacities**

The production details will be given in Table I.

**Table I  
Details of Proposed Products**

Particulars	Units	Capacity
<b>Products</b>		
Malt Spirit	KLD	30
IMFL Bottling	Cases/day	1000
Craft Gin	KLD	2
<b>Byproducts</b>		
DWGS	TPD	65
CO <sub>2</sub>	TPD	7

**IV. Cost of the project:** Details of the cost of the project is given in Table II.

**Table II**

**Project Cost Breakup**

Land, Building, Plant & Machinery	Oak Casks for maturation of spirit	Total Cost of the project
Rs. 151 Cr.	Rs. 146 Cr.	Rs. 297 Cr.



## V. Raw Material Requirement

The basic raw material for the manufacturing of Malt spirits will be Grain/Barley Malt. In the present scenario, all the raw materials are easily available in the nearby area. Details of raw material are given in Table III.

**Table III**  
**Raw Material Requirement**

S. No.	Particulars	Total Requirement	Storage	Source & Mode of transportation
1.	Grain/Barley Malt	60 TPD	1200 MT	Grain/Barley shall be procured from local market and will be transported through trucks.
2.	CIP Chemicals	6 Kg/day	180 Kg	These chemicals shall be procured from local market and will be transported through trucks.
3.	Caustic soda	6 Kg/day	180 Kg	
4.	Enzyme	12 liters/day	600 liters	

## VI. Water Requirement

Total water consumption for the grain-based distillery will be 900 KLPD which will be sourced from groundwater.

## VII. Power Requirement

The power requirement will be 1.5 MW, which will be sourced from Himachal Pradesh State Electricity Board.

## VIII. Manpower Requirement

The proposed project shall generate direct employment to 100 persons. Details of the same is given in Table IV.

**Table IV**  
**Details of Manpower Requirement**

S. No.	Description	Nos.
i)	Skilled Workers	45
ii)	Unskilled Workers	53
iii)	IT professionals	2
	<b>Total</b>	<b>100</b>



Process flow diagrams for Malt spirit and Craft gin plant is given in Figure I and II.

Figure I

Malt Spirit Process Flow Diagram

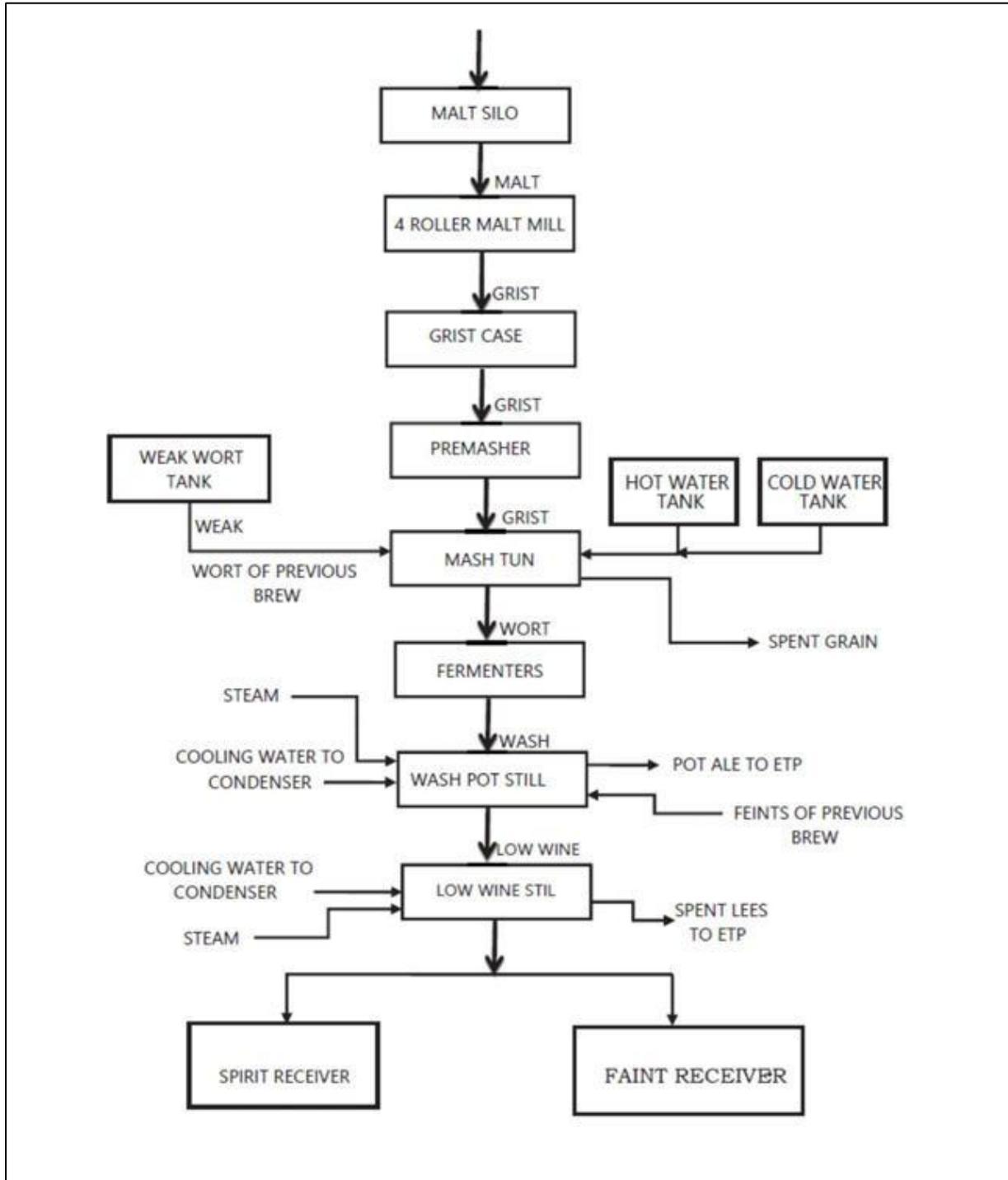
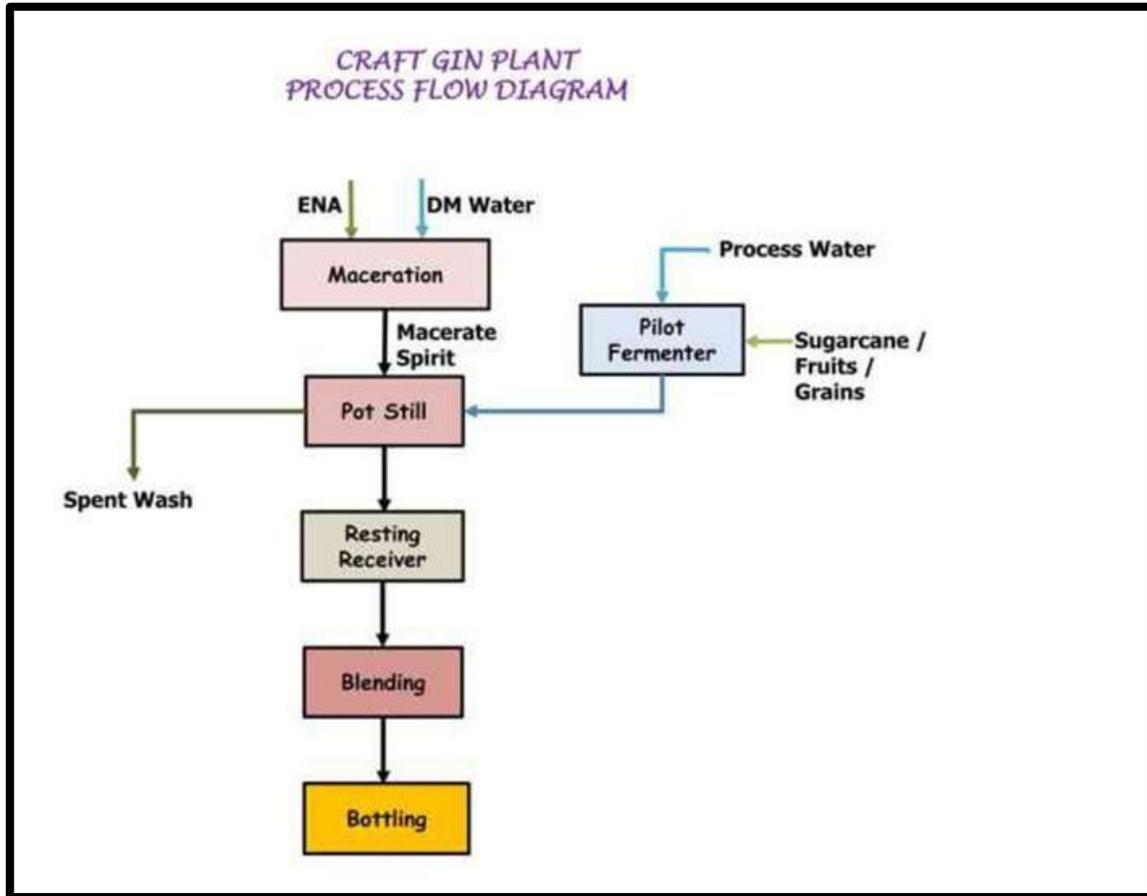




Figure II

Craft Gin Process Flow Diagram



IX.Environmental Baseline Study

Various Environmental factors are existing in the study area which are liable to be affected by the activities have been assessed both quantitatively and qualitatively. Baseline environmental data generation of study area was carried out during the period 15<sup>th</sup> March to 15<sup>th</sup> June 2025.

**a) Ambient Air Quality**

The PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, CO and O<sub>3</sub> levels were monitored at eight locations in the study area for three months. The P98 levels of criteria pollutants are as follows: PM<sub>2.5</sub> is 35.2 µg/m<sup>3</sup>, PM<sub>10</sub> is 70.4 µg /m<sup>3</sup>, SO<sub>2</sub> is 5.9 µg/m<sup>3</sup>, NO<sub>2</sub> is 12.2 µg/m<sup>3</sup>, CO is 0.55 mg/ m<sup>3</sup> and O<sub>3</sub> is 25.95 µg/m<sup>3</sup>. The baseline air quality level is within the National Ambient Air Quality Standards prescribed for industrial, residential, rural & other area and also satisfies the air quality index (AQI) w.r.t. health bracket for all the monitoring. (Standards are 60,



100, 80, 80  $\mu\text{g}/\text{m}^3$ , 4.0  $\text{mg}/\text{m}^3$  and 100  $\mu\text{g}/\text{m}^3$  for  $\text{PM}_{2.5}$ ,  $\text{PM}_{10}$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ , CO and  $\text{O}_3$  respectively). Due to better pollution abatement facilities, proposed project will have insignificant impact on existing air quality.

#### **b) Water Quality**

Eight groundwater samples and two surface water samples were collected from the study area for physical, chemical and bacteriological analysis. The groundwater quality of the study is satisfactory. No physical or bacterial contamination was found in the ground water samples. Since, no wastewater will be discharged on land, water quality is not likely to be impacted.

#### **c) Noise Environment**

Ambient noise levels were monitored at 8 locations in the study area. Noise levels at the Project site were found to be 61.6 dB (A) in day time and 32.4 dB (A) at night. The highest levels were observed at Project Site. The baseline noise levels are well within the National Standards.

#### **d) Soil Quality**

Eight soil samples were collected from the study area and analyzed. The texture of soil is sandy loam. The organic matter, nitrogen, potassium and phosphorus content of the soil are moderate. The pH of all the soil samples is within the acceptable range. No impact on soil will be there for proposed plant as no waste will be discharged on land.

#### **e) Biological environment**

Ecological data has been collected through secondary sources and by site visits. No endangered species of plants and animals are found in the study area, so no impact on ecological environment.

#### **f) Socioeconomic Condition**

Socioeconomic status has been studied through secondary sources and by site visits. The social requirements identified include the promotion of educational institutions for villagers, as well as initiatives focused on environmental sustainability. Additionally, special attention is given to the healthcare needs of senior citizens, infants, and pregnant women. Community centers, recreation facilities etc. will also be developed as part of social responsibility.



## **XI Measures on mitigating the impact on the environment and mode of discharge or disposal**

The purpose of mitigation measures is to avoid, reduce or minimize adverse impacts on the environment. To minimize & control the emissions from boiler, the exhaust after suction through suction hood will be passed through spark arrestor, air cooling and finally bag filters before its discharge to atmosphere. DG set will be fitted with a canopy and adequate stack to take care of noise and particulate & gaseous emission.

- Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.
- MSW @ 25 Kg/day will be collected, segregated using collection bins and the biodegradable component will be converted into compost. This compost shall be used in the plantation area as manure.
- Distillers Dried Grains with Solubles (DDGS) @ 19 TPD to be produced shall be very rich in protein, which will be given to Cattle feed manufacturing units to use it as additive, which will replace the use of ingredients required to maintain protein component of the field.
- ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.
- Distillers Wet Grains with Solubles (DWGS) @ 65 TPD will be mixed with Spent Wash/Thin Slope in MEE to make DDGS.
- Paper waste and glass culets @ 300 Kg/day will be sold to local supplier for recycling.
- Used oil/spent oil @ 0.5 Kl/annum will be sent to HPSPCB authorized recyclers.
- The industry will install Air Pollution Control Devices (APCD), ensuring that emissions will be effectively collected and the concentration of air pollutants in its emissions complies with the emission standards set by the board. Additionally, the unit will incorporate advanced technologies to further optimize emission control, reduce environmental impact, and enhance compliance with regulatory requirements.

## **XII Likely impact of the project on air, water, land, flora-fauna and nearby population**

No, likely impact of the project site on the air, water, land, flora-fauna and nearby population will be seen with the proposed project coming into being.



### XIII Environment Monitoring Programme

The monitoring of environmental parameters like air, water, noise, soil, and meteorological data and performance of pollution control facilities and safety measures in the plant are vital for Environmental management of any industrial project.

Therefore, the company shall create environmental monitoring facilities by the environmental and safety department to monitor air and water pollutants as per the guidelines. Moreover, air, noise, drinking water and soil shall be monitored by outside agencies authorized by Pollution Control Board at regular frequencies. This department shall also carry out periodically check of fire and safety equipment.

### XIV Green Belt Development

- 12,730 sqm i.e., 36.8% of total area will be developed as greenbelt.
- Native plant species will be planted in consultation with local DFO.
- Greenbelt will be developed as per Central Pollution Control Board (CPCB) guidelines.
- Greenbelt development along with the road & plant boundary will attenuate noise level, arrest dust and improve the environment in surroundings.
- Greenbelt & plantation development will begin simultaneously with the initiation of construction activities of the proposed unit. Name of plant species to be planted, no. of trees and per unit cost are given in Table V.

**Table V  
Greenbelt Development**

S. No.	Common Name	Biological Name	No. of trees	Per Unit cost (Rs.)	Total Cost (Rs.)
1.	Arjun	<i>Terminalia arjuna</i>	797	1005.68	801526.96
2.	Baheda	<i>Terminalia bellirica</i>	795	1005.68	799515.6
3.	Amla	<i>Phyllanthus emblica</i>	795	1005.68	799515.6
4	Kachnar	<i>Bauhinia variegata</i>	795	1005.68	799515.6
<b>TOTAL</b>			<b>3182</b>		<b>3,200,073.76</b>



**Table VI**

**Planning Schedule of Green Belt**

Planning Schedule	Approx. number of saplings	Area (Ha)	Width of greenbelt (along the boundary of plant)	Fund allocation
1 <sup>st</sup> Year	1591	0.6365	10 m	Funds to be allocated for greenbelt development and all miscellaneous requirement will be 32.0 lakhs as capital cost for 2 years.
2 <sup>nd</sup> Year	1591	0.6365	10 m	
<b>Total</b>	3182	1.273		

- Funds to be allocated for greenbelt development and all miscellaneous requirement will be **32.0 lakhs as capital cost for 2 years.**

**XV Environmental Management Plan (EMP)**

The total capital cost & recurring cost of Environmental Management plan and its Budget measure shall be Rs. 412.0 lakhs & 94.0 lakhs respectively.



# **DRAFT ENVIRONMENTAL IMPACT ASSESMENT REPORT**



## CHAPTER-1

### INTRODUCTION

#### 1.0 Purpose of the report

As per the EIA Notification dated 14<sup>th</sup> September 2006, as amended from time to time, it is mandatory to obtain the Environmental Clearance for any new industry or the expansion of the existing industry from Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India, New Delhi/ State Level Environmental Impact Assessment Authority for which EIA study is required to be conducted as per the Terms of Reference issued by Competent Authority.

- ✓ *The purpose of the report is to identify environmental aspects & impacts arising out from the proposed project & to propose mitigation measures in the form of an EIA report.*
- ✓ *It also allows the public and other stakeholders to present their views and inputs on the proposed development.*
- ✓ *The primary aim of EIA is to promote sustainable development by ensuring that proposed projects are designed & implemented to minimize negative impacts on the environment and maximize positive benefits for the local community and the wider society.*

#### 1.1 Identification of Project and Project Proponent

M/s Angus Dundee India Private Limited has proposal to setup a new distillery unit for production of 30 KLD Malt Spirit Plant and 2 KLD Craft Gin Plant along with Pilot Plant for fermentation as well as maturation and bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village-Salol, Tehsil & Distt. Kangra, Himachal Pradesh.

- The total project area is 34,529 sqm, out of which 12730 sqm i.e., 36.8% of total area will be developed under greenbelt & plantation.
- The proposed project also contains existing infrastructure i.e.,
  - ❖ Cold store building,
  - ❖ ETP Tank, Admin Block,
  - ❖ Semi Furnished Structure,
  - ❖ 1 lakh Ltr. RCC water Tank,
  - ❖ Poly-shed, Bore well.



- As per EIA Notification dated 14th Sept., 2006 and its subsequent amendments, the project falls under Category “B”, Project or Activity ‘5(g)’ Distilleries (Non-Molasses based distilleries ≤ 200 KLPD).

### 1.1.2 Project Proponent *(Terms of Reference No. 2.2)*

M/s Angus Dundee India Private Limited, has been incorporated in the year 2012, & details of the project proponent is given in Table 1.1

**Table 1.1**

#### **Details of project proponent**

<b>PARTICULARS</b>	<b>DESCRIPTION</b>
Name of Company	<b>M/s Angus Dundee India Private Limited</b>
Project site Location	Mohal Parei, Village Salol, Tehsil & District- Kangra, Himachal Pradesh
<b>MANAGEMENT:</b>	
Ms. Tania Hillman	
Mr. Aaron Nicholas Hillman	
Mr. Brian John Megson	
Mr. Sanjeev K Puri	
Authorised Signatory	Mr. Hasan Bakhtawar
Designation	Chief Operating Officer
Email ID	Email ID: angushp2025@gmail.com
Phone no.	Phone no.: 9810018896

## **1.2 Brief Description:**

### **1.2.1 Nature of the project:**

Malt spirit and Craft Gin will be produced through distillation of fermented grains. Raw materials shall be sourced from nearby area for production of Malt spirit and Craft Gin.

### **1.2.2 Size/ Capacity of the Plant**

The industry intends to establish a distillery unit for production of 30 KLD of Malt Spirit, 2 KLD of Craft Gin and bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village-Salol, Tehsil and District Kangra, Himachal Pradesh.



The land area, in which proposed unit is to be established, measuring 34,529 Sqm has been purchased from Mr. Madan Lal Kapoor S/o Ranjha Ram vide agreement to sell executed between Mr. Madan Lal Kapoor S/o Ranjha Ram and M/s Angus Dundee India Private Limited on 28.10.2024.

In the agreement to sell, it has been mentioned as under:

- a) In para (c) of this agreement it has been mentioned that this land was mortgaged by Shri Ranjha Ram to J&K Bank, Dharamshala as a security against a loan facility availed by M/s Great Himalayan Farm Fresh. Shri Ranjha Ram was the sole proprietor of the said firm.
- b) In schedule I of this agreement it has been mentioned that there is an existing industrial shed and machinery of the unit namely M/s Great Himalayan Farm Fresh.

Now, this land is under the title of M/s Angus Dundee India Private Limited and this unit has already taken possession of the land.

The proposed configuration of the plant capacity is as follows;

**Table 1.2**  
**Size / Capacity of the Industry**

S. No.	Particular	Units	Capacity
<b>Proposed Products</b>			
1.	Malt Spirit	<b>KLD</b>	30
2.	IMFL Bottling	<b>Cases/day</b>	1000
3.	Craft Gin	<b>KLD</b>	2
<b>By-Products</b>			
1.	DWGS	<b>TPD</b>	65
2.	CO <sub>2</sub>	<b>TPD</b>	7
<b>Raw Materials</b>			
1.	Grain/Barley Malt	<b>TPD</b>	60
2.	CIP Chemicals	<b>Kg/day</b>	6
3.	Caustic soda	<b>Kg/day</b>	6
4.	Enzyme	<b>ltr/day</b>	12

### 1.2.3 Location of the project

The proposed project site is located at Mohal Parei, Village Salol, Tehsil and District Kangra, Himachal Pradesh. The nearest city is Kangra, 8.43 km (NE), while Dharamshala 16.72 km (N). The closest railway



station is Kangra Railway Station, 8.52 km (SE) from the site. Air connectivity is available via Kangra (Gaggal) Airport, 9.05 km (NE) from the site. Also, there are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, or Reserved Forests within a 10 km radius of the project location.

**Table-1.3**  
**Project Co-ordinates**

POINT	LATITUDE	LONGITUDE
A	32°7'13.64"N	76°10'46.34"E
B	32°7'14.35"N	76°10'49.24"E
C	32°7'10.61"N	76°10'53.00"E
D	32°7'7.53"N	76°10'47.91"E
E	32°7'9.09"N	76°10'41.83"E
F	32°7'11.15"N	76°10'42.70"E
<b>ELEVATION</b> 630 m		
<b>Source</b> (Google Earth)		

**Table- 1.4**  
**Salient Features of the Project and Environmental Settings**

S. No.	Particulars	Details																
<b>A. Location details</b>																		
1.	Location																	
a	Village/ Town/Plot No.	Mohal Parei Village- Salol																
b	Tehsil	Kangra																
c	District	Kangra																
d	State	Himachal Pradesh																
2.	Toposheet No.	I43W4, I43W8																
3.	Project Area	34,529 sqm																
<b>C.</b>	<b>Production Capacity</b>	<table border="1"> <thead> <tr> <th>Particulars</th> <th>Capacity</th> </tr> </thead> <tbody> <tr> <td colspan="2"><b>Product</b></td> </tr> <tr> <td>Malt Spirit Plant</td> <td>30 KLPD</td> </tr> <tr> <td>IMFL Bottling Plant</td> <td>1000 cases/day</td> </tr> <tr> <td>Craft Gin Plant</td> <td>2 KLPD</td> </tr> <tr> <td colspan="2"><b>By-products</b></td> </tr> <tr> <td>DWGS</td> <td>65TPD</td> </tr> <tr> <td>CO<sub>2</sub></td> <td>7TPD</td> </tr> </tbody> </table>	Particulars	Capacity	<b>Product</b>		Malt Spirit Plant	30 KLPD	IMFL Bottling Plant	1000 cases/day	Craft Gin Plant	2 KLPD	<b>By-products</b>		DWGS	65TPD	CO <sub>2</sub>	7TPD
		Particulars	Capacity															
		<b>Product</b>																
		Malt Spirit Plant	30 KLPD															
		IMFL Bottling Plant	1000 cases/day															
		Craft Gin Plant	2 KLPD															
		<b>By-products</b>																
DWGS	65TPD																	
CO <sub>2</sub>	7TPD																	
<b>D.</b>	<b>Environmental settings</b>																	



1.	Nearest Village	Salol
2.	Nearest City	Kangra, 8.43 Km in North East direction from the project site.  Dharamshala, 16.72 km in North direction from the project site.
3.	National Highway/State Highway/ Express Highway	NH-503 Jawalamukhi Kangra ji road is approx. 8.41 km in E direction from the project site.  SH-23, approx. 4.06 Km in South direction from the project site.
4.	Nearest Railway Station	Kangra, approx. 8.52 km in South East direction from the project site.
5.	Nearest Airport	<b>Kangra (Gaggal):</b> - Airport approx. 9.05 km in North East direction from the project site.
6.	National Parks/ Wild Life Sanctuaries/ Biosphere Reserves within 5 km radius	Pong Dam Wildlife Sanctuary is located approx. 10.7 Km, SW from the project site.
7.	Nearest Police Station	<b>Kangra</b> , 9.44 Km, in East direction from the project site
8.	Nearest Fire Station	<b>Kangra</b> , 9.97 Km, in East direction from the project site  <b>Jawali</b> , 16.69 Km, in North West direction from the project site
9.	Nearest Schools & Colleges	Govt. Primary School Salol, 1.92 Km, E Govt. Sen. Sec. School Salol, 1.98 Km, E SD Model School Dhangoti, 4.35 Km, SW DAV Public School Manai, 3.2 Km, W Govt. Primary School Diber, 5.25 Km, NW Govt. Degree college Lanj, 3.80 Km, SW MCM DAV college, 8.8 Km, E Sharan college of Education for women, 11.0 Km, E Atal Bihari Vajpayee Govt. degree college Takipur, 10.42 Km, SE
10.	Nearest Hospitals	Civil Hospital Kangra, 8.92 Km, E Shree Balaji Hospital, 9.49 Km, E Fortis Hospital, 9.62 Km, E Tanda Hospital, 11.35 Km, SE
11.	Nearest Archaeological site	Kangra Fort, 7.86 Km, SE Archaeological museum Kangra Fort, 8 Km, SE
12.	Reserved / Protected Forest within	Raltung Protected Forest, 8.44 Km, NW



	10 km radius (Boundary to boundary distance)	Ramgarh Kurala Protected Forest, 3.69 Km, N Lanj Protected Forest, 1.75 Km, S Pandhwar Protected Forest, 4.21 Km, NW Baldoa Reserved Forest, 8.51 Km, W Jainimasror Reserved Forest, 7.22 Km, SW
13.	Nearest water bodies	Baner Khad, 6.91 Km, East Ghaj Khad, 0.54 Km, W Chambi Khad, 6.22 Km, N Manuni Khad, 8.43 Km, E Pong Dam, 10.7 Km, SW
9.	Water Requirement & Source	900 KLPD Ground water: Tube-well
10.	Seismic Zone	Seismic <b>Zone – V</b>
<b>D.</b>	<b>COST DETAILS</b>	
1.	Capital Cost of the project	<b>Rs 297 Cr.</b>
2.	Total cost for Environmental Management Plan (EMP)	<b>Capital cost: Rs 4.12 Cr</b> <b>Recurring cost: Rs 0.94 Cr.</b>

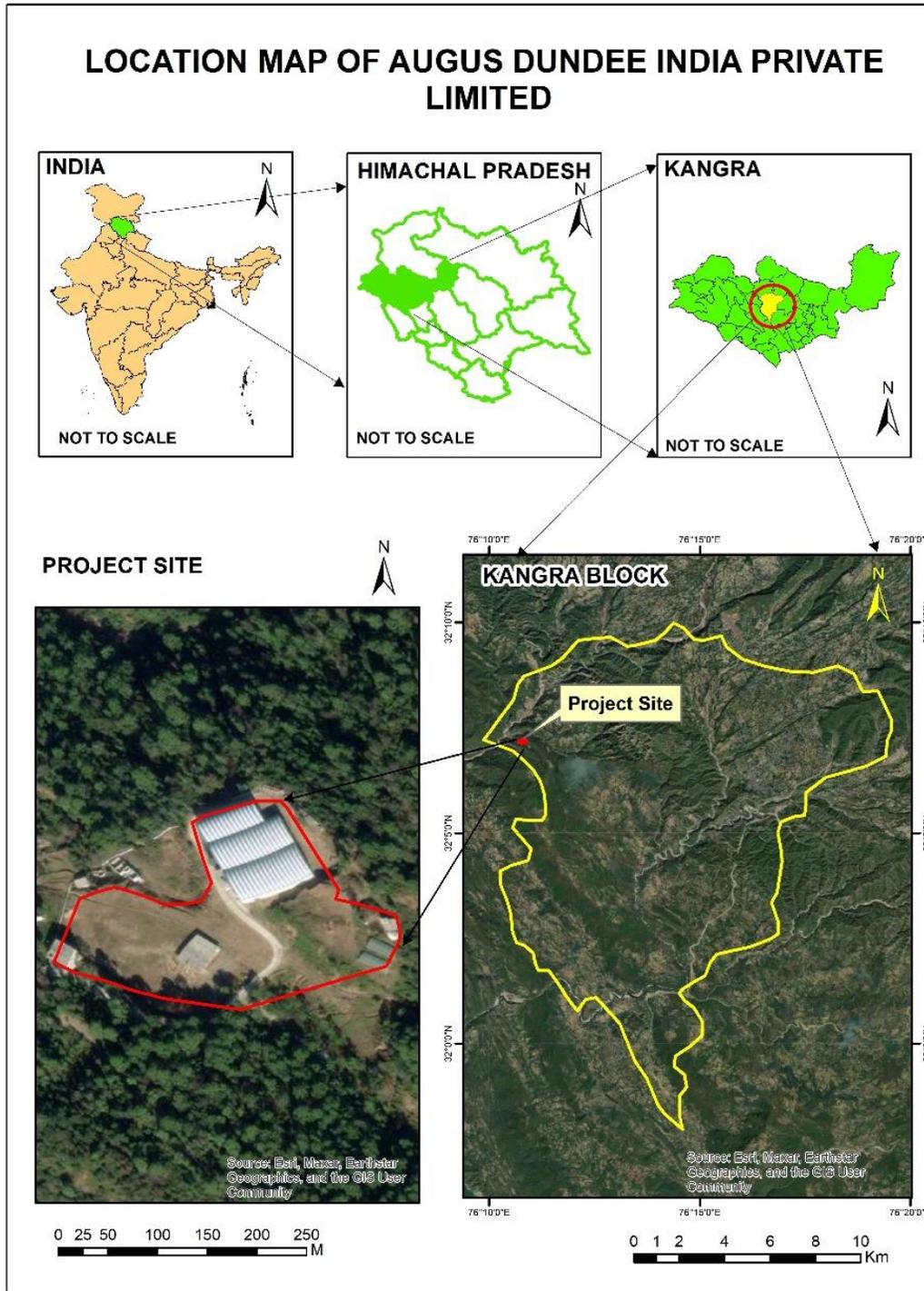
**Table 1.5**

**Applicability of General Conditions**

S. No.	GENERAL CONDITIONS	REPLY
1.	Protected Areas notified under the Wild Life (Protection) Act, 1972	<b>Not applicable</b> , Pong Dam Wildlife Sanctuary is located approx. 10.7 Km, SW from the project site.
2.	Critically Polluted areas as notified by the Central Pollution Control Board from time to time.	<b>Not applicable</b> , the project does not fall in Critical Polluted Area.
3.	Eco-sensitive areas notified by MoEF&CC and H.P. Govt.	<b>Not applicable</b> , as there is no eco-sensitive area falls within 10 km or project site.
4.	Inter-State boundaries and international boundaries	<b>Not applicable</b> , as there is no Inter-State boundary or international boundary falls within 10 km or project site.



**Figure 1.1**  
**Location of the Project Site**

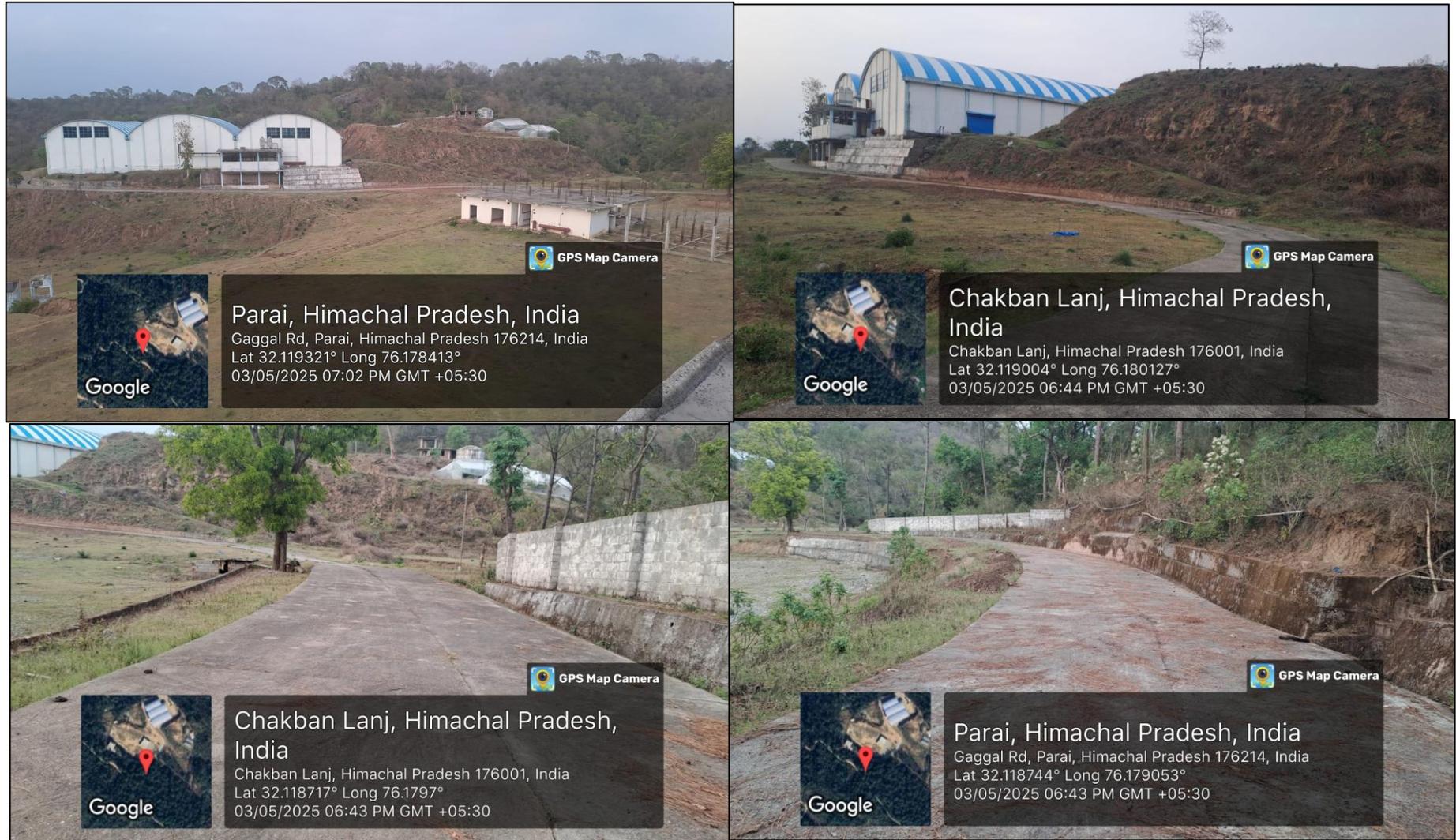


*(Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community 12/05/2025)*





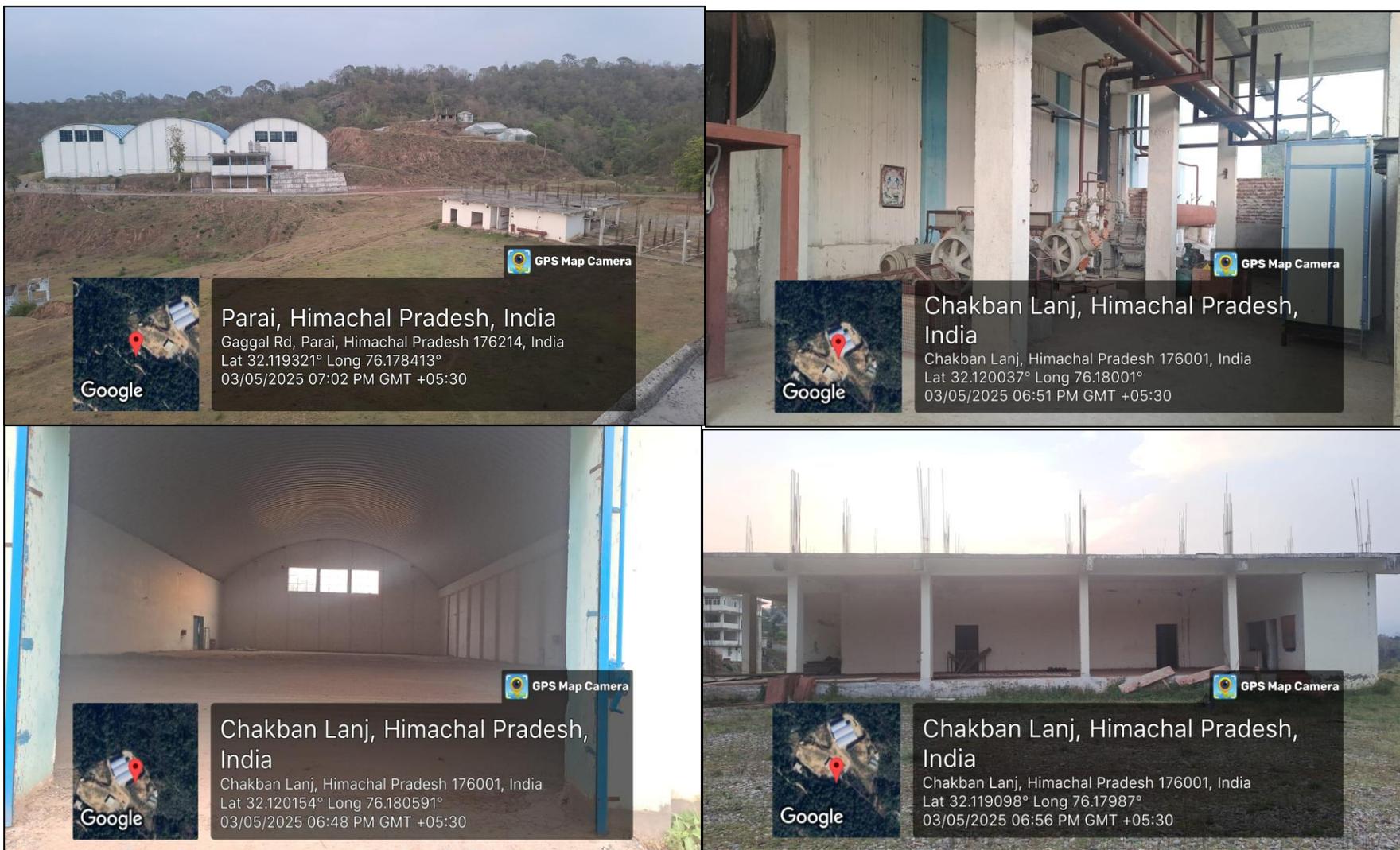
Figure 1.3 Site Photographs



(Source: Site Visit)



Fig. 1.4 Existing Infrastructure and Equipment



(Source: Site Visit)



### **1.3 Importance to the Country and Region**

India stands as one of the largest producers of alcohol globally, contributing to approximately 65% of regional production and nearly 7% of imports. However, the precise extent of unrecorded alcohol production remains unclear. During the 2006–2007 period, an estimated 4 million liters of alcohol were produced in India. The bulk of this alcohol is derived from sugarcane molasses, with around 52% of it being intended for potable purposes. Among the dominant alcohol products, Indian-made foreign liquor and country liquor together account for about 60 to 70% of the total beverage alcohol consumed. Additionally, traditional home-brewed beverages contribute significantly to unrecorded alcohol consumption.

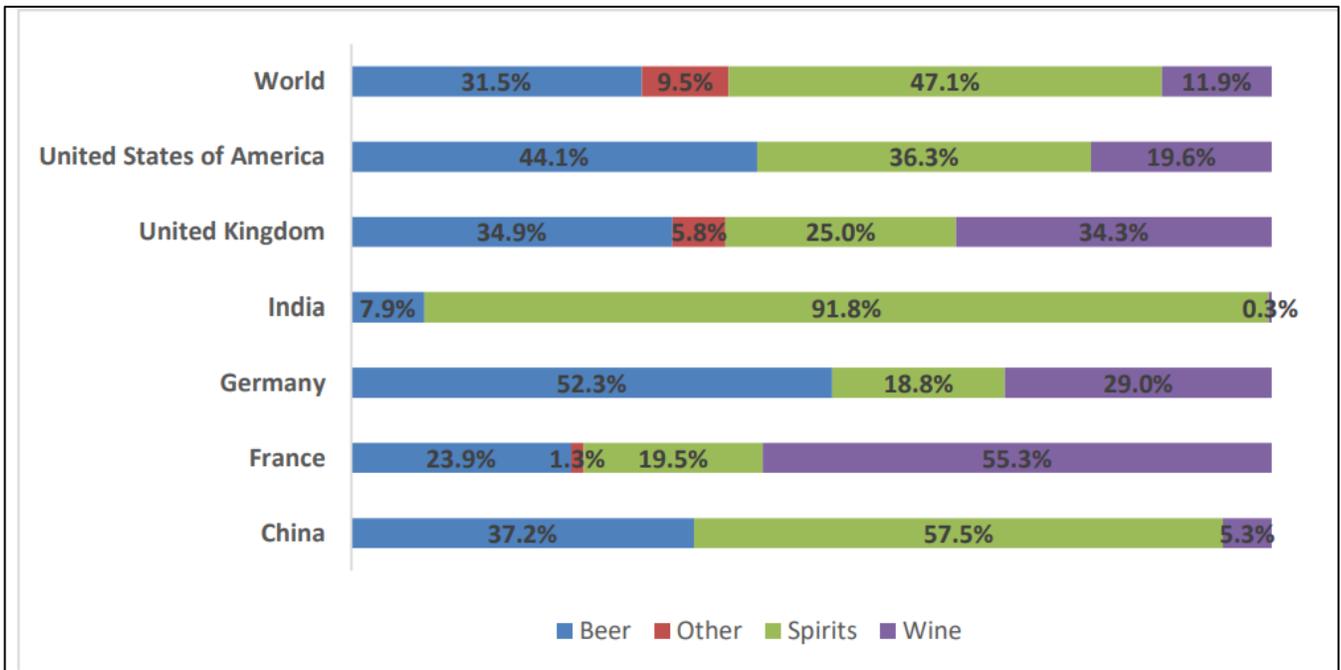
Alcohol production, distribution, and sales in India are primarily governed by state laws, with each state having its own complex excise duty structure. These varying regulations lead to discrepancies in production levels, often resulting in alcohol being produced in excess of the state's legal limits. Furthermore, the taxation on imported alcohol can range from 100% to 500%, depending on the state. The alcohol industry has been a major contributor to state revenues, generating an estimated ₹216 billion in 2003–2004, which accounted for nearly 90% of the state's excise duties. This revenue has become a crucial source of income for state governments.

Despite the significant role of alcohol in government revenue generation, there is little evidence to suggest that higher taxes have influenced drinking habits. In fact, the consumption of alcohol has continued to rise, indicating that price elasticity plays a minimal role in curbing consumption. Policy approaches so far have primarily focused on increasing taxes rather than addressing public health concerns related to alcohol use. This lack of a public health perspective in alcohol regulation has resulted in limited efforts to control the negative social and health impacts of alcohol consumption, which remains largely neglected in the formulation of alcohol-related policies and programs.

The Indian alco-bev market is the third biggest in the world after China and Russia. It is also the 2nd biggest spirits market in the world. Indian alco-beverage market is forecast to expand at a CAGR of ~11.3% by value ~6.1% by volume during the period FY 2023 to FY 2028. The Indian market is dominated by Indian made foreign liquor (IMFL) which is estimated to contribute close to 69% in value to the overall market in FY 2023.

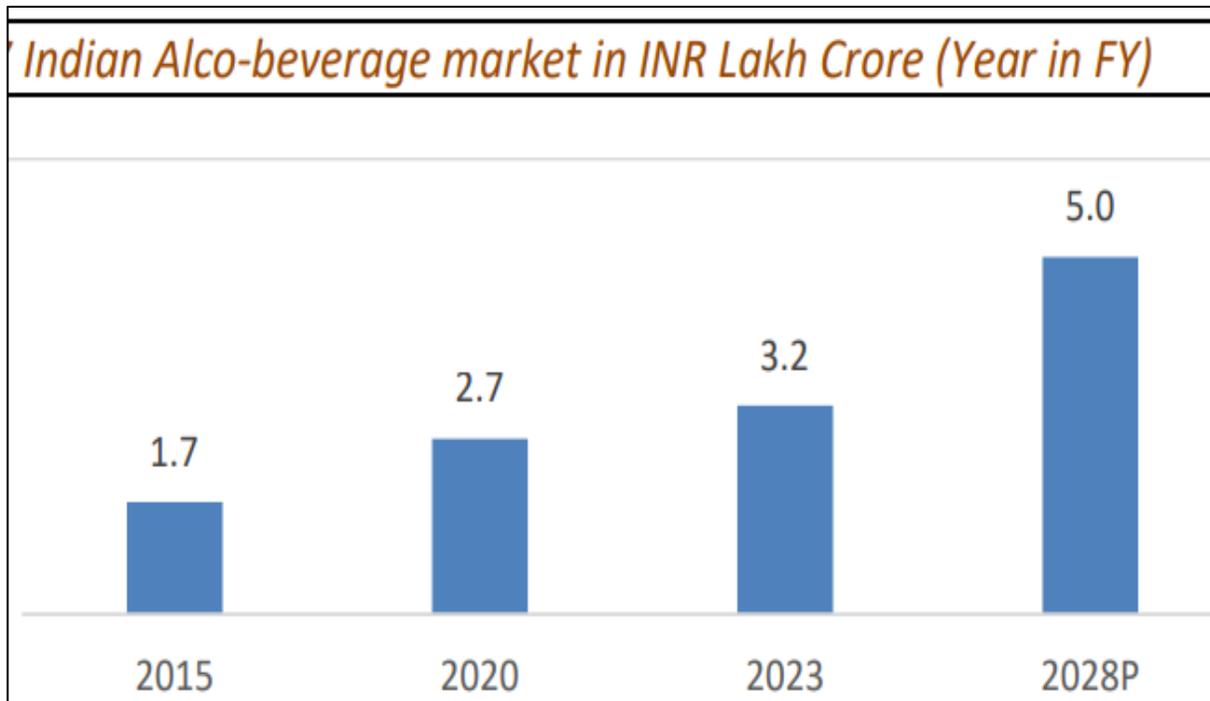


Figure 1.5 Rise in Demand



(Source: Technopak Analysis)

Fig 1.6: Indian Alco-Beverage market size in INR Lakh Crore (FY)





The recorded alcohol per capita (APC) for India in CY 2023 was estimated at 3.2 litres per annum against the world average of 5.0 litres. Indian alco-beverage market scale was around 3.2 billion litres of pure alcohol in CY 2023. Distilled beverages accounted for nearly 92.0% of the overall pure alcohol consumption in India. According to ~2.1% by volume market share estimate of alco beverage market in India for the years CY 2023 to CY 2028, there is an increase in number of people who have achieved legal drinking age and the number of women who consume alcohol.

*(Source: <https://monikaalcobev.com/storage/1287/Industry-Report-dated-April-8,-2025.pdf>, Technopak Analysis)*

The proposed project aims to produce high-quality malt spirit, including 30 KLD of malt spirit, with some aged for one year for the Indian Made Foreign Liquor (IMFL) industry and some matured for over three years to be bottled as premium Indian single malt whisky for domestic and international markets. The facility will also house a 2 KLD craft gin plant and a pilot unit for small-batch development.

This project will generate significant socio-economic benefits, including direct and indirect employment, a stable market for local barley farmers, and increased tax revenues for the state. It will contribute to regional infrastructure development, promote local entrepreneurship, and support tourism through a visitor center, further boosting the economy and improving the standard of living for residents.

#### **a) Demand and Supply gap:**

The malt spirit produced by this facility is strategically positioned to cater to the growing demand in the premium segment of the Indian Made Foreign Liquor (IMFL) market, which is projected to reach approximately 339 million cases by the last quarter of 2024. Of this, whisky is expected to account for nearly 62%, underscoring a dominant and sustained consumer preference for whisky-based products. Despite this rising demand, there remains a significant supply gap in the availability of high-quality, domestically produced malt spirit—particularly for premium blends and single malt whiskies. The key drivers fueling this growth include increasing disposable incomes, rapid urbanization, evolving consumer preferences, and a marked shift towards premium and lifestyle-oriented alcoholic beverages. This project aims to bridge the supply-demand gap by offering a consistent, high-quality supply of matured malt spirit for blending and single malt bottling, thereby supporting the needs of both domestic IMFL manufacturers and the growing export market.



## **b) Imports vs. Indigenous production**

In addition to the various incentives and benefits extended by State and Local Governments to promote industrial development, indigenous alcohol production continues to hold a strong strategic and economic advantage. Import duties on alcoholic beverages in India currently range from 150% to 500%, creating a significant cost barrier for foreign products—a trend that is expected to persist in the foreseeable future. Even in the event of moderate reductions in import duties or taxes, locally produced alcoholic beverages will retain a strong cost advantage, allowing for more competitive pricing in the market. Historical market data shows that price sensitivity is particularly acute in the low- to mid-range whisky segments, where a modest 10% price increase can result in a sharp decline of up to 50% in sales volume. This sensitivity further reinforces the importance of cost-effective domestic production. Consequently, the perceived threat from imported spirits remains negligible, and the future of the Indian alcohol market is expected to be driven predominantly by indigenous production, which offers greater pricing flexibility, supply chain control, and alignment with consumer preferences.

## **c) Export Possibility**

Apart from domestic consumption Indian single malt whiskey is being favored worldwide. America being the second largest consumer of whiskey in the world and acceptance of Indian single malt whiskey, the world over is an indicator of potential of export and foreign exchange in return. India is in a unique position to supply cost effective and quality whiskey to the world market.

## **d) Domestic/Export Markets**

### **Domestic Market:**

- 1. Growing Demand:** The Indian Made Foreign Liquor (IMFL) and Country Liquor (CL) market is growing rapidly, driven by increasing demand from a young and urbanizing population.
- 2. Increasing Preference for Premium Brands:** Consumers are increasingly preferring premium and semi-premium IMFL brands, driving growth in this segment. In India's the domestic consumption of whiskey is estimated as 1.5 million liters or 193 million cases per annum which is only 50 % of the estimated demand.
- 3. Government Initiatives:** The Indian government's initiatives, such as the "Make in India" program, are promoting the growth of the domestic liquor industry.
- 4. Key States:** Key states for IMFL and CL sales include Maharashtra, Delhi, Uttar Pradesh, and Karnataka.



**Export Market:**

- 1. Growing Global Demand:** The global demand for IMFL and CL products is growing, driven by increasing demand from countries like the UAE, Singapore, and South Africa.
- 2. Competitive Advantage:** India has a competitive advantage in the production of IMFL and CL products, due to its large grain reserves, skilled workforce, and favorable climate.
- 3. Target Markets:** Target export markets include the Middle East, Africa, and South East Asia.
- 4. Key Products:** Key products for export include IMFL brands like whiskey, rum, and vodka, as well as CL products like country liquor and spirits.

**1.4 Scope of the Study**

This study contains information on the Environmental factors viz-a-viz contribution of pollution by the proposed unit. These factors include air, water, noise, health, socio economic, land use and agricultural pattern etc. It discusses the predicted impact of the proposed plant activities on these factors. Broadly under the scope it is envisaged:

- To assess the present status of air, water, Land, Noise, biological and socio-economic components of environment.
- To identify, quantify and evaluate positive or negative impacts of various operations on different environmental components.
- To evaluate proposed pollution control measures and to suggest additional control strategies, if any, to mitigate the adverse impacts.
- To identify risk factors & suggest their mitigation including occupational health of the workers.
- To prepare Environmental Management Plan for utilization and adoption of safety measures.
- To delineate the needs of the study area and suggest supportive measures under Corporate Social Responsibility.

**(1) Regulatory framework:**

All the rules & regulation under the Environment Protection Act 1986, Air Act, 1981 & Water Act, 1974 are applicable. The main regulatory provisions governing the proposed project are tabulated below:

**Table 1.6**

**Regulatory rules and regulation for proposed project**

Sr. No.	Legal Instrument (Type,	Responsible Ministry or	Objective of Legislation
---------	-------------------------	-------------------------	--------------------------



	<b>Ref., Year)</b>	<b>Bodies</b>	
1.	Air (Prevention and Control of Pollution) Act, 1981	CPCB and SPCB	The Control prevention, and abatement pollution
2	Water (Prevention and Control of Pollution) Act, 1974	CPCB and SPCB	The prevention and control of water pollution and also maintaining or restoring the wholesomeness of water
3.	The Environment (Protection) Act, 1986 & Environmental (Protection) Rules, 1986	Ministry of Environment and Forests, & Climate Change (MoEF&CC), CPCB and SPCB.	Protection and improvement of the Environment
4.	Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016	MoEF&CC, CPCB, SPCB, DGFT, Port Authority and Customs Authority	Management & Handling of hazardous waste in line with the Basel convention.
5.	Noise Pollution (Regulation and Control) Rules, 2000)	CPCB and SPCB	Prevention control pollution
6.	The Factories Act, 1948	Ministry of Labour, DGFASLI and Directorate of Industrial Safety and Health/Factories and Inspectorate.	Control of workplace environment, and providing for good health and safety of workers.
7.	Public Liability Insurance Act, 1991 amended 1992 & Public Liability Insurance Rules, 1991 and its subsequent amendments	MoEF&CC, District Collector	To provide immediate relief to persons affected by accident involving hazardous substances.

### 1.4.1 Methodology

Various steps involved in Environmental Impact assessment study of the proposed project are divided into the following phases:

- ❖ Identification of significant environmental parameters and to study the existing status within the impact zone with respect to air, water, noise, soil and socio-economic components of the environment.
- ❖ Study of various activities of the proposed project leading to final product and to identify the area's leading to impact for the identified activities and to study levels of impacts on various environmental components.



- ❖ Evaluation of final levels of various parameters after superimposing the predicted impacts over the baseline quality.
- ❖ Formulation of Environmental management Plan for implementation in the proposed project.



## CHAPTER-2

### PROJECT DESCRIPTION

#### 2.1 Type of Project:

The industry intends to set up a proposed unit of 30 KLD Malt Spirit Plant, 2 KLD of Craft Gin Plant and 1000 cases/day of IMFL Bottling Plant in the revenue estate of Mohal Parei Village-Salol, Tehsil and District Kangra, Himachal Pradesh.

As per EIA Notification dated 14th Sep., 2006 and its subsequent amendments, the project falls under Category "B", Project or Activity '5(g)' Distilleries (Non-Molasses based distilleries  $\leq$  200 KLPD).

#### 2.2 Need for the Project:

The Indian Made Foreign Liquor (IMFL) market is growing rapidly, driven by increasing demand from a young and urbanizing population. This growing demand has resulted in a shortage of malt spirit, a critical ingredient in the production of IMFL. The project aims to produce malt spirit, with a portion aged for at least one year for supplying to the Indian Made Foreign Liquor (IMFL) industry for blending in various proportions. Another portion will be matured for over three years to meet international whisky standards, allowing it to be marketed and bottled as Indian single malt whisky for both domestic and export markets. This facility will also include a 2 KLD craft gin plant, along with a pilot fermentation and bottling plant. The Indian government's initiatives, such as the "Make in India" program, aim to promote domestic production and reduce reliance on imports. The proposed project aligns with these initiatives, supporting the government's efforts to boost domestic manufacturing and economic growth.

The proposed project will generate significant economic benefits, including:

- 1. Employment opportunities:** The project will create jobs in the manufacturing, bottling, and power generation sectors.
- 2. Foreign exchange savings:** By reducing reliance on imports, the project will conserve foreign exchange and contribute to India's trade balance.
- 3. Increased tax revenues:** The project will generate tax revenues for the government, supporting public finances and economic development.

In conclusion, proposed grain/barley-based distillery for manufacturing of capacity 30 KLPD of Malt Spirit Plant and 2KLPD Craft Gin Plant along with Pilot Plant for fermentation and Bottling Plant is a necessary project that addresses the growing demand for IMFL and Craft Gin, promotes domestic production, and supports energy efficiency and sustainability.



### 2.3 Location of the project site:

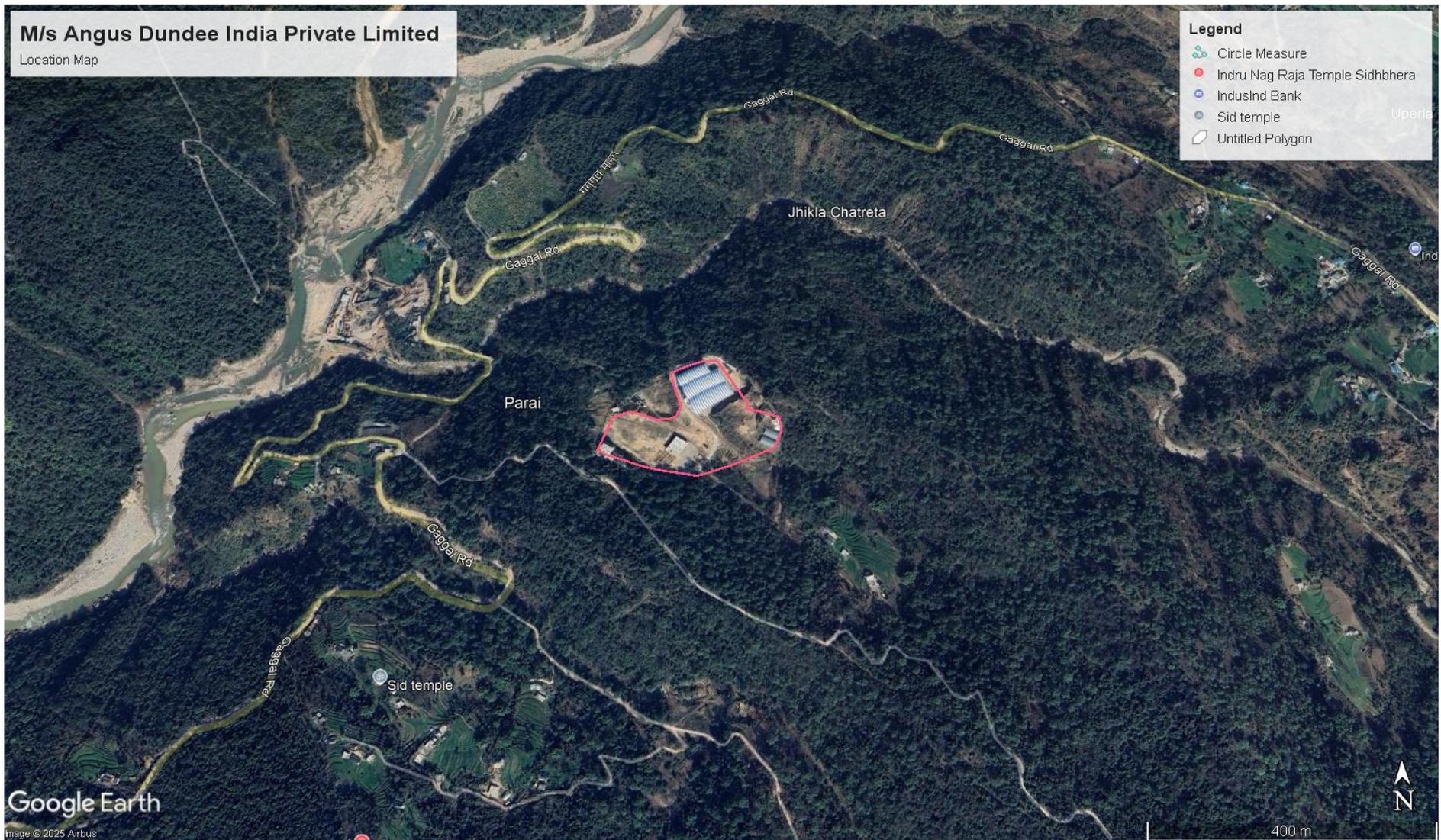
The proposed project is located in the revenue estate of Mohal Parei Village-Salol, Tehsil and District Kangra, Himachal Pradesh. It is well connected by road. Location at Google image is given at Fig 2.1, 500 m radius map shown at Fig 2.2, and layout & pillar coordinate of project site is shown at Fig 2.3 & 2.4.

**Table 2.1 Coordinates of the project**

<b>POINT</b>	<b>LATITUDE</b>	<b>LONGITUDE</b>
A	32°7'13.64"N	76°10'46.34"E
B	32°7'14.35"N	76°10'49.24"E
C	32°7'10.61"N	76°10'53.00"E
D	32°7'7.53"N	76°10'47.91"E
E	32°7'9.09"N	76°10'41.83"E
F	32°7'11.15"N	76°10'42.70"E
<b>ELEVATION</b> 630m		
<i>Source</i> Google Earth		



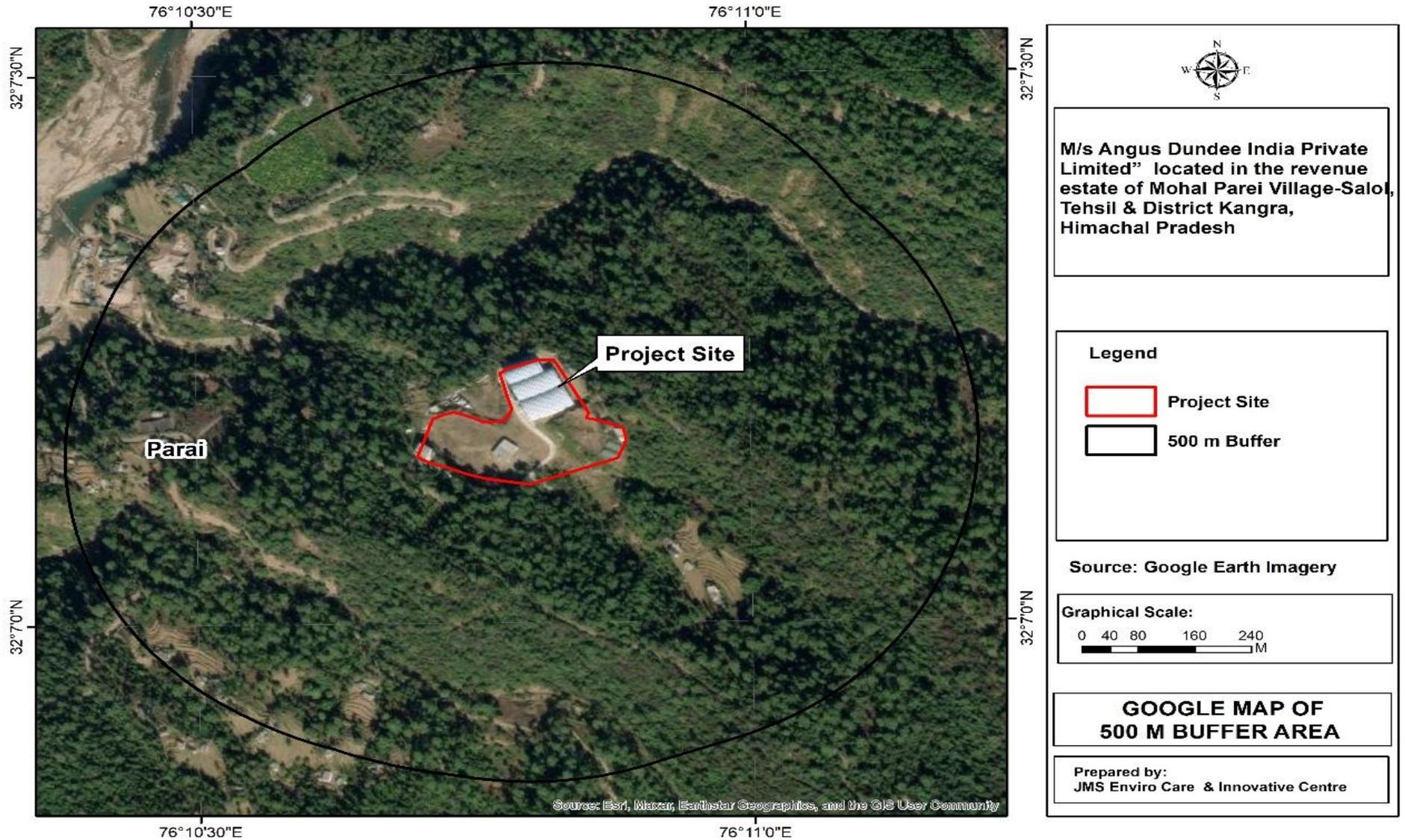
Figure 2.1 Google Imagery Location



(Source: - Google Earth 12/05/2025)



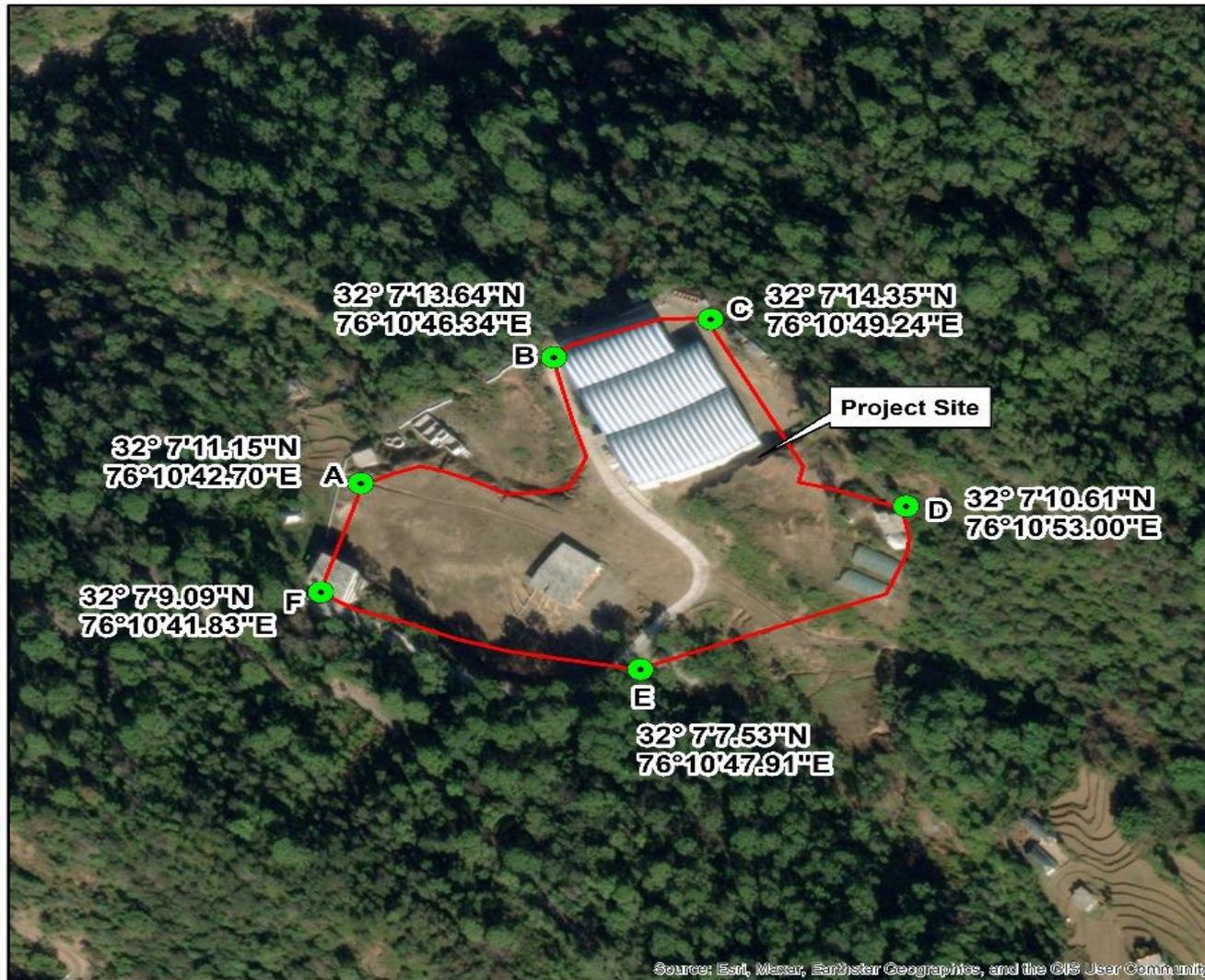
Figure 2.2 500m Radius map



(Source: - Esri, Maxar, Earthstar Geographics, and the GIS User Community Google Earth 12/05/2025)



Figure 2.3 Pillar Co-ordinates map of the project site



**M/s Angus Dundee India Private Limited** located in the revenue estate of Mohal Parei Village-Salo, Tehsil & District Kangra, Himachal Pradesh

**Legend**

- Project Site
- 500 m Buffer

Source: Google Earth Imagery

Graphical Scale:

0 15 30 60 90 M

**PILLAR COORDINATE MAP OF THE PROJECT SITE**

Prepared by:  
JMS Enviro Care & Innovative Centre

(Source: - Esri, Maxar, Earthstar Geographics, and the GIS User Community Google Earth 12/05/2025)



Figure 2.4 Layout plan





## 2.4 Size or Magnitude of Operation

### 2.4.1 Proposed Product Details (Terms of Reference No. 3.2)

The unit is proposing Grain/Barley-based distillery for production of capacity 30 KLPD of Malt Spirit Plant and 2KLPD Craft Gin Plant along with Pilot Plant for fermentation and Bottling Plant in Mohal Parei Village-Salol, Tehsil and District Kangra, Himachal Pradesh.

The production details will be given in Table 2.2.

**Table 2.2**  
**Details of Proposed Products**

S. No.	Particular	Units	Capacity
<b>Products</b>			
1.	Malt Spirit	<b>KLD</b>	30
2.	IMFL Bottling	<b>Cases/day</b>	1000
3.	Craft Gin	<b>KLD</b>	2
<b>By-Products</b>			
1.	DWGS	<b>TPD</b>	65
2.	CO <sub>2</sub>	<b>TPD</b>	7

### 2.4.2 Raw Materials (Terms of Reference No. 3.3)

The basic raw materials for the manufacturing of Malt spirits will be Grain/Barley Malt. In the present scenario, all the raw materials are easily available in the nearby area. Details of raw materials are given in table 2.3.

**Table 2.3**  
**Details of Raw Materials**

Particulars	Quantity (TPD)	Storage Capacity	Source & Mode of transportation of raw material
Grain/Barley Malt	60 TPD	1200 MT	Grain/Barley shall be procured from local market and will be transported through trucks.
CIP Chemicals	6 Kg/day	180 Kg	These chemicals shall be procured from local market and will be transported through trucks.
Caustic soda	6 Kg/day	180 Kg	



Enzyme	12 Ltr/day	600 Ltr.	
Yeast	75 Kg/day	1000Kg	

### 2.4.3 Land Description:

The total area for the project is 34,529 sqm. The land is already under the possession of Company. Detailed description of land is given in Table 2.4. Land Papers for the same is attached as Annexure I.

**Table 2.4 Land Description**

S. No.	Description	Area (Sqm)
1.	Malt Distillery (Raw Material Storage, Milling, Mashing, Fermentation, and Distillation)	3400
2.	Utilities- Boiler, Water Treatment Plant, Chiller, Cooling Towers, DG Set, Effluent Treatment Plant, Electrical Set Up, Weigh Bridge, Parking and Others.	4000
3.	Maturation Warehouses	5000
4.	Bottling Hall and Gin Plant	750
5.	Storage Dry Goods	320
6.	Storage Finished Goods	329
7.	Roads and Drains	6000
8.	Security, Admin Office, Excise Office, Visitors Center & Others	2000
9.	Green Area/ Belt	12730
<b>Total</b>		<b>34529</b>

### 2.4.4 Manufacturing Process Details

#### 1. Malt spirit

Malt spirits are distilled from malted barley or rye (usually) from a single distillery, the malt spirit is being matured in maturation halls in special type oak wood casks and further used in blending of whisky. Malt spirit is produced in special type of plant, comprising sections like, malt storage, pre cleaning and malt milling section. Mashing and fermentation section, the distillation section comprising pot stills for washing as well as spirit maturation or aging. The pot still processes by



which malt whisky is made may be divided into four main stages: malting, mashing, fermentation and distillation. Details of equipment given in table 2.15.

**Table 2.5**  
**Equipment List for 30 KLPD section A: Malt Storage, Handling & Milling**

S.N.	Description	Technical Data	MOC	Qty.
1	Malt Storage Silos	Type: Std 300 MT	GI Rested on Civil Foundation	4
2	Receiving Hopper	Type: Standard	MS Rested on Civil Foundation	1
3	Malt Elevator I	Type: Bucket	Bucket: GI	1
4	Drum Cleaner	Suitable	Casing: MS	1
5	Dust Collection Unit	Type: Filter Bag	Bags: Polyester Housing: MS	1
6	Magnetic Separator Indian Make	Type: Rotary Magnet Separator	MS	1
7	DE Stoner	Suitable	MS	1
8	Malt Elevator II	Type: Bucket	Bucket: GI	1
9	Malt Mill Indian Make	Type: Roller Mill 5 TPH	Roll MOC: Cast Iron with Alloy Steel	1
10	Vertical Grist Case	Type: Cylindrical Vessel with Conical Bottom	SS	1
11	Connecting Chutes	-	GI	Lot
12	Piping, Valves, Electricals and Instrumentation	-	-	Lot

#### a) Malting:

The barley is first screened to remove any foreign matter and then soaked for two or three days in tanks of water known as steps. After this it is spread out on a concrete floor known as the malting floor and allowed to germinate. Germination may take from 8 to 12 days depending on the season of the year, the quality of the barley used and other factors. During germination the barley secretes the enzyme diastase which makes the starch in the barley soluble, thus preparing it for conversion into sugar. Throughout this period the barley must be turned at regular intervals to control the temperature and rate of germination. At the appropriate moment germination is stopped by drying the malted barley



or green Power malt in the malt kiln. More usually nowadays malting is carried out in Saladin boxes or in drum malting in both of which the process is controlled mechanically. Instead of germinating on the distillery floor, the grain is contained in large rectangular boxes (Saladin) or in large cylindrical drums. Temperature is controlled by blowing air at selected temperatures upwards through the germinating grain, which is turned mechanically. A recent development caused by the rapid expansion of the scotch whisky industry is for distilleries to obtain their malt from centralized malting which supply a number of distilleries, thereby enabling the malting process to be carried out more economically. This malt is used for production of malt spirit.

#### b) Mashing:

The dried malt is ground in a mill and the grist, as it is now called, is mixed with hot water in a large circular vessel called a mash tun. The soluble starch is thus converted into a sugary liquid known as wort. This is drawn off from the mash tun and the solids and husk remaining are removed for and use as cattle food. Details of equipment given in table 2.6.

**Table 2.6**

**List of Equipments used in Mashing Section**

S. No.	Description	Technical Data	MOC	Qty.
1.	Mash Tun	Type: Cylindrical With False Bottom	SS304	2
2.	Underback	Type: Standard	SS304	2
3.	Spent Grain Conveying System	Spent Grain Hopper & Screw Conveyer	MS	2
4.	Wort Recirculation Cum Transfer Pump	Type: Centrifugal	Wettedpartcf8	2
5.	Wort Cooler1	Type: PHE	Platess316 Frame MS	2
6.	Wort Cooler2	Type: PHE	Platess316 Frame MS	2
7.	Pre-Masher Grist Conveyer		SS304	1
8.	Piping, Valves and Instrumentation		-	Lot

#### c) Fermentation:

After cooling, the wort is passed into large vessels holding anything from 25000 to 45,000 liters of liquid where it is fermented by the addition of yeast. the living yeast attacks the sugar in the wort and converts it into crude alcohol fermentation takes about 48 hours and produces a liquid known as wash,



containing alcohol of low strength, some unfermentable matter and certain by-products of fermentation. Details of equipment given in table 2.7.

**Table 2.7**  
**List of Equipments used in Fermentation Section**

S. No.	Description	Technical Data	MOC	Qty.
1.	Buffer Tank	Type: Vertical Shell & Conical Top & Dished Bottom	SS304	2
2.	Fermenter With Cleaning Nozzles & Accessories	Type: Vertical Shell & Conical Top & Dished Bottom 40/52 KL	SS304	18
3.	Fermented Wash Transfer Pump	Type: Centrifugal	Wetted Part CF8	2
4.	CIP Tank	Type: Cyl / Vert Shell With Flat Top and Sloping Bottom 5/6 KL	MS	2
5.	CIP Pump	Type: Centrifugal	CI	2
6.	Water Pre Heater For Hot Water Tank	Type: Plate Heat Exchanger	Platess316 Frame CS	2
7.	Hot Water Tank	Type: Cyl / Vert Shell With Conical Top & Dished Bottom 50 KL (W)	SS304	2
8.	Hot Water Recirculation Pump	Type: Centrifugal	Wetted Parts CF8	2
9.	Cold Water Tank	Type: Cyl / Vert Shell With Conical Top & Dished Bottom 50 KL (W)	SS304	2
10.	Weak Wort Tank	Type: Cyl / Vert Shell With Conical Top & Dished Bottom 50 KL (W)	SS304	2
11.	Piping, Valves and Instrumentation		-	Lot

**d) Distillation:**

Malt whisky is distilled twice in large copper pot stills the liquid wash is heated to a point at which the alcohol becomes vapour. This rises up the still and is passed into the cooling plant where it is condensed into liquid state the cooling plant may take the form of a coiled copper tube or worm that is kept in continuously running cold water, or it may be another type of condenser. The first distillation



separates the alcohol from the fermented liquid and eliminates the residue of the yeast and un-fermentable matter. This distillate, known as low wines, is then passed into another still where it is distilled a second time. The first running's from this second distillation are not considered potable and it is only when the spirit reaches an acceptable standard that it is collected in the spirit receiver again, towards the end of the distillation. The spirit begins to fall off in strength and quality it is then no longer collected as spirit but drawn off and kept, together with the first running, for re-distillation with the next low wines pot still distillation is a batch process. Details of equipment given in table 2.8.

**Table 2.8**

**List of Equipments used in Distillation Section**

S. No.	Description	Technical Data	M.O.C.	Qty
1.	Wash Still	Type: Hemispherical Top Goose with Internal Heating Arrangement 24 KL	Wash Still: Dow Cu Radiators: SS	4
2.	Spirit Still	Type: Hemispherical Top Goose with Internal Heating Arrangement	Spirit Still: Dow Cu Radiators: SS	4
3.	Wash Still Condensers	Vertical Shell & Tube Heat Exchanger	Dow Cu with SS304 Dish Ends	4
4.	Spirit Still Condensers	Vertical Shell & Tube Heat Exchanger	Dow Cu with SS304 Dish Ends	4
5	Low Wines Tanks	Type: Cyl /Vert Shell with Dish Top and Bottom 10/12 KL	SS304	2
5.	Low Wines Transfer Pump	Centrifugal Type	Wetted Part SS304	2
6.	Low Wine Receiver	Type: Cyl /Vert Shell with Dish Top and Bottom 10/12 KL	SS304	4
7.	Low Wines Transfer Pump	Centrifugal Type	Wetted Part SS304	2
8.	Fore Shot & Faints Storage Tank	Type: Cyl /Vert Shell with Dish Top and Bottom 20/25 KL	SS304	2
9.	Fore Shot & Faints Transfer Pump	Centrifugal Type	Wetted Partss304	2
10.	Spent Lees Collection Tank	Type: Cyl /Vert Shell with Dish Top and Bottom 10/12 KL	SS304	2
11.	Spent Lees Transfer Pump	Centrifugal Type	Wettedpartss304	2
12.	Product Receiver	Type: Cyl /Vert Shell with Dish Top and Bottom	SS304	4
13.	Product Transfer Pump	Centrifugal Type	Wettedpartcf8	2



14.	Fermented Wash Preheater	PHE	Frame: MS Plates: SS316	2
15.	Piping, Valves	Lot	SS304/ Dow Cu/MS	Lot
16.	Instrumentation	Instruments Like Pressure Gauges, RTD, etc.	-	Lot
17.	Indicating Instrumentation Panel	Common For All Sections		Lot
18.	Electrical	-	-	Lot

#### e) Maturation:

Both malt and grain whisky must be matured after distillation has been completed. The new spirit is filled into casks of oak wood which, being permeable allows air to pass and evaporation takes place by this means the harsher constituents in the new spirit are removed and it becomes in due course a mellow whisky malt whisky which contains more of these flavory constituents takes longer to mature than grain whisky and is often left in the cask for 15 years or even longer. The period of maturation for both malt and grain whisky is also affected by the size of casks used. The strength at which the spirit is stored and the temperature and humidity of the warehouse. Details of equipment given in table 2.9.

**Table 2.9**

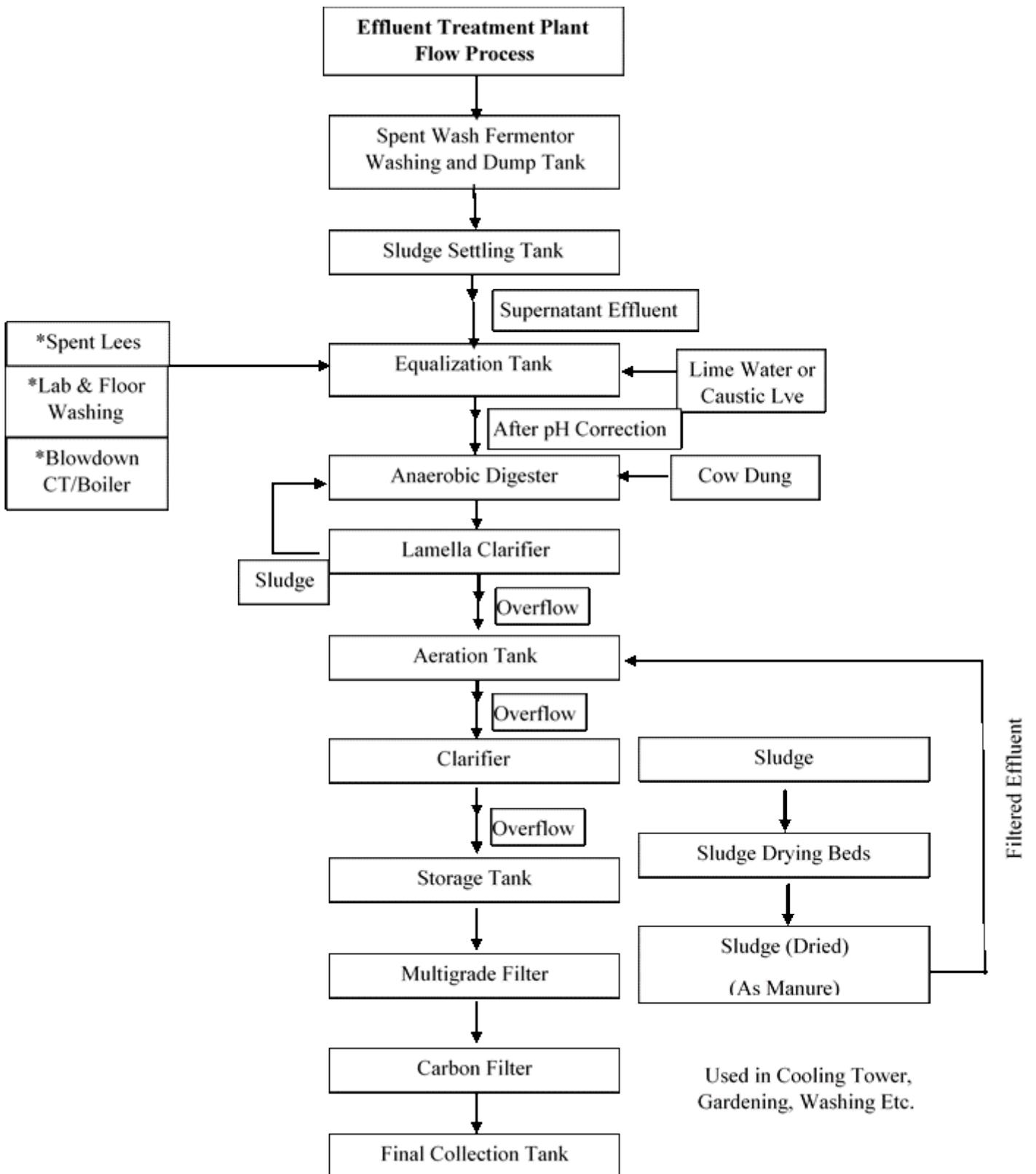
#### List of Equipments used for Malt Spirit Storage

S. No	Description	Technical Data	M.O.C.	Qty
1.	Malt Spirit Day Storage	Type: Cylindrical/Vertical 30 KL	SS304	1
2.	Malt Spirit Bulk Storage	Type: Cylindrical/Vertical 60 KL	SS304	6
3.	Malt Spirit Bulk Storage (Warehouse)	Type: Cylindrical/Vertical 30 KL	SS304	2
3.	Malt Spirit Transfer Pump	Type: Centrifugal	Wetted Parts CF8	2
4.	Piping, Valves & Instrumentation	Lot	-	1lot

Flow diagram for the manufacturing of Malt spirit is given in Figure 2.5.



Figure 2.5: Flow Diagram of manufacturing of Malt Spirit





## 2 2 KLPD Craft Gin Plant with Fermentation

### Major Equipment:

- Universal Pot Still
- Maceration Tank
- Resting Tanks etc.

Grain based ENA (extra neutral alcohol) is diluted & is mixed with botanicals in the maceration tank for 6-10 hrs. followed by distillation in the pot still distillate, so produced is kept in the resting tank followed by dilution for final blend for bottling.

Pilot plant (fermentation system) set of fermenters with matching capacity of universal pot still (2 KLPD product). System will be used for pilot fermentation of different substrates i.e., fruit juices/starchy material/cane juice etc. After fermentation broth will be distilled in the universal pot still and the effluent/washings will be sent to ETP for treatment. distilled product will be further processed for different products. Details of equipment given in table 2.10.

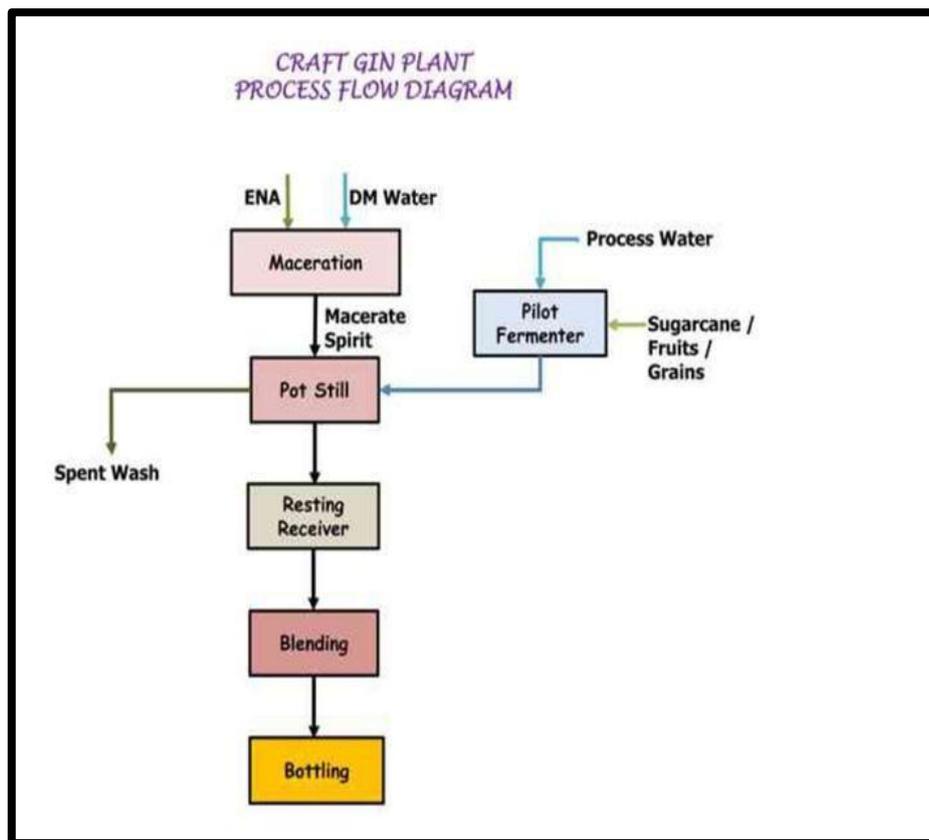
**Table 2.10**  
**Major Equipment and Machineries for GIN Plant**

S. No	Requirement	Specification	Qty
1	Pilot Fermenters (Agitator + Jacketed + Insulated + Cladded).	2.5 KL	7
2	ENA Feed Transfer Tank.	2.5 KL	1
4	Maceration Tank (Agitator + Jacketed + Insulated + Cladded)	2.5 KL	2
3	Copper Pot Distillation Equipment Including Wash Still, Column Still, Spirit Condenser Along With Accessories.	Capacity - 500 Litres	1
5	ENA Storage Tank.	12.5 KL	1
6	Gin Receiver Tank.	2 KL	6
7	Pumps For Fermenters, Maceration Tank % Pots	3 M3/Hr @ 20 M, SS304	4
8	Pumps For ENA Loading and All Circulations	5 M3/Hr @ 20 M, SS304	2

Flowchart and Manufacturing process of Craft Gin Plant is given in **Figure 2.6**.



Figure 2.6: Flowchart and Manufacturing process of Craft Gin Plant



### 3. Bottling Section IMFL:

Table 2.11

Bottling Line and Equipment's

<b>BOTTLING LINE</b>		
<b>Number Of Case</b>		
Bottling Of Number of Cases Per Day	Case	1000
Number Of Working Days in Month	Day	25
Bottling Of Number of Cases Per Month	Case	25000
<b>Blend, ENA, Blending &amp; VMS Tanks Requirement</b>		
Blend Required Per Month Including 1.5% Wastage	Litres	228375
ENA (95.5%V/V Strength) Required for Blend	Litres	102828.5
ENA Storage Tank Required	Number	2
SS ENA Storage Tank Capacity of Each	Litres	25000
ENA Storage Capacity	Litres	50000
Blendingtime4days	Days	4
Blending Tank Capacity	Litres	10000
SS Blending Tanks Required	Number	5



Blending Capacity	Litres	50000
SS VMS Storge Tank	Number	2
SS Tanks VMS Storage Capacity of Each	Litres	5000
VMS Storage Capacity	Litres	10000
<b>Number Bottling of Line Required</b>		
Bottling of 750ml bottle	ML	750
Bottles In a Case	Number	12
Semi Auto Bottling Line Capacity Bottles/Minute (750ml)	Bottles	30
Bottles In One Hrs.	Bottles	1800
Case Per Hrs	Case	150
Case Per Day 7 Hrs. Working	Case	1050
OR Case Per Day	Case	1000
Per Month	Case	25000
<b>Number Of Line Required</b>	<b>Number</b>	<b>One</b>

Table 2.12

Requirement of Tanks and Other Equipments

S. No.	Description	Unit	Value	Capacity	MOC	Type
				30 KL		
1	Extra Neutral Alcohol Storage Tanks	Nos	2	Each	SS	Cylindrical
	Bag Filter For ENA Filter During					
2	Unloading From Tanker	Nos	1			
				5 KL		
3	VMS Storage Tanks	Nos	2	Each	SS	Cylindrical
4	DM Water Tank	Nos	1	20 KL	SS	Cylindrical
				10 KL		
5	Blending Tanks	Nos	5	Each	SS	Cylindrical
6	Holding Tank for Blend	Nos	2	2 KL Each	SS	Cylindrical And Place Horizontal
7	Rejection Tank	Nos	1	200 Litres	SS	Cylindrical
8	Pumps For ENA Transfer	Nos	2	10 M3/Hrs	SS	Centrifugal Mono Block with 3hp flame proof Motor
9	Pumps For DM Water Transfer	Nos	2	10 M3/Hrs	SS	Centrifugal Mono Block with 3hp motor
10	Sparkler Filter For Filtering Blend Pipeline, Fittings&Valvefor11	Nos	2	5M3/Hrs	SS	
11	Tanks	Lot	Lot		SS	
12	MS Structure for Holding Tanks	Lot	Lot		MS	
	MS Structure For Storage & Blending					
13	Tanks	Lot	Lot		MS	
14	RO/DM Plant For Bottling	Set	1		SS/CI	
	ETP For Bottle Washing/Ringing					



15	Water	Set	1		CI	
16	Air Compressor	Nos	1		CI	With 2hp motor

#### 2.4.5 Water Requirement & Source:

Total freshwater requirement for the proposed project will be 900 KLPD which will be sourced from own borewell, permission for which will be submitted after the grant of EC.

#### A) Water requirement for 30 KLD Malt spirit distillery:

Total fresh water requirement will be 498 KLD. The breakup of water requirement is given in Table 2.13

**Table 2.13**

#### Water Requirement for Malt Spirit

S No.	Particulars	Freshwater (KLD)
1.	Boiler	46
2.	Makeup Water in Cooling Tower	342
3.	Rinsing and Product filling	14
4.	Addition of fresh water in Pre-Masher	96
	<b>Total</b>	<b>498</b>

#### B) Water requirement for 2 KLD Craft Gin Plant:

**Table 2.14**

#### Water Requirement for Craft Gin Plant

S No.	Particulars	Quantity (in KLD)
1.	Distillation Process	1.0
	<b>Total</b>	<b>1.0</b>



**Table 2.15**

**Total Water Requirement (Malt spirit + Craft Gin Plant)**

S No.	Particulars	Fresh Water (KLD)	Wastewater Generation (KLD)	Reuse of treated wastewater (KLD)	Total Water Requirement (KLD)
1.	Malt spirit distillery (30 KLD)	498	392	390	888
2.	Craft Gin Plant (2.0 KLD)	1	**4	**6	7
	<b>Total</b>	499	396	396	895
	<b>Domestic</b>	5	4	4	5
	<b>Grand Total</b>	504			900

**NOTE:**

\* From the above it is evident that the total water consumption for production of Malt Spirit and Craft Gin will be 900 KLD. Out of which 504 KLD shall be met by using fresh water and remaining 396 KLD shall be met by recycling the treated wastewater.

\*\* In Craft Gin production plant, the fresh water to the tune of 1 KLD will be required in distillation process and 6 KLD of water requirement in the pilot fermenters and maceration shall be met from treated wastewater, thereby, the total requirement in this plant will be to the tune of 7 KLD. Out of 6 KLD of treated wastewater, 4 KLD will be met from treated wastewater of Craft Plant and 2 KLD of treated wastewater will be taken from Malt Spirit Plant.



Fig 2.7 – Water Balance Diagram of Malt Spirit Plant (Terms of Reference No. 3.5)

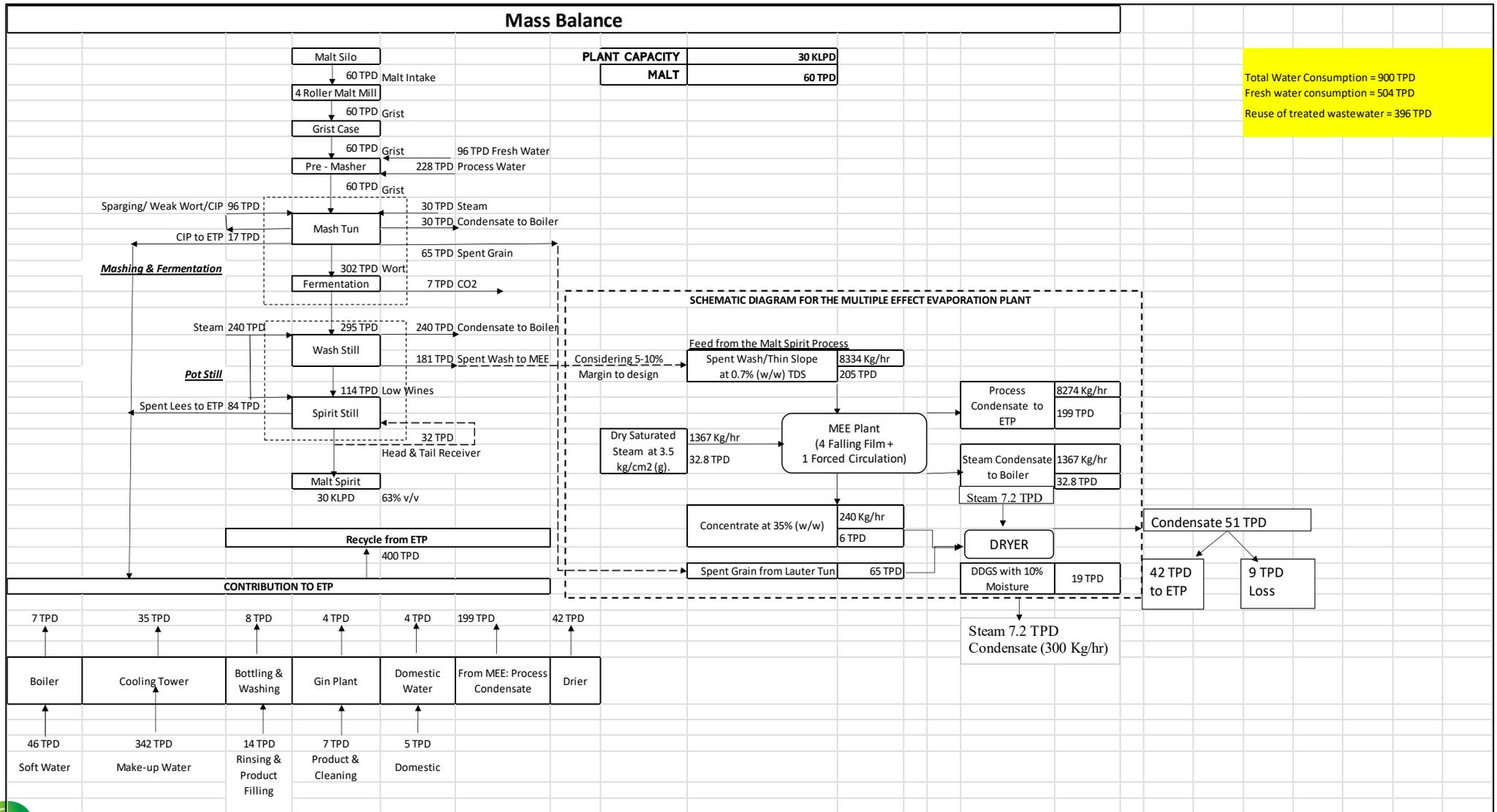
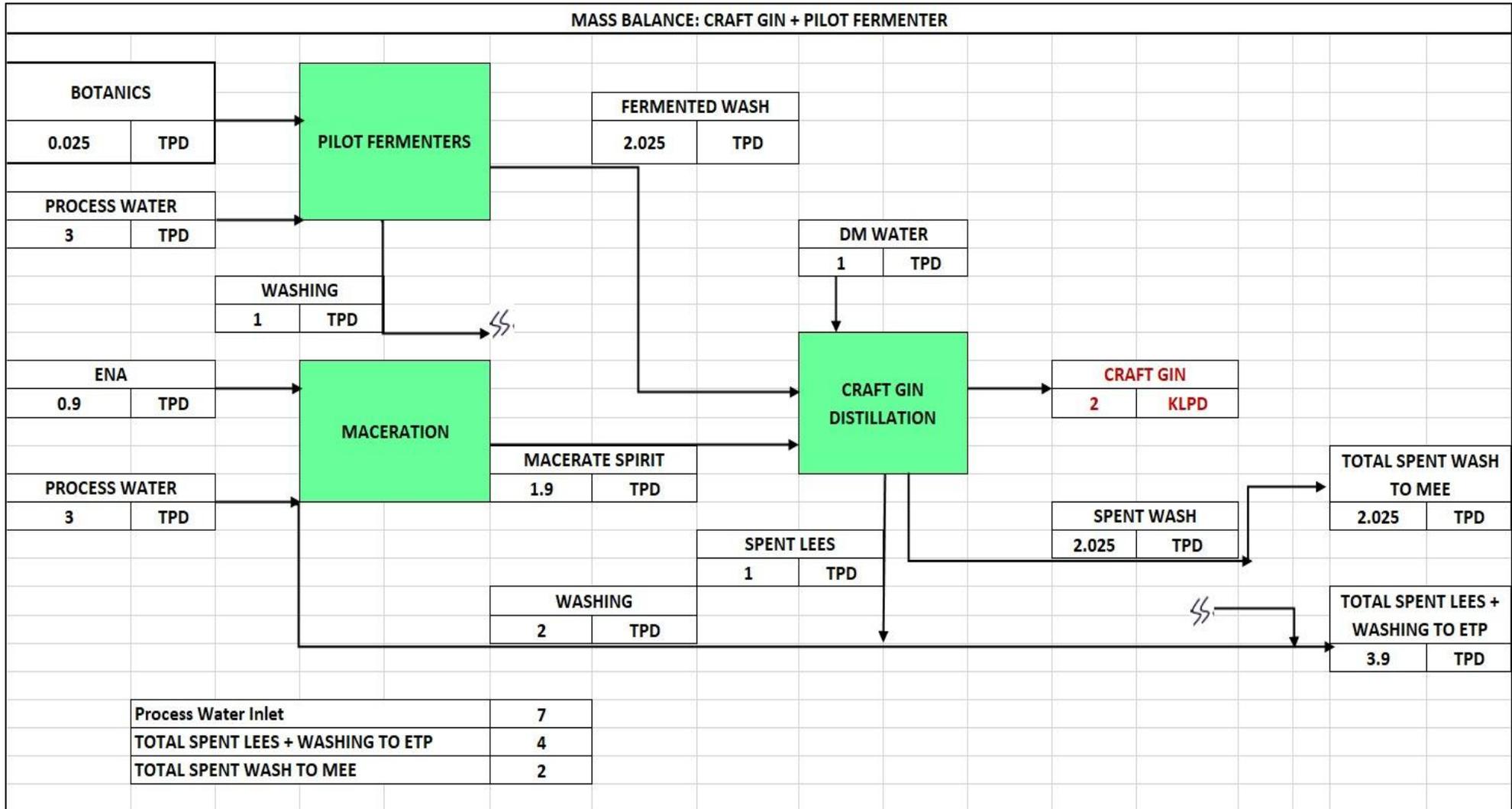




Fig. 2.8 Water Balance Diagram of Craft Gin Plant (Terms of Reference No. 3.5)





## Wastewater Generation & Reuse (Terms of Reference No. 7.4)

### A) 30 KLD Malt Spirit Distillery

Details of wastewater generation from Malt Spirit and Reuse of treated wastewater are given in table 2.16 and 2.17.

**Table 2.16**

#### Wastewater Generation from Malt Spirit

S No.	Particulars	Quantity (in KLD)
1.	Process condensate from MEE	199
2.	Spent Lees	84
3.	CIP of Mash Tun/Fermenters	17
4.	Boiler Blowdown	7
5.	Cooling Tower Blowdown	35
6.	Bottle Washing	8
7.	Drier Condensate	42
	<b>Total</b>	<b>392</b>

**Table 2.17**

#### Reuse of treated wastewater from Malt Spirit

S No.	Particulars	Quantity (KLD)
1.	Pre Masher	228
2.	Cooling Tower	162
	<b>Total</b>	<b>390</b>

**B) Wastewater generation and reuse for 2 KLD Craft Gin Plant:** Details of wastewater generation from Craft Gin Plant and Reuse of treated wastewater are given in table 2.18 and 2.19.

**Table 2.18**

#### Wastewater Generation from Craft Gin

S No.	Particulars	Quantity (in KLD)
1.	Washing of Pilot fermenter	1.0
2.	Washing of maceration tank	2.0
3.	Spent Lees	1.0
	<b>Total</b>	<b>4 KLD</b>



**Table 2.19**

**Reuse of treated wastewater from Craft Gin**

S No.	Particulars	Quantity (in KLD)
1.	Fermentation	3.0
2.	Maceration	3.0
	Total	6.0

**C) Spent Wash Generation:**

There will be generation of 181 KLD of Spent wash from wash still containing 0.7 % of TDS. However, keeping in view the variation in the quality of raw material and generation of spent wash from craft gin plant, about 205 KLD of spent wash shall be fed to four stage MEE. From MEE, 199 KLD of condensate and 6 KLD of concentrate will be generated. The concentrate shall be mixed with spent grain to the tune of 65 KLD, which will be fed to drier to get 18 KLD of DDGS containing 10 % moisture content. Spent wash, spent lees, CT blow down DM Plant regeneration and boiler blowdown along with processed condensate will be treated in ETP comprising CPU and MEE. Treated wastewater will be used as cooling tower make up, liquefaction and boiler feed water. The quantity of spent wash generation will be 6.03 kl per kl of Malt Spirit produced (181/30).

**Table 2.20**

**Spent wash to be generated from 30 KLD Malt spirit Plant**

S No.	Spent wash to be generated from 30 KLD Malt spirit Plant
Spent wash to be generated	181 KLD
	6.03 Kl/Kl of alcohol produced

**D) Handling of Spent Lees and Drier Condensate**

About 85 KLD of Spent Lees will be generated from spirit still, and will be sent to CPU (Condensate Polishing unit) for treatment.

**Table 2.21**

**Handling of Spent Lees and Drier Condensate**

Source of wastewater generation	Quantity being generated (KLD)	Quantity of reused directly /after treatment (KLD)
Spent Lees generation	85	After treatment, the spent lees shall be used in the



		process/utility.
<b>MEE and Drier condensate</b>	241 (199+42)	After treatment, the entire treated wastewater shall be used in the process and well as cooling tower.

### E) Domestic waste water generation & treatment:

Approx. 4 KLD Domestic waste water will be generated from the plant. This wastewater will be treated in a proposed Sewage Treatment Plant (STP) with a capacity of 10 KLD based on MBBR technology.

**Table 2.22**

**Details of fresh water, wastewater generation, reuse of treated wastewater in domestic section**

S. No.	Particulars	Fresh Water (KLD)	Wastewater Generation (KLD)	Reuse of treated wastewater (KLD)	Total Water Requirement (KLD)
1	Domestic	5	4	4	5

### Details of the Treatment components of STP of capacity 10 KLD are given as under:

- 1. Screen Chamber:** In order to remove the floating matter from the domestic effluent, a mechanical screen of 5- 8mm spacing shall be installed to rule out the possibility of entering the floating matter in the downstream components of the STP.
- 2. Equalization Tank:** In order to equalize the characteristics of sewage before feeding to downstream components of the STP, an equalization tank of adequate capacity shall be provided.
- 3. MBBR:** MBBR system is considered a biofilm process. Other conventional biofilm processes for wastewater treatment are called trickling filter, rotating biological contactor (RBC) and biological aerated filter (BAF). Biofilm processes in general require less space than activated sludge systems because the biomass is more concentrated and the efficiency of the system is less dependent on the final sludge separation. Some other advantages compared to activated sludge systems are:
  - Higher effective sludge retention time (SRT) which is favourable for nitrification.
  - Responds to load fluctuations without operator intervention



- Lower sludge production
- Less area required
- Resilient to toxic shock

The MBBR is primarily meant to treat the wastewater with the help of aerobic bacteria (heterotrophic) and for the survival of these bacteria proper aerations system comprises of fine diffuser shall be provided to supply the require amount of oxygen. In this tank the wastewater will be degraded into carbon dioxide, water, new cells and ATP. The new cells will be utilized to replace the old cells in the form of MLVSS and ATP will provide the necessary energy required for survival of biomass. In order to have, healthy condition of biomass the required concentration of N and P shall be maintained in addition to other operational parameters such as pH, MLVSS, F/M, ORP and DO etc. The COD reduction will be approximate 80% and BOD reduction will be 90% after aeration tank outlet.

**4. Tube Settler:** For separation of sludge and the wastewater, the treated wastewater of aerobic biological treatment system shall be passed through clarifier. The biomass/ sludge settled in the clarifier shall be recirculated in the aeration tank for maintaining the required concentration of MLVSS and the excess sludge, if any, shall be sent to sludge drying beds for dewatering of the same. The dried sludge shall be used as manure in the planation area. The clarified wastewater shall be collected in a tank for imparting tertiary treatment to polished the treated wastewater to the tune to make it fit for recycling in the process/utility. The Effluent from aeration tank goes to clarifier where the sludge is removed from bottom of clarifier. Part of sludge is recycled to aeration tank and rest spread on sludge beds.

**5. Multi Grade Filter (MGF) (1 no.):** The wastewater treated in the secondary treatment system, will be stored in a storage tank for further pumping to Multi Grade Filter for removal of suspended solids. Multi Grade filter shall consist of a cylindrical mild steel vessel with dished ends and it shall be containing filter media in the form of sand and gravel etc.

**6. Activated Carbon Filter (ACF) (1 no.):**

Activated carbon filter shall consist of a cylindrical mild steel vessel with dished ends. This vessel shall be filled with activated carbon having iodine value of 900 for removal of TDS, color & odor from treated wastewater.

**7. Sludge Drying Beds:** In the aerobic digestion, the sludge is sufficiently mineralized and does not need any further treatment before dewatering and disposal. Sand filtration drying beds will be provided, where sludge will be dewatered by filtration through sand bed and drying the dewatered



sludge by solar heat. Sludge drying beds are constructed in brick masonry with a sand media supported by gravel bed and suitable under-drainage arrangement.

**F) CPU (CONDENSATE POLISHING UNIT):** The condensate collected from different sections will be treated in condensate polishing units of capacity 425 KLD and the treated water will be used as boiler feed water. The CPU comprises the following sections:

- a. Equalization Tank
- b. Anaerobic Digester
- c. Primary Clarifier
- d. Aeration Tank (Stage-1)
- e. Aeration Tank (Stage-2)
- f. Secondary Clarifier
- g. Multi Grade Filter
- h. Activated Carbon Filter
- i. Ultra Filtration
- k. Final Collection Tank.

**Details of the Treatment components of ETP/CPU of capacity 425 KLD are given as under:**

**a) Equalization Tank (EQT):** In order to equalize the characteristics of wastewater before feeding to downstream components of the CPU/ETP, an equalization tank of adequate capacity shall be provided

**b) Anaerobic digester (Mild Steel Tank with Epoxy Coating)**

The wastewater having high COD shall be segregated and collected in a separate tank for treatment in the anaerobic digester. In digester the wastewater shall pass through 4 phases such as hydrolysis, acidogenesis, acetogenesis and Methanogenesis.

Eventually, there will be liberation of methane gas from the anaerobic reactor, which will be used as fuel in the boiler furnace and also there will be arrangement of flaring of this gas for using in case of any exigency. The treated wastewater from the reactor shall be carrying sludge in the form of solids. Therefore, for separation of these solids, which are settleable in nature, the treated wastewater with this component shall be passed through Primary Clarifier.



- c) Primary Clarifier (Lamella):** Primary Clarifier is meant for removal of settleable solids coming with wastewater treated in the anaerobic reactor. In order to maintain the, VSS in the reactor, the sludge separated with primary clarifier shall be recycled in the reactor. The clarified wastewater shall be passed through degasser for removal of reduced gases generated during anaerobic digestion of the substrate present in the wastewater. Otherwise, the reduced gases may hinder the functioning of the aeration tanks
- d) Degasser:** Degasser of adequate capacity for removal of reduced gases from the treated wastewater of anaerobic reactor shall be provided, which will make the wastewater fit for treatment in the aerobic biological treatment system by removing reduced gases.
- e) Aeration Tank (RRC Tank):** The aeration tank primarily meant to further treat the wastewater with the help of aerobic bacteria (heterotrophic) and for the survival of these bacteria proper aerations system comprises of fine diffuser shall be provided to supply the require amount of oxygen. In this tank the wastewater will be degraded into carbon dioxide, water, new cells and ATP. The new cells will be utilized to replace the old cells in the form of MLVSS and ATP will provide the necessary energy required for survival of biomass. In order to have, healthy condition of biomass the required concentration of N and P shall be maintained in addition to other operational parameters such as pH, MLVSS, F/M, ORP and DO etc. The COD reduction will be approximate 80% and BOD reduction will be 90% after aeration tank outlet.
- f) Clarifier (RRC Tank):** For separation of sludge and the wastewater, the treated wastewater of aerobic biological treatment system shall be passed through clarifier. The biomass/ sludge settled in the clarifier shall be recirculated in the aeration tank for maintaining the required concentration of MLVSS and the excess sludge, if any, shall be sent to sludge drying beds for dewatering of the same. The dried sludge shall be used as manure in the planation area. The clarified wastewater shall be collected in a tank for imparting tertiary treatment to polished the treated wastewater to the tune to make it fit for recycling in the process/utility. The Effluent from aeration tank goes to clarifier where the sludge is removed from bottom of clarifier. Part of sludge is recycled to aeration tank and rest spread on sludge beds.
- g) Sludge Drying Beds:** In the aerobic digestion, the sludge is sufficiently mineralized and does not need any further treatment before dewatering and disposal. Sand filtration drying beds will be provided, where sludge will be dewatered by filtration through sand bed and drying the dewatered sludge by solar heat. Sludge drying beds are constructed in brick masonry with a sand media supported by gravel bed and suitable under-drainage arrangement.
- h) Treated Effluent Storage Tank (RRC Tank):** The overflow of clarifier (treated effluent) will be collected in RCC tank.



i) **Multi Grade Filter and Carbon Filter:** The treated effluent from storage tank will be passed through MGF to reduce suspended particles. From MGF effluent goes to carbon filter to remove any smell to make the treated wastewater fit for recycling in the process as well as utility.

**Table 2.23: Characteristics of Wastewater**

Sr. No	Description	Quantity of Spent Generation (KLD)	Conc. of (mg/l)			Pollution Load of (kg/day)		
			BOD	COD	TDS	BOD	COD	TDS
1.	Process condensate from MEE	199	450	1450	-	89.55	288.55	-
2.	Spent Lees of Malt Spirit	84	300	1050	-	25.2	88.2	-
3.	CIP of Mash Tun/Fermenters	17	1650	4450	-	28.05	75.65	-
4.	Boiler Blowdown	7	-	-	1800	-	-	108
5.	Cooling Tower Blowdown	35	-	-	2000	-	-	48
6.	Bottle Washing	8	100	250	-	0.8	2	-
7.	Washing of Pilot fermenter	1.0	1400	4150	-	1.4	4.15	-
8.	Washing of maceration tank	2.0	-	-	-	-	-	-
9.	Spent Lees of Craft Gin Plant	1.0	300	1050	-	0.27	0.945	-
10.	Drier Condensate	42	150	500	500	6.3	21	21

**Table 2.24**

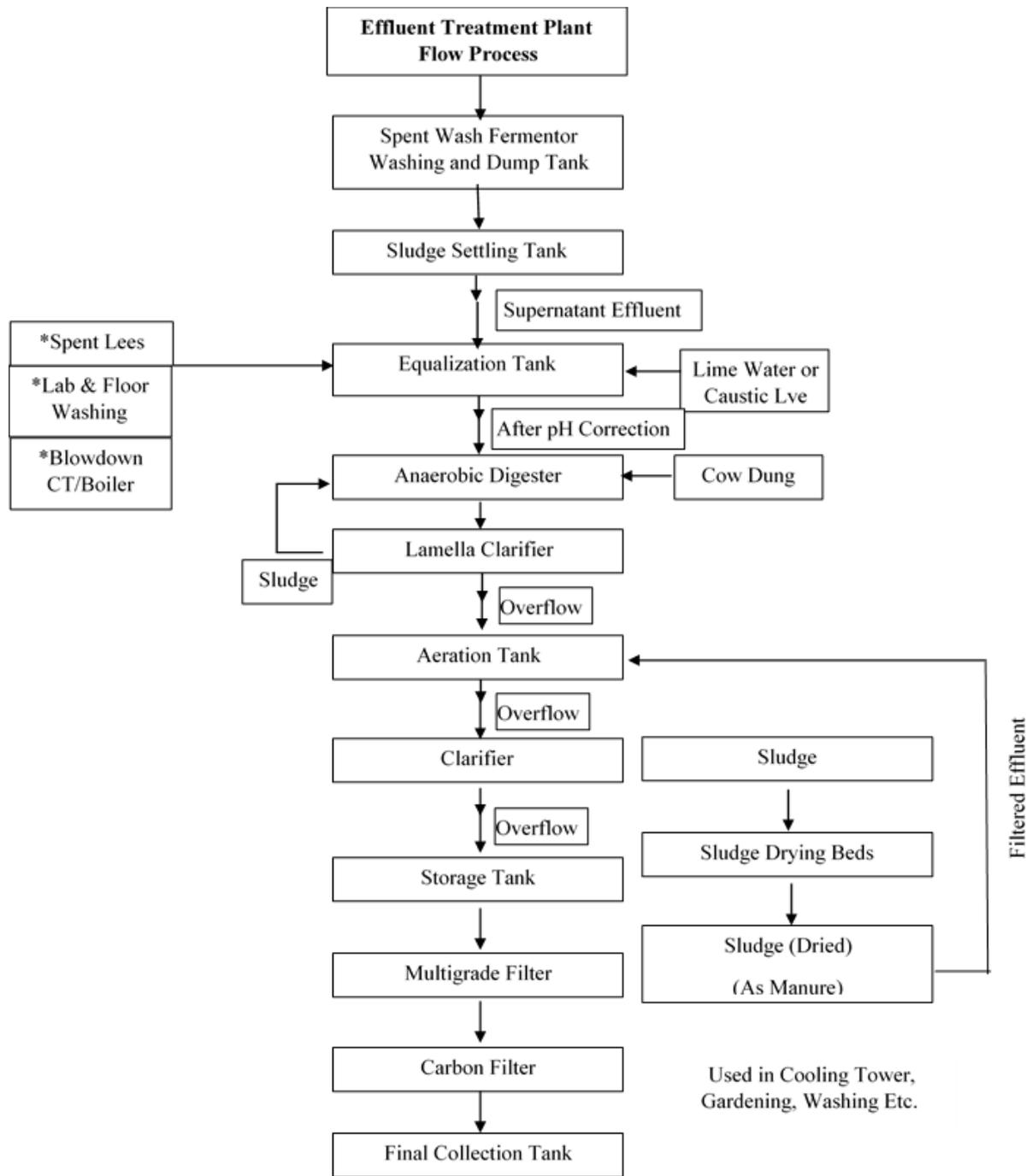
The treated effluent which is permeate of RO Details and Performance of ETP/CPU to be installed

Point of sampling	Conc. of the Parameters (mg/l except pH)			
	pH	BOD	COD	TSS
Final Outlet of the ETP	7.00-8.00	Less than 30	Less than 100	<50
<b>Prescribed Standards</b>	<b>5.5-9</b>	<b>100</b>	<b>-</b>	<b>100</b>



Figure 2.9

Process Flow Diagram of Effluent Treatment Plant





### 2.4.6 Power Requirement (Terms of Reference No. 3.5)

The power requirement will be 1.5 MW, which will be sourced from the HPSEB. Details of power requirement is given in Table 2.25.

**Table 2.25**  
**Power Requirement**

DESCRIPTION	QUANTITY
Power Requirement	1.5 MW
Source	HPSEB
<b>Details regarding DG Sets</b>	
DG Set	2X750 KVA for emergency back up
Stack Height	15 m
Fuel	HSD @1000 liters
APCD	Adequate stack height and acoustic enclosures will be provided

#### 2.4.6.1 Energy Conservation

Following energy conservation measures shall be adopted:

- i) LED shall be used in place of inter lighting.
- ii) Street lighting shall be done completely with solar energy, likely saving of energy will be as follows:

Load Distribution:

1. Total Internal Lighting Load =15 KW
  2. Outer Lighting Load = 15 KW
  3. Other Power load =1470 KW
- Total Load =1500 KW

Saving: By using LEDs with tube lights	=	15 KW
By adopting solar energy for outer Lighting (100%)	=	15 KW
<b>TOTAL</b>	=	<b>30 KW</b>
<b>Percentage (30/1500x100)</b>	=	<b>2.0 %</b>

#### 2.4.7 Manpower Requirement (Terms of Reference No. 3.5)

The proposed project will bring employment for 100 persons. The details are given in Table 2.26



**Table 2.26**  
**Manpower Requirement**

S. No.	Description	Nos.
i)	Skilled Workers	45
ii)	Unskilled Workers	53
iii)	IT professionals	2
	<b>Total</b>	<b>100</b>

#### 2.4.8 Solid & Hazardous waste generation and their management:

##### A) Solid Waste: *(Terms of Reference No. 12.10)*

- Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.
- Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.
- DDGS @ 19 TPD will be sold as Cattle feed.
- ETP Sludge @ 3.0 TPD as Cake will be dewatered in sludge drying beds and will be used as manure.
- DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in MEE to make DDGS.
- Paper waste and Glass culets @ 300 Kg/day will be sold to local supplier for recycle.

**Table 2.27: Solid Wastes**

Sr. No.	Type of Waste	Generation (Kg/day)	Mode of Treatment & Disposal
		Proposed Product	
1.	Sludge of ETP	3.0 TPD	ETP sludge will be dewatered in sludge drying beds and will be used as manure.
2.	Boiler Ash	3.75 TPD	1. Conditioning of soil. 2. Brick kiln for manufacturing of bricks 3. Filling of low-lying area.
3.	MSW	25 Kg/day	MSW will be collected, segregated using collection bins and handed over to authorized agency for final disposal at waste disposal site of



			local authority.
4.	DWGS	65 TPD	DWGS will be mixed with Spent Wash/Thin Slope in MEE to make DDGS.
5.	DDGS	19 TPD	DDGS will be sold as Cattle feed.
6.	Paper waste and Glass Culets	300 Kg/day	Paper waste and Glass Culets will be sold to local supplier for recycle.

**B) Hazardous Waste: (Terms of Reference No. 7.7)**

- Used oil @ 0.5 Kl/annum will be generated from servicing of DG Sets and the same will be sent to HPSPCB authorized recyclers for final disposal.

**Table 2.28 Hazardous Waste Generation**

Sr. No.	Type of Waste	Category (As per Schedule)	Generation per day from (KL/annum)	Source of Generation	Mode of Storage	Mode of Treatment & Disposal
			Proposed			
1	Used Oil	5.1	0.5 Kl/annum	From servicing of DG Sets	Drums & Containers	Used oil will be sent to HPSPCB authorized recyclers for final disposal.

**2.4.9 Project Cost Breakup:**

The total project cost of will be Rs. 297 Crores. The bifurcation of cost is as follows:

**Cost for Environment Protection Measures:**

- ❖ Capital Cost: Rs. 4.12 Crores
- ❖ Recurring Cost/annum: Rs. 0.94Crores/annum

**2.5 Boiler Details: (Terms of Reference No. 12.4)**

Boiler of 15 TPH capacities with Bag filter as Air Pollution Control Equipment will be installed. Details regarding boiler are mentioned in the given table 2.29.

**Table 2.29: Details of Boiler and its fuel**

PARTICULARS	DESCRIPTION
Capacity of Boiler	15TPH
Fuel used	Multifuel (Biomass/Wood Chips / Briquettes) 80TPD



Stack Height	31m (AGL)
APCD	Bag filter
Diameter of Stack	900 mm
Flue Gas Generated	28837 m <sup>3</sup> /hr

**Table 2.30**

**Steam Requirement**

S.No.	Process/Section	Steam Requirement
1	Mash Tun	30 TPD
2	Wash Still	240 TPD
3	MEE	32.8 TPD
4	Drier	7.2 TPD
	Total	310 TPD

**2.6 Proposed Schedule and Approval and Implementation**

The construction of the project will only be started after obtaining Environmental Clearance and all other required clearance and there is likely hood of commissioning of the plant within 15-18 Months.



S. No.	Description	PERT CHART: Month Feb 2026 - July 2027																	
		February 2026	March	April	May	June	July	August	September	October	November	December	January 2027	February	March	April	May	June	July
1.	Start of building construction																		
2.	Order placing for plant and machinery																		
3.	Installation of plant and machinery																		
4.	Start of trial production																		
5.	Start of commercial production																		



## 2.7 Description of Mitigation Measures (Terms of Reference No. 3.5)

These are the following mitigation measures will be adopted by M/s Angus Dundee India Private limited to minimize the impact of project on the surrounding environment:

**Table 2.31 Description of Mitigation Measures**

Particulars	Mitigation measures to be adopted
<b>Air Environment</b>	<ul style="list-style-type: none"> <li>➤ Bag filter with a stack of height of 31 m will be installed with the proposed (15 TPH) boiler to control the particulate matter emissions below 50 mg/m<sup>3</sup>.</li> <li>➤ In proposed distillery, CO<sub>2</sub> generated from the fermenter will be scrubbed, liquified and sold to vendors engaged in manufacture of carbonated drinks.</li> <li>➤ DG Set (2X750 KVA) will have adequate stack height (15 m above the canopy) as per CPCB guidelines.</li> <li>➤ All internal roads will be paved and mechanically swept to control the generation of fugitive emissions.</li> <li>➤ Adequate greenbelt will be developed in the plant area.</li> <li>➤ Continuous Emission Monitoring System (CEMS) will be installed on stacks and connected to the server of CPCB/SPCB for real time monitoring.</li> <li>➤ The overall quality of the ambient air will be monitored and maintained within the limits prescribed under NAAQS-2009 prescribed by CPCB.</li> </ul>
<b>Water Environment</b>	<ul style="list-style-type: none"> <li>➤ The distillery will be based on “ZERO LIQUID DISCHARGE”.</li> <li>➤ Domestic effluent will be treated in STP of 10 KLD based on MBBR technology and reused for plantation within the premises.</li> <li>➤ Treated wastewater from the ETP will be used in the process as well as utility.</li> <li>➤ Spent wash will be generated from the distillation after passing through centrifugal decanter and separation of solids as DWGS/ Wet cake will be treated in ETP/CPU.</li> </ul>



<p><b>Solid/Hazardous Waste Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> <li>➤ Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.</li> <li>➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in Multiple Effect Evaporator (MEE) to produce DDGS.</li> <li>➤ DDGS @ 19 TPD will be sold as cattle feed.</li> <li>➤ ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.</li> <li>➤ Paper waste and Glass Culletts @ 300 Kg/day will be sold to local supplier for recycling.</li> <li>➤ Used oil/spent oil @ 0.5 Kl/annum will be sent to HPSPCB authorized recyclers.</li> </ul>
<p><b>Noise Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.</li> <li>➤ Personal Protective Equipment like earplugs and earmuffs will be provided to the workers exposed to high noise level.</li> <li>➤ D.G sets will be provided with acoustic to control the noise level within the prescribed limit.</li> <li>➤ Greenbelt inside the plant premises and at the plant boundary will be developed.</li> <li>➤ Regular monitoring of noise level will be carried out.</li> </ul>
<p><b>Odour management</b></p>	<ul style="list-style-type: none"> <li>➤ Adequate greenbelt will be developed &amp; maintained all around the periphery of the plant</li> <li>➤ Regular housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment.</li> <li>➤ Longer storages of any product will be avoided &amp; use of efficient biocides to control bacterial contamination.</li> <li>➤ Regular use of eco-friendly disinfectants in the drains to avoid generation of putrefying micro-organisms.</li> </ul>



<b>Flue Management</b>	<p>gas ➤ During combustion of fuel in the boiler furnace, there will be generation of flue gas emissions and to contain the concentration of particulate matter within the prescribed standards of 50 mg/Nm<sup>3</sup>, Bag filter will be installed as APCD.</p>
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**Table 3.32: Details of Emission**

LOCATION	APCD	FLUE GAS VOLUME m <sup>3</sup> /hr	STACK HEIGHT (in m)	STANDARD ACHIEVED
Attached with Proposed Boiler 15 TPH	Pulse Jet Bag Filters with Offline cleaning technology shall be provided (Air handling capacity- 28837 m <sup>3</sup> /hr) to contains & control the primary as well as secondary emission from proposed Boiler.	28837	31 m	PM- <50mg/Nm <sup>3</sup>



## CHAPTER - 3

### DESCRIPTION OF ENVIRONMENT

#### 3.1.1 Study Area

As a precursor for the prediction of various types of environmental impacts likely to arise due to implementation of the project, it is essential to establish the baseline environmental setting of the physical, natural and socio-cultural environmental parameters along the project and within the project influence area. Details of the baseline environmental parameters are required for decision making for the project design, implementation and operation from the environmental point of views. The data was generated through primary data collection (direct monitoring) which was done by laboratory namely **M/s Chandigarh Pollution Testing Laboratory, Mohali (NABL accredited), MoEF&CC recognized, NABL Certificate TC- 6728, Validity: valid upto 08.11.2028** and secondary sources (published data).

This chapter incorporates the description of environmental status in an area encompassed within 10 km radius around the proposed steel manufacturing unit.

Details showing all major features of area & environmentally sensitive places provided in table 3.1 and Figure 3.1

**Table 3.1**

#### Major Features around 10 km radius of study area

Environmental Features	Distance from Project site
National Park/ Wildlife Sanctuaries/ biosphere Reserve/ Tiger Reserves/ Migratory Corridors: Migratory routes etc.	Pong Dam Wildlife Sanctuary is located approx. 10.7 Km, SW from the project site
Historical Places/ places of tourist/ Archaeological site	Kangra Fort, 7.86 Km, SE Archaeological museum Kangra Fort, 8 Km, SE
Defence Installation	There is no Defence installation within 10km radius of study area.
Nearest Village	Salol



Reserved/protected Forest	<b>Particulars</b>	<b>Direction</b>	<b>Distance</b>
	Raltung PF	NW	8.44 Km
	Ramgarh Kurala PF	N	3.69 Km
	Lani PF	S	1.75 Km
	Pandhwar PF	NW	4.21 Km
	Baldoa RF	W	8.51 Km
	Jainimasror RF	SW	7.22 Km
<b>Water Body</b>	Baner Khad, 6.91 Km, East Ghaj Khad, 0.54 Km, W Chambi Khad, 6.22 Km, N Manuni Khad, 8.43 Km, E Pong Dam, 10.7 Km, SW		
Nearest Airport	<b>Kangra (Gaggal):</b> - Airport approx. 9.05 km in North East direction from the project site.		
Nearest Rail Head	Kangra, approx. 8.52 km in South East direction from the project site.		
National Highway/State Highway	NH-503 Jawalamukhi Kangra ji road is approx. 8.41 km in E direction from the project site. SH-23, approx. 4.06 Km in South direction from the project site.		

### 3.1.2 Study Period

The baseline environmental monitoring for the proposed project was conducted from March 15 to June 15, 2025. It began with a reconnaissance survey of the study area to identify suitable monitoring stations. Primary data collection followed standard procedures outlined in CPTLE/QSPM-06/01 to CPTLE/QSPM-06/09, in line with the organization’s Quality Management System (QMS). Additionally, secondary data sources such as land use details, socio-economic profiles, historical meteorological data, census reports, gazetteers, and records from the Indian Meteorological Department (IMD) were reviewed. The baseline status of various environmental components is presented in the following sections.

### 3.1.3 Components of Study

This chapter contains information on existing environmental scenario for the following parameters.

1. Land Environment
2. Meteorology
3. Air Environment
4. Noise Environment



5. Water Environment
6. Soil Environment
7. Biological Environment
8. Socio-economic Environment

### **3.1.4 Methodology**

For the present study, all the sampling locations are marked with the help of Google maps and site visits. The land use/ land cover map has been generated on 1:50,000 scale using Satellite imagery and ground truth information. The baseline environmental quality has been assessed during period i.e., 15 March to 15 June, 2025. Samples of Air, Water, Noise and Soil from the site and nearby areas has been collected and analyzed to ascertain existing status. Primary and secondary data collection has been done by the Ecology and Biodiversity team. The baseline data is generated through field study within the impact zone for various components of the environment viz. Air, Noise, Water, Land, Ecology and Socioeconomic. While generating the baseline status of physical and biological environment of the study area, the concept of impact zone has been considered. The impact zone selection is based on preliminary screening and modeling studies. The methodologies for various environmental facets are as follows:

#### **1. Meteorological Data**

Meteorological data of project site has been used for the study and for reference a secondary data was obtained from Indian Meteorological Department (IMD). The important parameters considered are temperature, humidity, wind speed, wind direction and rainfall.

#### **2. Ambient Air Quality**

The guidelines for selections of ambient air monitoring stations and analysis of air pollutants as given in IS – 5182 part 14, 2000 (Guidelines for planning the sampling of atmosphere) and ‘Guidelines for Ambient Air Quality Monitoring’ by CPCB respectively were followed.

#### **3. Water Quality**

Grab sampling was done for ground and surface water. Water samples were taken as per the Standard Methods (IS 10500: 2012 & APHA, 23rd Edition). Necessary precautions were taken during sampling and preservation of samples.

#### **4. Noise Quality**

At each station noise level was monitored for day and night once in a season as per IS 9989:1981. As sensitive receptors are the prime consideration for sound levels, the monitoring locations are the same as those decided for ambient air quality monitoring.



## 5. Soil Quality

For soil, augur method was used and samples were collected at 15-30 cm depth after removing the upper crust.

## 6. Geology and Hydrogeology

Field survey has been conducted to verify secondary data like drainage pattern, ground water condition, elevation etc.

## 7. Land Use

The land use/ land cover map has been generated on 1:50,000 scale using Satellite imagery and ground truth information.

## 8. Biological Environment

Primary and secondary data collection has been carried out by the Ecology and Biodiversity expert/ team for the study of flora and fauna in the core and buffer zone.

## 9. Socio- Economic Environment

For demography and socioeconomic, secondary data block wise has been collected and used for the assessment of impacts. Field survey has been conducted to verify secondary data.

### 3.2 ENVIRONMENTAL BASELINE DATA COLLECTION

Baseline data for the proposed plant was collected before monsoon season. Primary data was collected by monitoring & surveying of various environmental components/ parameters in the core zone during the study period, details of which are given in **Table - 3.2**.

**Table-3.2**

#### Primary Data

S. No.	Parameters	Description
1.	<b>Meteorology</b>	Meteorological parameters on hourly basis at project site <i>Parameters: Temperature, Relative humidity, Wind Speed &amp; Wind Direction.</i>
2.	<b>Air</b>	Ambient air quality monitoring (24 hourly), twice a week. <i>Parameters are PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub>&amp; CO.</i> <i>No. of Locations: 8 in core and buffer zone.</i>
3.	<b>Noise</b>	Noise level monitoring ( <i>Day &amp; Night time</i> ), Once in a season. <i>No. of Locations: 8 in core and buffer zone.</i>
4.	<b>Water</b>	Ground water & surface water sampling, once in a season.



		No. of Locations: 8 locations in core and buffer zone ( <i>for groundwater</i> ), 2 locations in buffer zone ( <i>for surface water</i> ). <i>Tested for physical and chemical parameters.</i>
5.	<b>Soil</b>	Soil sampling, once in a season. <i>No. of Locations: 8 locations in core and buffer zone.</i>
6.	<b>Biological Factors</b>	Biodiversity survey, once in a season. <i>Location: Core and buffer zone.</i>
7.	<b>Socio-economic Environment</b>	Socio-economic survey, once in a season. <i>Location: Core and buffer zone.</i>

### 3.3 METEOROLOGY

#### 3.3.1 Climate

The project area is located in the foot hills of Shivalik Range and experiences a pleasant Climate throughout the year. The average altitude of the region is from 350 meter to 700 meter above sea level. The region generally experiences three seasons. The winter season spans from October to February and the summer from March to June. By July the rainy season starts in the hilly region and ends in September. During winter the days and nights are very cold.

- Summer – March to June
- Monsoon – July to August
- Winter Season – October to February

In order to study the meteorology of the project area, site specific one season meteorological data was collected. Annual Weather Averages & Windrose diagram is provided at Fig 3.3 and Fig 3.4 respectively.

#### 3.3.2 Temperature

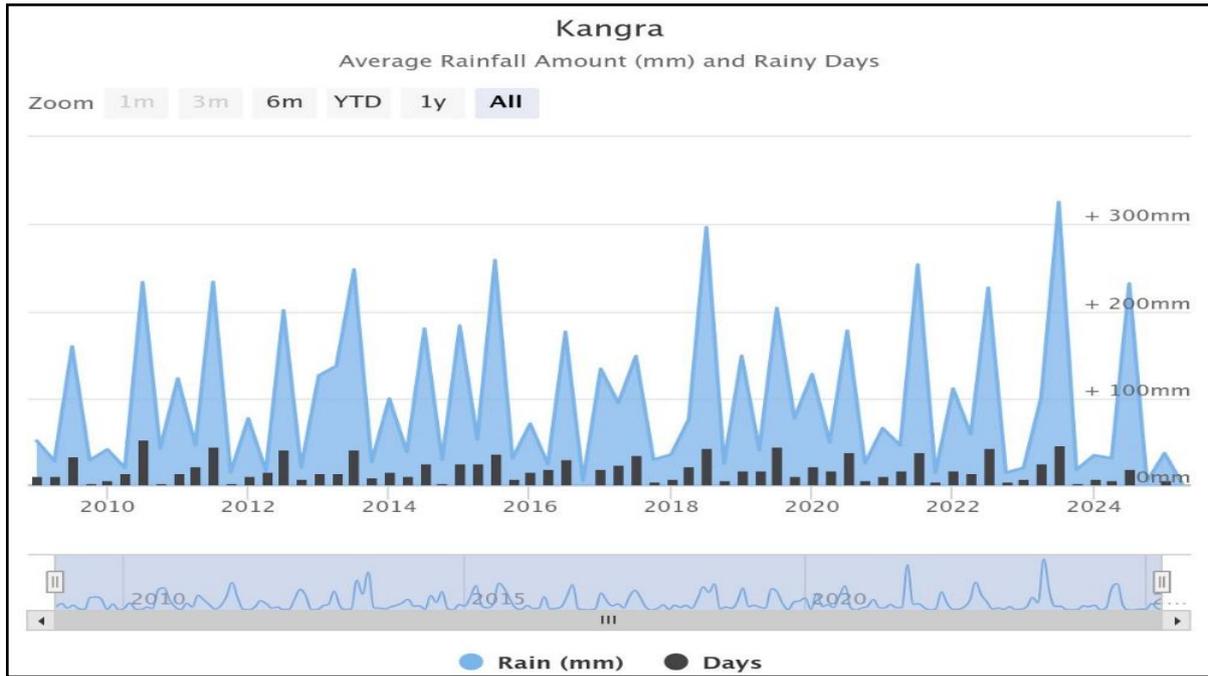
June and July are the hottest months with daily average temperature going up to 30°C and minimum average daily temperature as 24°C. Hot scorching dust laden winds blow during the summer season and on individual days the temperature sometimes goes a little above 40°C. With the on-set of monsoons in July there is appreciable drop in temperature but due to increased moisture in the air the weather becomes uncomfortable. After monsoon in September the night temperature drops appreciably. December and January are the coldest months when the maximum average daily temperature is around 22°C and minimum about 6°C.



### 3.3.3 Rainfall

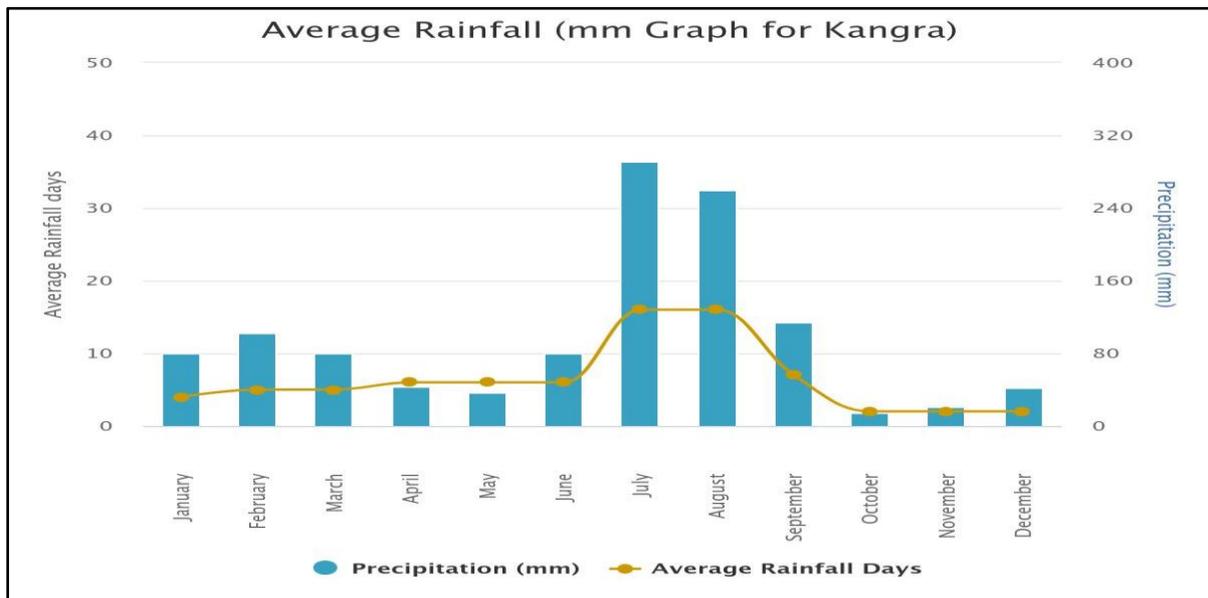
The rainfall in the zone is caused by the Southwest monsoon. It starts in the month of July and extends up-to the end of September. During this period the monsoon rain-fall contributes about 70 to 80% of the total annual rainfall. The average annual rain fall is in the range of 1010mm. The annual numbers of rainy days on an average are about 62 in a year, out of which about 30 falls in the monsoon period of July to September. Rainfall averages in given in fig. 3.1.

**Fig 3.1 Average Rainfall data (mm)**



(Source: <https://www.worldweatheronline.com/kangra-weather-averages/himachal-pradesh/in.aspx>)

**Fig. 3.2 Yearly Average Rainfall for year 2024**





(Source: <https://www.worldweatheronline.com/kangra-weather-averages/himachal-pradesh/in.aspx>)

### 3.3.4 Micro-Meteorology at Site (Terms of Reference No. 6.1)

Meteorological station was set-up at site to record surface meteorological parameter during the study period. Wind rose diagram for the study period is given at Figure 3.2. Summary of the micro-meteorology at site is given in Table 3.3.

**Table- 3.3 Micro-meteorology**

Month	Temperature(°C)		Relative Humidity (%)
	Max.	Min.	Average
March, 2025	34°C	10°C	21°C
April, 2025	38°C	14°C	27°C
May, 2025	38°C	20°C	28°C
June, 2025	39°C	18°C	28°C

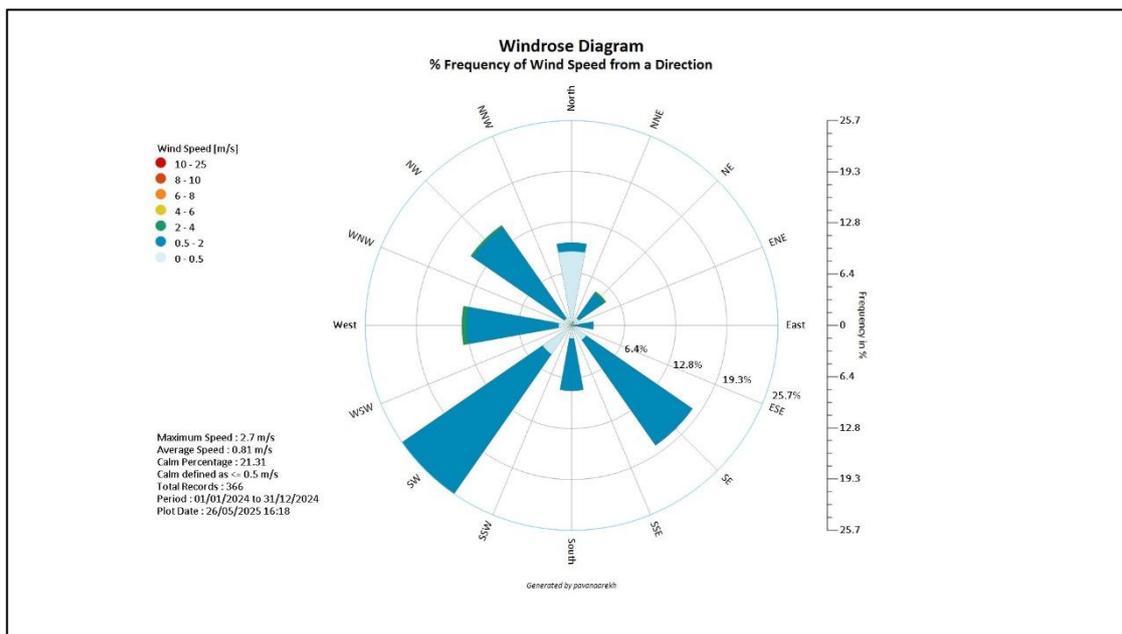
(Source: <https://www.timeanddate.com/weather/@1256073/historic?month=10&year=2024>)

### 3.3.5 Wind Rose Pattern:

- A wind rose diagram is a graphical tool used to visualize the distribution and frequency of wind directions at a specific location over a given period of time. This diagram consists of a circular plot divided into segments that represent different wind directions (e.g., north, south, east, west) around the compass.
- The length of each segment corresponds to the proportion of time the wind blows from that direction, while color shading or concentric circles may indicate wind speed ranges.
- Wind speed and Wind direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the study area. Based on the collected meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind rose for twenty-four hourly durations. Wind rose diagram for (January-December, 2024) is given in Figure 3.3. Summary of site-specific wind pattern is given in Table 3.4. Wind rose diagram for (15<sup>th</sup> March to 15<sup>th</sup> June, 2025) is given in Figure 3.4. Summary of site-specific wind pattern is given in Table 3.5.



Fig. 3.3 Wind Rose Diagram (January-December, 2024)



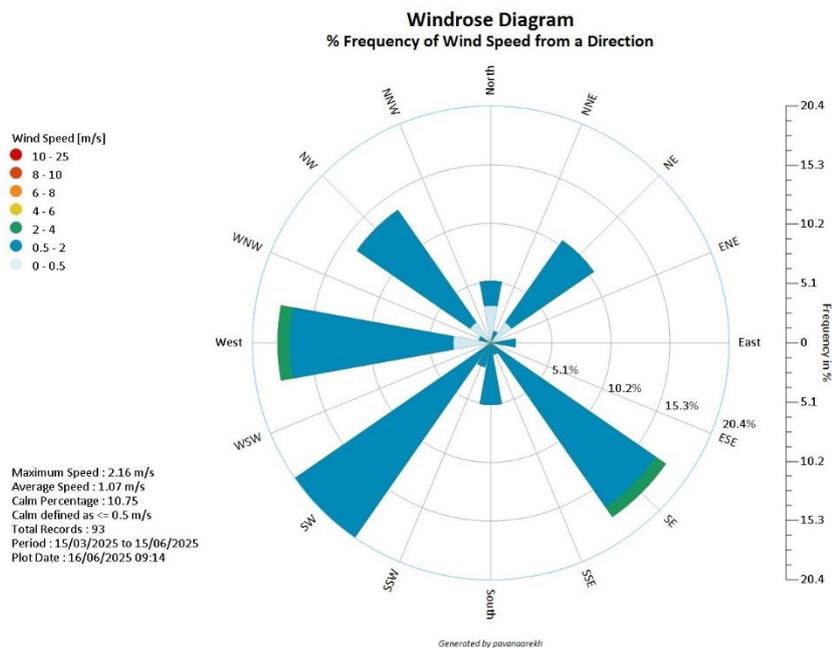
(Source: <https://www.timeanddate.com>)  
 (Software name: - Pavanaarekh)

Table 3.4: Summary of site-specific wind pattern

<b>Season</b>	January-December, 2024
<b>First Predominant Wind Direction</b>	SW
<b>Avg. Wind Speed (m/s)</b>	0.81 m/sec
<b>Maximum Speed</b>	2.7 m/sec
<b>Calm Percentage</b>	21.31 %
<b>Peroid</b>	01/01/2024-31/12/2024
<b>Plot Date</b>	26/05/2025 (16:18)



Fig 3.4 Wind Rose diagram for Study Period



(Source: <https://www.timeanddate.com>)  
(Software name: - Pavanaarekh)

Table 3.5: Summary of site-specific wind pattern

Season	Post-monsoon period
Predominant Wind Direction	SW
Avg. Wind Speed (m/s)	1.07 m/s
Maximum Speed	2.16 m/s
Calm Percentage	<=0.5 m/s
Period	15.03.2025 to 15.06.2025
Plot Date	16.06.2025



### 3.4 Ambient Air Quality (Terms of Reference No. 6.3)

The ambient air quality monitoring was done to assess the current status of air quality in the study area. Monitoring was carried out at eight stations for 15<sup>th</sup> March to 15<sup>th</sup> June, 2025. The guidelines for selections of ambient air monitoring stations given in IS – 5182 part 14, 2000 and ‘CPCB guidelines for air quality monitoring’ were followed. These guidelines state that, “when the objective of air sampling is to identify the contribution from specific sources of pollution, the sampling locations should be located in upwind and the downwind direction of such sources”.

The ambient air quality monitoring locations were selected considering the following criterion:

1. Location of sensitive receptors such as reserved forests, national parks, hospitals, archaeological sites, etc. in the vicinity of the study area.
2. The site should be representative of the area selected;
3. Topography of the study area.
4. The stations should be selected in a way so as to yield data that can be compared with another;
5. Certain physical requirements (electricity and other logistics) should be satisfied at the site.

#### 3.4.1 Methodology

The prime objective of the baseline study with respect to ambient air quality is to establish the present air quality and its conformity to National Ambient Air Quality Standards. This data has been further used during impact assessment to predict the final air quality. This section describes the sampling locations, frequency of sampling and methodology adopted for monitoring ambient air quality.

To quantify the impact of the project on the ambient air quality, it is necessary first to evaluate the ambient air quality of the area. The ambient air quality, in terms of Particulate Matter (Size <10µm) or PM<sub>10</sub>, Particulate Matter (Size <2.5 µm) or PM<sub>2.5</sub>, Sulphur-di-oxide (SO<sub>2</sub>), Oxides of Nitrogen (as NO<sub>2</sub>), Carbon Monoxide (CO), and Ozone (O<sub>3</sub>) has been measured through a planned field monitoring.

#### 3.4.2 Sampling Stations

To select the air sampling locations, meteorological data with respect to temperature, relative humidity, wind speed and direction plays a vital role. Predominant wind direction plays an important role in determining location of monitoring stations. List of Air sampling stations are given in table 3.6 and Location Air Sampling Stations are given in Fig 3.6. Ambient air abstract is given in table 3.8. Photographs of site visits are provided in Figure 3.5.



Table 3.6

Ambient Air Monitoring Stations

Sample Code	Location	Distance (Km)	Direction	Co-ordinates		Justification For the Selection
				Latitude	Longitude	
AAQ-1	Project Site	--	--	32°7'13.64"N	76°10'46.34"E	Represent the project site
AAQ-2	Salwana Tatwani	2.86 Km	N	32° 8'42.80"N	76°10'49.23"E	Upwind direction of the project site.
AAQ-3	Jhajhroli	3.98 Km	NW	32° 7'23.92"N	76° 8'17.38"E	Crosswind direction of the project site.
AAQ-4	Jheer Balla	2.60 Km	NE	32° 8'28.10"N	76°11'26.43"E	Crosswind direction of the project site.
AAQ-5	Bhohar Kawalu	4.02 Km	S	32° 5'0.92"N	76°11'15.69"E	Downwind direction of the project site.
AAQ-6	Bharth	3.31 Km	SE	32° 6'0.61"N	76°12'25.18"E	Crosswind direction of the project site.
AAQ-7	Korian	2.65 Km	SW	32° 6'0.04"N	76° 9'49.43"E	Crosswind direction of the project site.
AAQ-8	Bhandrel	2.03 Km	W	32° 6'57.32"N	76° 9'32.43"E	Crosswind direction of the project site.

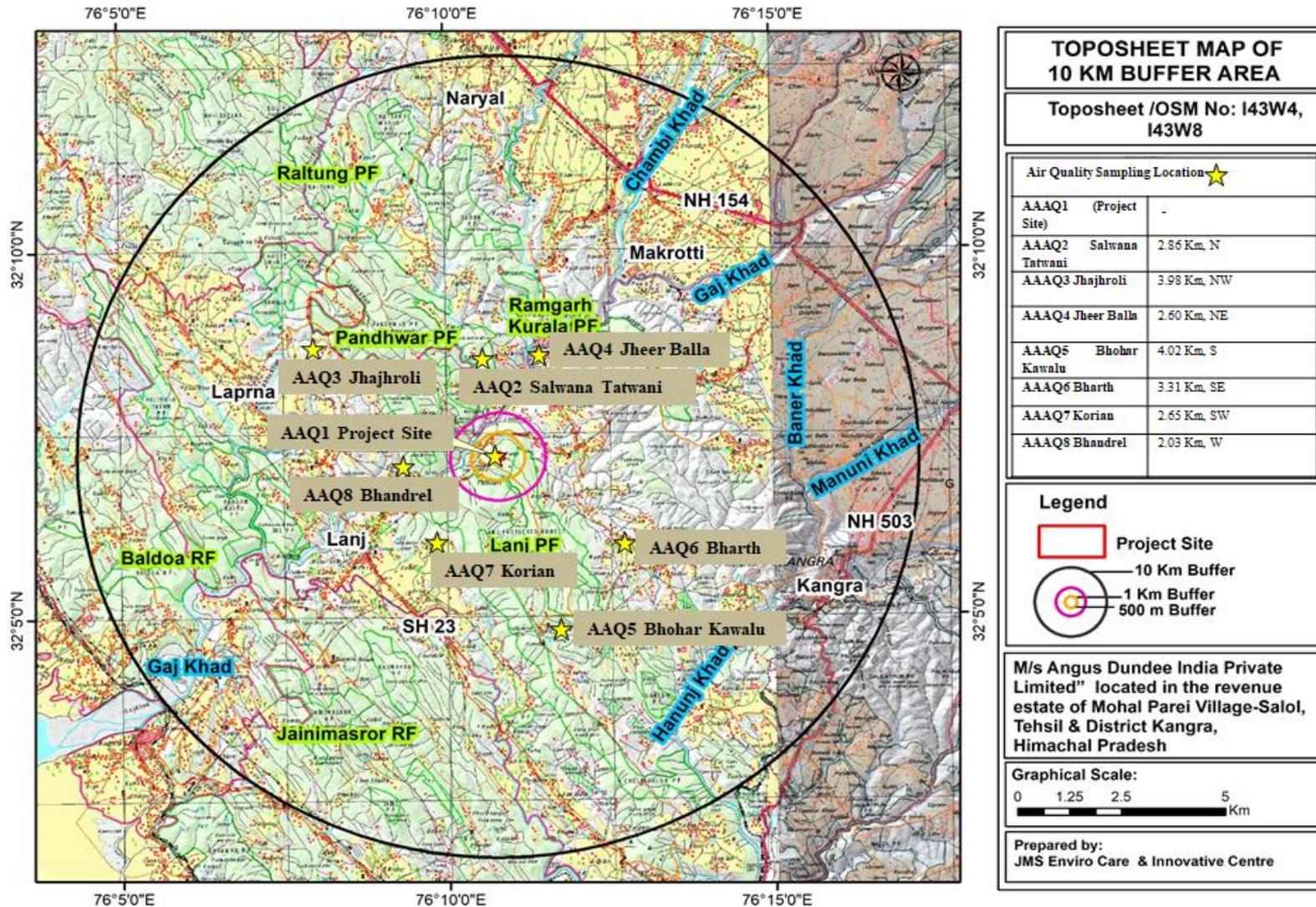
Fig. 3.5 Photographs of Air Sampling Stations



(Source: Site Visits)



Fig. 3.6 Monitoring locations of Ambient Air





## Monitoring Schedule

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for 12 weeks.

### (2) Methods of Sampling and Analysis

Fine particulate Sampler Envirotech APM-550 (FPS) & APM-460 (RDS) were used for monitoring of Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>); gaseous pollutants like SO<sub>2</sub>, and NO<sub>2</sub> were collected by Gaseous Pollutant Sampler Envirotech APM-433. The analysis was done as per methods mentioned in table 3.7:

**Table 3.7: Methods of Sampling and Analysis**

	Parameters	Analysis Method
1.	PM <sub>10</sub> µg/m <sup>3</sup>	IS:5182, (Part-23) 2006, By Gravimetric Method: 2006
2.	PM <sub>2.5</sub> µg/m <sup>3</sup>	SP-57, Issue Date-01-05-2019, CPCB Guideline Vol-I: 2011
3.	SO <sub>2</sub> µg/m <sup>3</sup>	IS 5182 (P-2):2001 1 <sup>st</sup> Rev (RA: 2012): 2001
4.	NO <sub>x</sub> µg/m <sup>3</sup>	IS:5182, (P-6), RA 2012: 2006
5.	CO mg/m <sup>3</sup>	IS 5182 (P- 10):RA2014: 1999

**Sample Transportation and Sample Preservation:** Proper preservation of samples was done after sampling. The Gaseous samples were preserved in an ice box (below 4°C) and transported to the laboratory for analysis. The filter papers were collected using forceps and stored in polythene bags and stored in dry containers during transportation.



Table 3.8 Ambient Air Quality Abstract

Locations	PM <sub>10</sub> µg/m <sup>3</sup>			PM <sub>2.5</sub> µg/m <sup>3</sup>			SO <sub>2</sub> µg/m <sup>3</sup>			NO <sub>x</sub> µg/m <sup>3</sup>			CO mg/m <sup>3</sup>			O <sub>3</sub> µg/m <sup>3</sup>			NH <sub>3</sub> µg/m <sup>3</sup>	Benzene µg/m <sup>3</sup>	BaP µg/m <sup>3</sup>	Pb µg/m <sup>3</sup>	Ni ng/m <sup>3</sup>	As ng/m <sup>3</sup>	
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
AAQ1- Project Site	64.1	71.5	67.8	30	33.8	31.9	5.0	6.0	5.5	10.0	12.0	11.0	0.50	0.54	0.52	20.10	24.20	22.15	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ2- Salwana Tatwani	62	71.4	66.7	30	31.7	30.9	5.0	5.6	5.3	10.0	11.1	10.6	0.50	0.53	0.52	20.10	22.20	21.15	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ3- Jhajhroli	62.1	70.5	66.3	30	32.9	31.5	5.0	5.5	5.3	10.0	11.2	10.6	0.50	0.51	0.51	20.30	24.30	22.50	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ4- Jheer Balla	61.5	64.5	63.0	31.3	33.8	32.6	5.0	5.5	5.3	10.0	10.9	10.5	0.50	0.55	0.53	20.20	26.60	23.40	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ5- Bohar Kawalu	62	66.7	64.4	32.1	35.8	34.0	5.0	5.9	5.5	10.0	12.4	11.2	0.50	0.56	0.53	20.20	23.20	21.70	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ6- Bharth	60.4	64.8	62.6	30	33.3	31.7	5.0	5.4	5.2	10.0	11.6	10.8	0.50	0.53	0.52	20.10	22.60	21.35	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ7- Korian	62.0	66.7	64.4	31.3	33.8	32.6	5.0	5.5	5.3	10.0	10.9	10.5	0.50	0.54	0.52	20.10	21.60	20.85	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ8- Bhamdrel	62.2	65.4	63.8	30.0	32.1	31.1	5.0	5.3	5.2	10.0	10.4	10.2	0.50	0.53	0.52	20.10	22.60	21.35	BDL	BDL	BDL	BDL	BDL	BDL	BDL
P98	70.4			35.2			5.9			12.2			0.55			25.95			0	0	0	0	0	0	0
CPCB Standards	100			60			80			80			4			100			400	05	01	1.0	20	06	



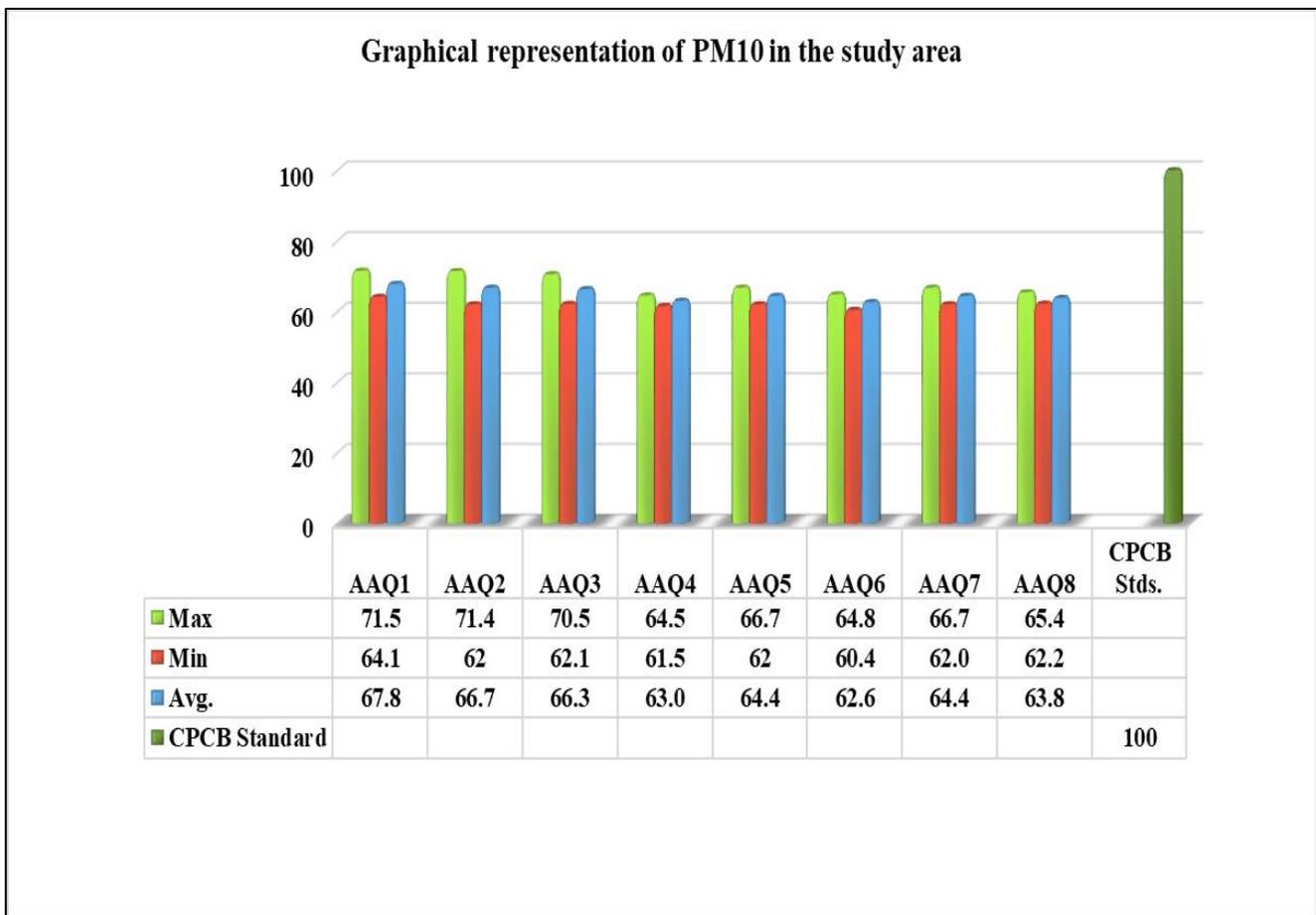
### 3.4.3 Interpretation

The observations based on a perusal of the results for the study period are summarized below:

#### A) Respirable Particulate Matter (PM<sub>10</sub>):

As per the study conducted between 15<sup>th</sup> March to 15<sup>th</sup> June 2025, the maximum and minimum values of PM<sub>10</sub> were analyzed, with the average values ranging from  $\mu\text{g}/\text{m}^3$  62.6 to 67.8  $\mu\text{g}/\text{m}^3$ . The highest recorded value of PM<sub>10</sub> was 71.5  $\mu\text{g}/\text{m}^3$  at the project site (AAQ1), while the lowest value was 60.4  $\mu\text{g}/\text{m}^3$  at Bharth (AAQ6). P98 for the PM<sub>10</sub> was found to be satisfactory i.e., 70.4  $\mu\text{g}/\text{m}^3$  which is well below the prescribed standards of 100  $\mu\text{g}/\text{m}^3$ . Graphical representation of PM<sub>10</sub> is shown in Figure 3.7.

**Figure 3.7 Graphical representation of PM<sub>10</sub> in Study Area**

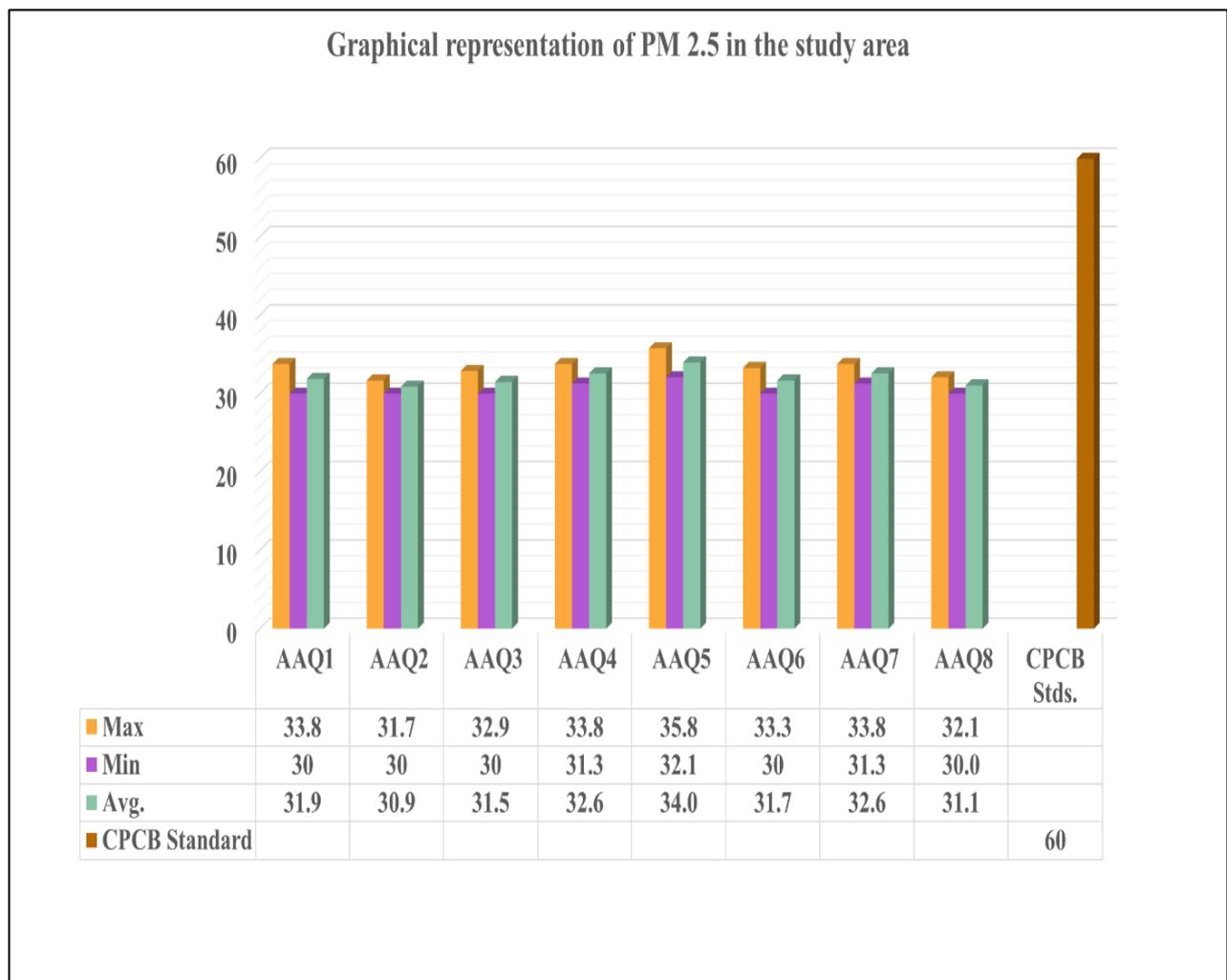




**B) Particulate Matter (PM2.5):**

As per the study conducted during the period 15<sup>th</sup> March to 15<sup>th</sup> June 2025, the maximum and minimum values of PM<sub>2.5</sub> were analyzed. The average of these values was found to lie within the range of 30.9 to 34.0 µg/m<sup>3</sup>. The maximum PM<sub>2.5</sub> concentration was recorded as 35.8 µg/m<sup>3</sup> at Bohar Kawalu (AAQ5), while the minimum concentration was observed at (AAQ1), Salwana Tatwani (AAQ2), Jhajhroli (AAQ3), Bharth (AAQ6), Bhandrel (AAQ8), measured at 30 µg/m<sup>3</sup>. P98 for the PM<sub>2.5</sub> was found to be satisfactory i.e., 35.2 µg/m<sup>3</sup> which is well below the prescribed standards of 60 µg/m<sup>3</sup>. Graphical representation of PM<sub>2.5</sub> is shown in Figure 3.8.

**Figure 3.8 Graphical representation of PM<sub>2.5</sub> in Study Area**

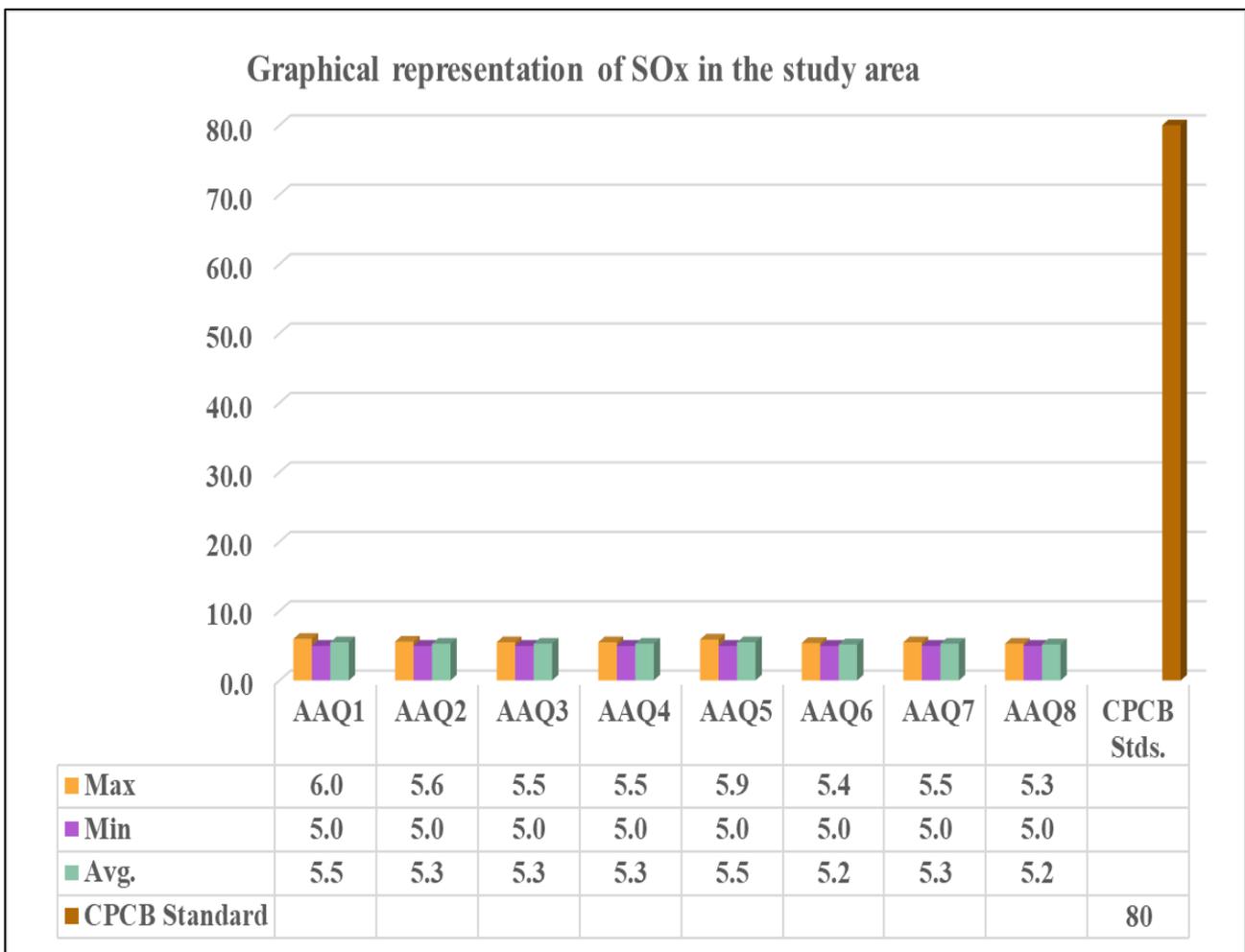




**C) Sulphur Dioxide (SO<sub>2</sub>):**

As per the study conducted during the period 15<sup>th</sup> March to 15<sup>th</sup> June 2025, the maximum and minimum concentrations of SO<sub>2</sub> were analyzed. The average of these values was found to range between 5.2 to 5.5 µg/m<sup>3</sup>. The maximum concentration of sulfur dioxide (SO<sub>2</sub>) was recorded at 6.0 µg/m<sup>3</sup> at the project site (AAQ1), while the minimum concentration of 3.0 µg/m<sup>3</sup> was consistently observed across all monitoring locations, including AAQ1 through AAQ8. These values indicate relatively low levels of SO<sub>2</sub> in the ambient air across the study area, remaining well below the prescribed national ambient air quality standards. Graphical representation of PM<sub>2.5</sub> is shown in Figure 3.9.

**Fig 3.9 Graphical representation of SO<sub>2</sub> in Study Area**

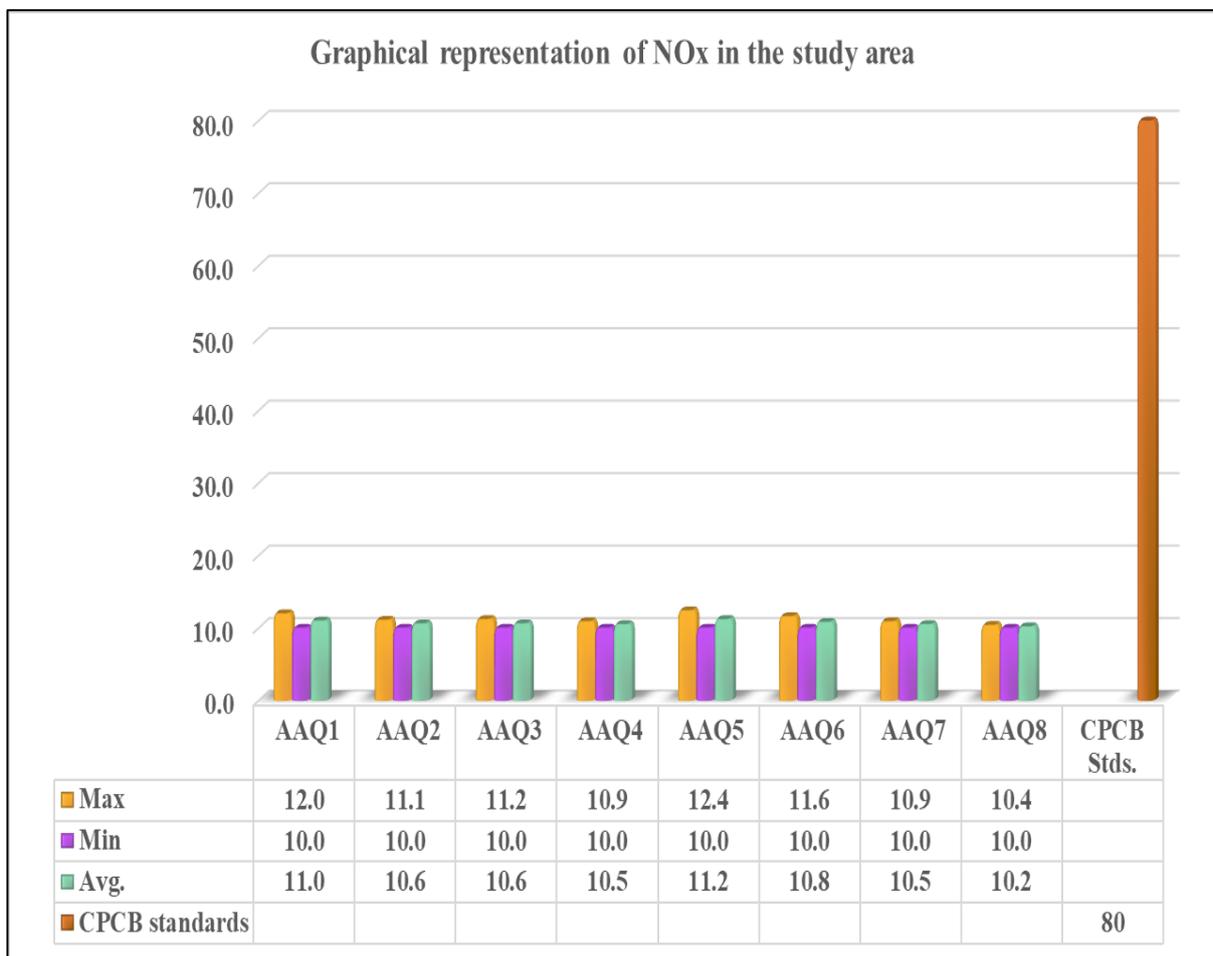




**D) Nitrogen Dioxide (NO<sub>2</sub>):**

As per the study conducted during the period 15<sup>th</sup> March to 15<sup>th</sup> June 2025, the maximum and minimum concentrations of NO<sub>2</sub> were evaluated. The average values were found to range between 10.2 to 11.2 µg/m<sup>3</sup>. The highest NO<sub>2</sub> concentration was recorded at the Bhojar Kawalu (AAQ5), measuring 12.4 µg/m<sup>3</sup>, while the minimum concentration of 10.0 µg/m<sup>3</sup> was consistently observed across all monitoring locations, including AAQ1 through AAQ8. These values indicate relatively low levels of NO<sub>2</sub> in the ambient air across the study area, remaining well below the prescribed national ambient air quality standards. Graphical representation of PM<sub>2.5</sub> is shown in Figure 3.10.

**Fig 3.10 Graphical representation of NO<sub>x</sub> in Study Area**

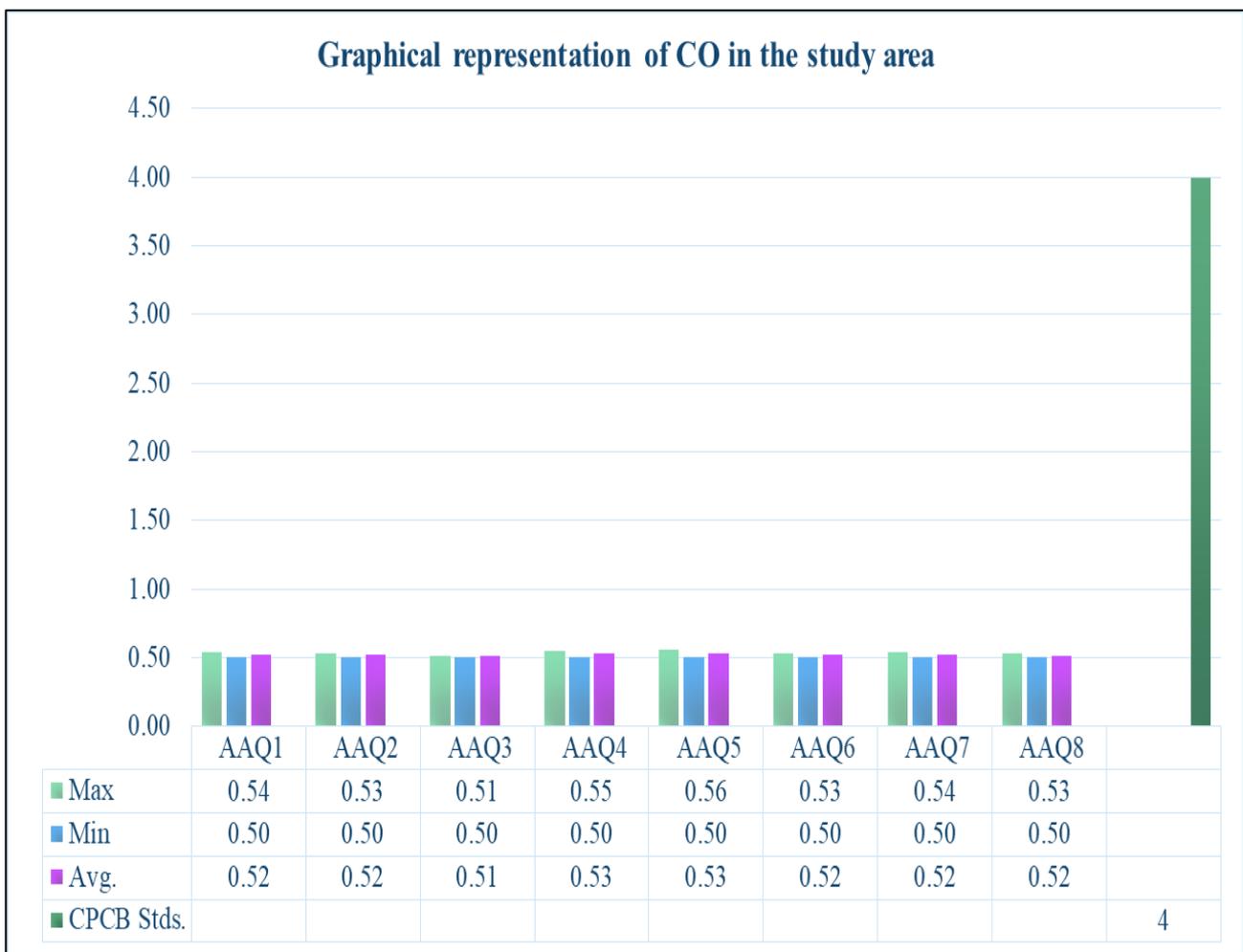




### E) Carbon Monoxide (CO):

As per the study conducted during the period 15<sup>th</sup> March to 15<sup>th</sup> June 2025, the maximum and minimum concentrations of CO (Carbon Monoxide) were evaluated. The average values were found to range between 0.51 to 0.53 mg/m<sup>3</sup>. The highest CO concentration of 0.56 mg/m<sup>3</sup> was recorded at Bhohar Kawalu (AAQ5), while the minimum concentration of 0.50 mg/m<sup>3</sup> was consistently observed across all monitoring locations, including AAQ1 through AAQ8. These values indicate relatively low levels of CO in the ambient air across the study area, remaining well below the prescribed national ambient air quality standards. Graphical representation of PM<sub>2.5</sub> is shown in Figure 3.11.

**Fig 3.11 Graphical representation of CO in Study Area**

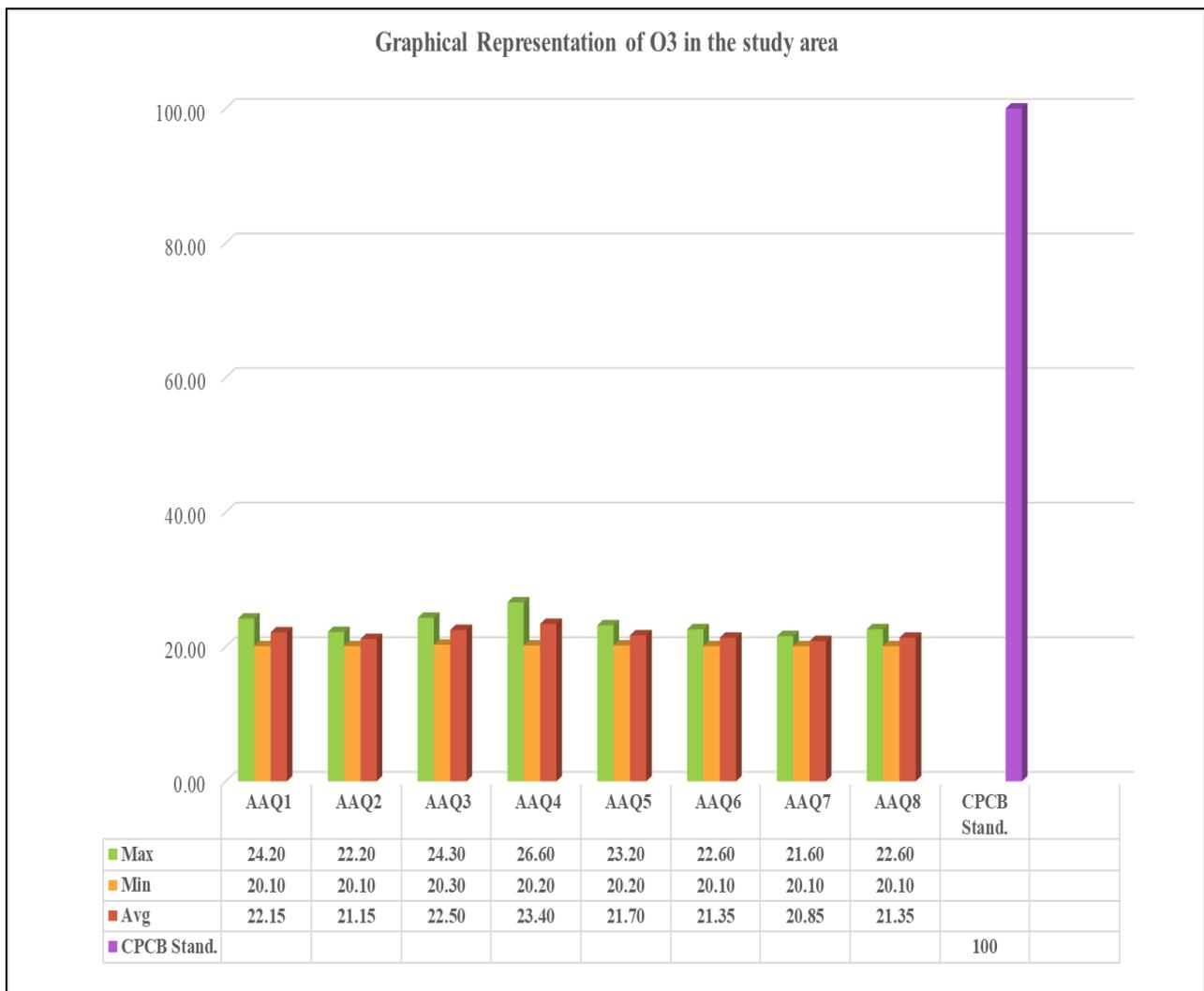




**F) Ozone (O<sub>3</sub>):**

According to the study conducted between 15<sup>th</sup> March to 15<sup>th</sup> June 2025, the maximum and minimum concentrations of ozone (O<sub>3</sub>) were assessed. The average ozone levels were found to range from 20.85 µg/m<sup>3</sup> to 23.40 µg/m<sup>3</sup>. The highest concentration of 26.60 µg/m<sup>3</sup> was recorded at Jheer Balla (AAQ4), while the lowest concentration, 20.10 µg/m<sup>3</sup>, was observed at (AAQ1), (AAQ2), (AAQ6), (AAQ7) and (AAQ8). Graphical representation of PM<sub>2.5</sub> is shown in Figure 3.12.

**Fig. 3.12 Graphical Representation of O<sub>3</sub> in the study area**





## **Conclusion:**

The overall inference from the above analysis can be summed up as follows:

- *As per the analytical reports of the project site and the surrounding areas, the ambient air quality is well below the NAAQS limits, so to maintain the ambient air quality of the area, the latest / modern air pollution control measurements and APCD will be used in the industry.*
- *Furthermore, concentrations of hazardous pollutants like benzene, benzo(a)pyrene (BaP), lead (Pb), nickel (Ni), and arsenic (As) were found to be below detection limits*
- *The baseline data for air quality was compared with CPCB air quality monitoring data base and was found to be moderately consistent.*



### 3.5 Water Environment

#### Water Quality

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of ground water has been studied in order to assess water-use in construction, drinking, cooling and horticulture purpose. The water quality at the site and other locations within the 10 km impact zone was monitored during 15<sup>th</sup> March to 15<sup>th</sup> June 2025.

#### Sampling frequency and Technique

Parameters for analysis of water quality were selected based on the utility of the particular source of water as per MoEF&CC guidance. Hence quality of ground water was compared with IS: 10500: 2012 for drinking purposes. As per the standard practice, one sample from each station was taken in the study period. Sampling was done by standard sampling technique as per the Standard Methods. Necessary precautions were taken for preservation of samples.

Sampling location of surface water and ground water are given in **Figure 3.13 and 3.15** and list of surface & ground water sample is given in **Table 3.9 & 3.13** respectively. The results of surface water & ground water are given in **Table 3.11 (a & b) & 3.14** respectively.

#### 3.5.1 Surface water sources in the study area *(Terms of Reference No. 6.4)*

The surface water resources in the study area as studied from the satellite imagery depicts that Baer khad is about 6.91 km flowing towards East and Ghaj Khad is about 0.54 Km flowing towards West. The sampling locations for the surface water were finalized after reconnaissance survey and consultation with the functional area experts from the respective areas.

**Table 3.9 Surface Water Sampling Stations**

Station	Sampling Location	Aerial Distance (Km) and Direction from	Sampling Location
SW-1	Baner Khad	6.91 Km, East	Surface water sampling location.
SW-2	Ghaj Khad	0.54 Km, West	
SW-3	Chambi Khad	6.22 Km, North	Due to their seasonal nature, these water bodies were dry at the time of sampling.
SW-4	Manuni Khad	8.43 Km, East	



**Table 3.10: Standard Operating Procedure (SOP) for Water Sampling**

Parameters	Sample collection	Sample size	Storage/Preservation
pH	Grab Sampling Plastic/glass container	50 ml	Onsite analysis
Electrical conductivity	Grab Sampling Plastic/glass container	50 ml	Onsite analysis
Total Suspended Solids	Grab Sampling Plastic/glass container	100 ml	Refrigeration can be stored for 7 days
Total Dissolved Solids	Grab Sampling Plastic/glass container	100 ml	Refrigeration can be stored for 7 days
BOD	Grab Sampling Plastic/glass container	500 ml	Refrigeration, 48 hrs.
COD	Grab Sampling Plastic/glass container	100 ml	Add H <sub>2</sub> SO <sub>4</sub> to pH>2, refrigeration; 7 days
Hardness	Grab Sampling Plastic/glass container	100 ml	Add HNO <sub>3</sub> to pH<2, refrigeration; 6 months
Chlorides	Grab Sampling Plastic/glass container	50 ml	Not required; 28 days
Sulphates	Grab Sampling Plastic/glass container	100 ml	Refrigeration, 28 days
Nitrates	Plastic containers	100 ml	Refrigeration, 48 hrs
Fluorides	Plastic containers only	100 ml	Not required; 28 days
Alkalinity	Plastic/glass containers	100 ml	Refrigeration, 14 days
Ammonia	Plastic/glass containers	100 ml	Add H <sub>2</sub> SO <sub>4</sub> to pH>2, refrigeration; 28 days
Hexavalent Chromium, Cr <sup>+6</sup>	Plastic/glass containers Rinse with 1+1 HNO <sub>3</sub>	100 ml	Grab Sample; refrigeration; 24 hours
Trace Metals (Hg, Cd, Cu, Fe, Zn, Pb)	Plastic/glass containers Rinse with 1+1 HNO <sub>3</sub>	100 ml	Add HNO <sub>3</sub> to pH<2, refrigeration; 6 months

*(Source: Standard methods for the Examination of Water and wastewater. Published by APHA. AWWA. w.e.f 21<sup>st</sup> Edition, 2005)*

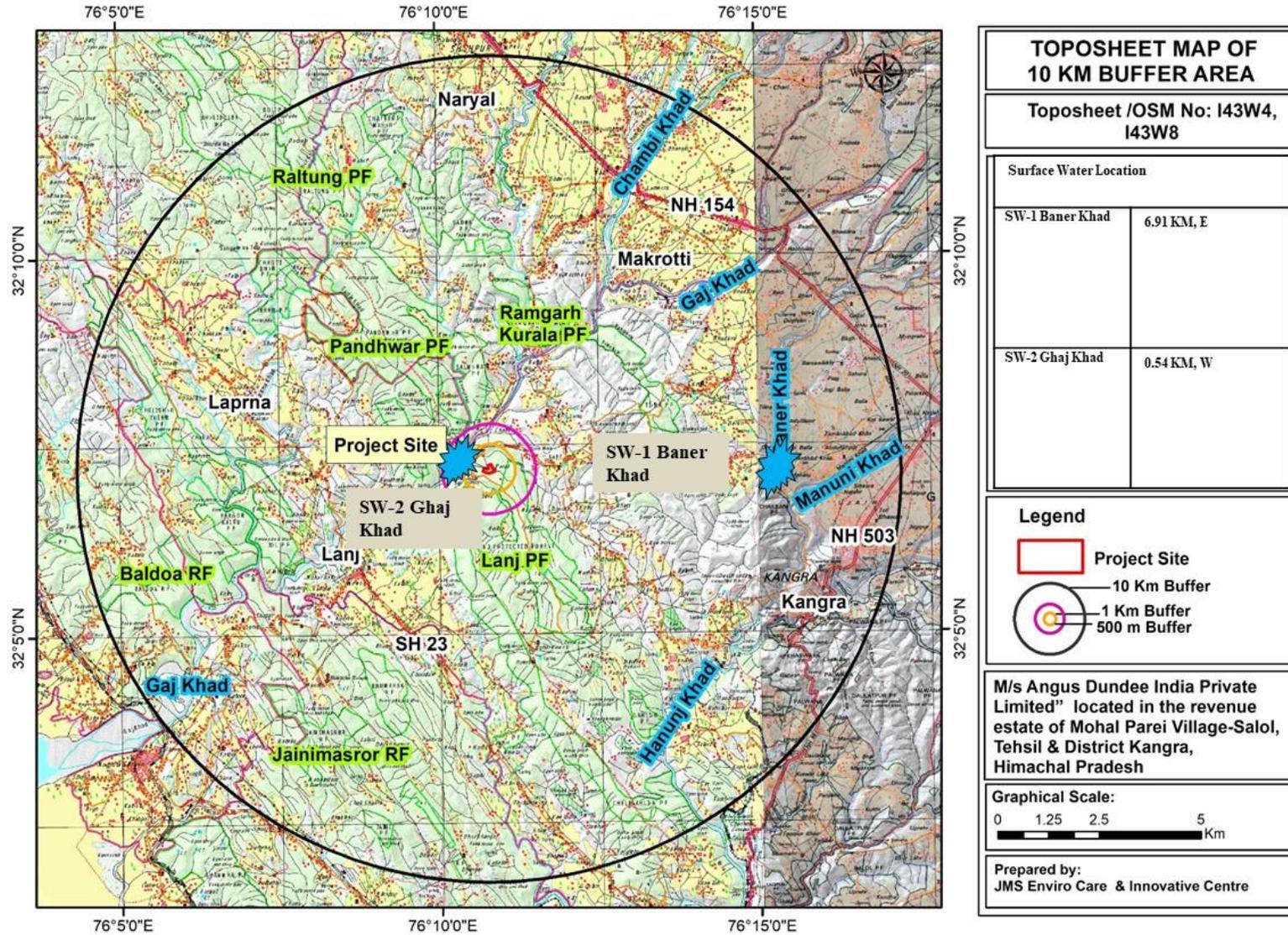
### Criteria for selection of surface water quality sampling locations

While selecting a sample it is always important to take care that the sample should be representative of the selected water body. In order to remove the bias in sample selection, grab samples were collected on random basis considering the following key aspects:

1. The sampling locations were selected based on the relevant uses and characteristics of the water body.
2. Drainage Pattern of study area in general.
3. Domestic discharge points from the near-by villages.



Figure 3.13 Surface water sampling locations



<b>TOPOSHEET MAP OF 10 KM BUFFER AREA</b>	
Toposheet /OSM No: I43W4, I43W8	
Surface Water Location	
SW-1 Baner Khad	6.91 KM, E
SW-2 Ghaj Khad	0.54 KM, W
<b>Legend</b> 	
M/s Angus Dundee India Private Limited" located in the revenue estate of Mohal Parei Village-Salol, Tehsil & District Kangra, Himachal Pradesh	
Graphical Scale: 	
Prepared by: JMS Enviro Care & Innovative Centre	



**Table – 3.11 Results of Surface Water Sample –Baner Khad**

S. No.	Parameters	Results	Test Method
1.	pH	7.25	IS:3025 (P-11): 2022
2.	Color, HU	<5	IS:3025 (P-4): 2021
3.	Odour	Agreeable	IS:3025 (P-5): 2018
4.	Turbidity, NTU	2.3	IS:3025 (P-10): 2023
5.	Total Dissolved Solids, mg/l	120	IS:3025 (P-16): 2023
6.	Total Suspended Solids, mg/l	6.7	IS:3025 (P-17): 2023
7.	Total Hardness (as CaCO <sub>3</sub> ), mg/l	110	IS:3025 (P-21): 2009
8.	Chemical Oxygen Demand, mg/l	10.0	IS:3025 (P-58): 2023
9.	BOD (at 27°C) for 3 days, mg/l	<2	IS:3025 (P-44): 2023
10.	Dissolved Oxygen, mg/l	6.6	IS:3025 (P-38): 1989
11.	Calcium (as Ca <sup>++</sup> ), mg/l	29.0	IS:3025 (P-40):1991:
12.	Magnesium (as Mg <sup>++</sup> ), mg/l	13.0	IS:3025 (P-46): 2023
13.	Sodium (as Na <sup>+</sup> ), mg/l	18.5	IS:3025 (P-45):1983:
14.	Potassium (as K), mg/l	8.9	IS: 3025 (P-45):1983
15.	Nitrate (as NO <sub>3</sub> ), mg/l	1.3	IS:3025 (P-34): Sec-1:2023
16.	Chloride (as Cl), mg/l	13.2	IS:3025 (P-32): 1988
17.	Sulphate (as SO <sub>4</sub> ), mg/l	16.6	IS:3025 (P-24): Sec-1:2022
18.	Iron (as Fe), mg/l	0.10	IS:3025 (P-53), 2024
19.	Total Chromium (as Cr), mg/l	ND (DL-0.005)	IS:3025 (P-52): 2021
20.	Zinc (as Zn), mg/l	ND (DL-0.02)	IS:3025 (P-49): 1994
21.	Fluoride (as F) mg/l	ND (DL-0.1)	IS:3025 (P-60) : 2008
22.	Mercury (as Hg) mg/l	ND (DL-0.002)	IS:3025 (P-48):1994:RA-2003
23.	Copper (as Cu),mg/l	ND (DL-0.04)	IS:3025 (P -42): 1992 (RA:2019
24.	Boron (as B),mg/l	ND	IS:3025 (P-57): 2005



		(DL-0.1)	
25	Aluminium (as Al) mg/l	ND	IS:3025 (P-55):2003
		(DL-0.1)	
26	Cadmium (as Cd), mg/l	ND	IS:3025 (P-41): 1992
		(DL-0.001)	
27	Total Ammonia, mg/l	ND	IS: 3025(P-34):1988
		(DL-1.0)	
28	Fecal Coliform, MPN/100 ml	50	IS: 1622-1981, MPN Method
29	Total Coliform, MPN/100 ml	90	IS: 1622-1981(RA2009) MPN Method

**Table 3.11 (b) Results of Surface Water Sample- Ghaj Khad**

Sr.No.	Parameters	Results	Test Method
1.	pH	7.23	IS:3025 (P-11): 2022
2.	Color, HU	<5	IS:3025 (P-4): 2021
3.	Odour	Agreeable	IS:3025 (P-5): 2018
4.	Turbidity, NTU	2.7	IS:3025 (P-10): 2023
5.	Total Dissolved Solids, mg/l	140	IS:3025 (P-16): 2023
6.	Total Suspended Solids, mg/l	8.3	IS:3025 (P-17): 2023
7.	Total Hardness (as CaCO <sub>3</sub> ), mg/l	132	IS:3025 (P-21): 2009
8.	Chemical Oxygen Demand, mg/l	10.0	IS:3025 (P-58): 2023
9.	BOD (at 27°C) for 3 days, mg/l	<2	IS:3025 (P-44): 2023
10.	Dissolved Oxygen, mg/l	6.6	IS:3025 (P-38): 1989
11.	Calcium (as Ca <sup>++</sup> ), mg/l	23.0	IS:3025 (P-40):1991:
12.	Magnesium (as Mg <sup>++</sup> ), mg/l	13.0	IS:3025 (P-46): 2023
13.	Sodium (as Na <sup>+</sup> ), mg/l	16.5	IS:3025 (P-45):1983:
14.	Potassium (as K), mg/l	6.2	IS: 3025 (P-45):1983
15.	Nitrate (as NO <sub>3</sub> ), mg/l	1.3	IS:3025 (P-34): Sec-1:2023
16.	Chloride (as Cl), mg/l	14.5	IS:3025 (P-32): 1988
17.	Sulphate (as SO <sub>4</sub> ), mg/l	18.4	IS:3025 (P-24): Sec-1:2022
18.	Iron (as Fe), mg/l	0.13	IS:3025 (P-53), 2024
19.	Total Chromium (as Cr), mg/l	ND	IS:3025 (P-52): 2021



		(DL-0.005)	
20	Zinc (as Zn), mg/l	ND (DL-0.02)	IS:3025 (P-49): 1994
21	Fluoride (as F) mg/l	ND (DL-0.1)	IS:3025 (P-60) : 2008
22	Mercury (as Hg) mg/l	ND (DL-0.002)	IS:3025 (P-48):1994:RA-2003
23	Copper (as Cu),mg/l	ND (DL-0.04)	IS:3025 (P -42): 1992 (RA:2019)
24	Boron (as B),mg/l	ND (DL-0.1)	IS:3025 (P-57): 2005
25	Aluminium (as Al) mg/l	ND (DL-0.1)	IS:3025 (P-55):2003
26	Cadmium (as Cd), mg/l	ND (DL-0.001)	IS:3025 (P-41): 1992
27	Total Ammonia, mg/l	ND (DL-1.0)	IS: 3025(P-34):1988
28	Fecal Coliform, MPN/100 ml	20	IS: 1622-1981, MPN Method
29	Total Coliform, MPN/100 ml	40	IS: 1622-1981(RA2009), MPN Method

**Table 3.12 CPCB water Quality Criteria for Surface water as per use**

Designated Best Use	Class	Criteria
<b>Drinking Water Source without conventional treatment but after disinfection</b>	A	<ol style="list-style-type: none"> <li>1. Total Coliforms Organism MPN/100ml shall be 50 or less</li> <li>2. pH between 6.5 and 8.5</li> <li>3. Dissolved Oxygen 6mg/l or more</li> <li>4. Biochemical Oxygen Demand 5 days 20°C, 2 mg/l or less</li> </ol>
<b>Outdoor bathing (Organized)</b>	B	<ol style="list-style-type: none"> <li>1. Total Coliforms Organism MPN/100ml shall be 500 or less</li> <li>2. pH between 6.5 and 8.5</li> <li>3. Dissolved Oxygen 5mg/l or more</li> <li>4. Biochemical Oxygen Demand 5 days 20°C, 3 mg/l or less</li> </ol>
<b>Drinking water source after conventional treatment and disinfection</b>	C	<ol style="list-style-type: none"> <li>1. Total Coliforms Organism MPN/100ml shall be 5000 or less</li> <li>2. pH between 6 and 9</li> <li>3. Dissolved Oxygen 4mg/l or more</li> </ol>



		4. Biochemical Oxygen Demand 5 days 20°C, 3 mg/l or less
<b>Propagation of Wild life and Fisheries</b>	D	1. pH between 6.5 and 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 4. Biochemical Oxygen Demand 5 days 20°C, 2 mg/l or less
<b>Irrigation, Industrial Cooling, Controlled Waste disposal</b>	E	1. pH between 6.0 and 8.5 2. Electrical Conductivity at 25°C micro mhos/cm, maximum 2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2 mg/l
	Below-E	Not meeting any of the A, B, C, D & E criteria

Class A: Drinking water source without conventional treatment but after disinfection.

Class B: Outdoor bathing (organized).

Class C: Drinking water source after conventional treatment and after disinfection.

Class D: Propagation of wild life fisheries.

Class E: Irrigation, Industrial cooling, controlled waste disposal.

Below E: Not meeting A, B, C, D & E Criteria

### Conclusion:

The surface water quality data from **Baner Khad and Ghaj Khad** were compared against the water quality criteria established by the Central Pollution Control Board (CPCB) for various water classes. Upon analysis, it was found that the water from both sources falls under **Category "A,"** which indicates that all water quality parameters were within the prescribed limits for the designated best uses. This classification suggests that the water is suitable for use as a drinking water source, provided it undergoes disinfection (and possibly other specified treatments), without the need for conventional treatment processes. Additionally, the water meets the standards for other uses specified under Category "A." In conclusion, the surface water from Baner Khad and Ghaj Khad is deemed fit for its intended purposes, as all tested parameters conform to the established water quality standards.



### A) Surface water quality results are summarized below (Baner Khad)

- pH: Recorded at 7.25, indicating neutral to slightly alkaline water quality, typical for freshwater bodies.
- Total Dissolved Solids (TDS): Measured at 120 mg/L, well within the acceptable limits for freshwater ecosystems, suggesting the water is not excessively mineralized.
- Total Hardness: Registered at 110 mg/L, consistent with typical hardness levels, reflecting moderate mineral content in the water.
- Total Coliform Count: Found to be 90 MPN/100mL, which is within the acceptable limits for freshwater and indicates no concerns regarding water safety.
- Notably, all heavy metals were found to be undetectable, suggesting that the water is free from heavy metal contamination.

### B) Surface water quality results are summarized below (Ghaj Khad)

- pH: Recorded at 7.23, indicating neutral to slightly alkaline water quality, typical for freshwater bodies.
- Total Dissolved Solids (TDS): Measured at 140 mg/L, well within the acceptable limits for freshwater ecosystems, suggesting the water is not excessively mineralized.
- Total Hardness: Registered at 132 mg/L, consistent with typical hardness levels, reflecting moderate mineral content in the water.
- Total Coliform Count: Found to be 40 MPN/100mL, which is within the acceptable limits for freshwater and indicates no concerns regarding water safety.
- Notably, all heavy metals were found to be undetectable, suggesting that the water is free from heavy metal contamination.

#### 3.5.2 Ground Water: *(Terms of Reference No. 6.6)*

Groundwater has been found as an important source for the local needs of water consumption for various purposes, mainly domestic and agriculture. Keeping in view the importance of groundwater to the local population, samples of ground water were collected from the study area for the monitoring and assessment of groundwater quality.

Ground water can be said to be affected by activities such as uncontrolled discharge of treated and/or untreated industrial effluent, open discharge of treated and/or untreated sewerage in the surrounding area.

The Quality of ground water was studied by collecting 8 water samples from representative hand pumps,



tube wells. Sampling points were decided using Google imagery and field survey. Standard procedures were followed for the sampling and analysis of physio–chemical parameters of water.

The sampling sites were selected considering the following criteria:

1. Topography of the study area Pattern.
2. Areas which may be affected due to the activity.
3. Any probable locations with open discharge of sewage or waste water.
4. Location of any solid waste dumping facility in the vicinity of the project site.

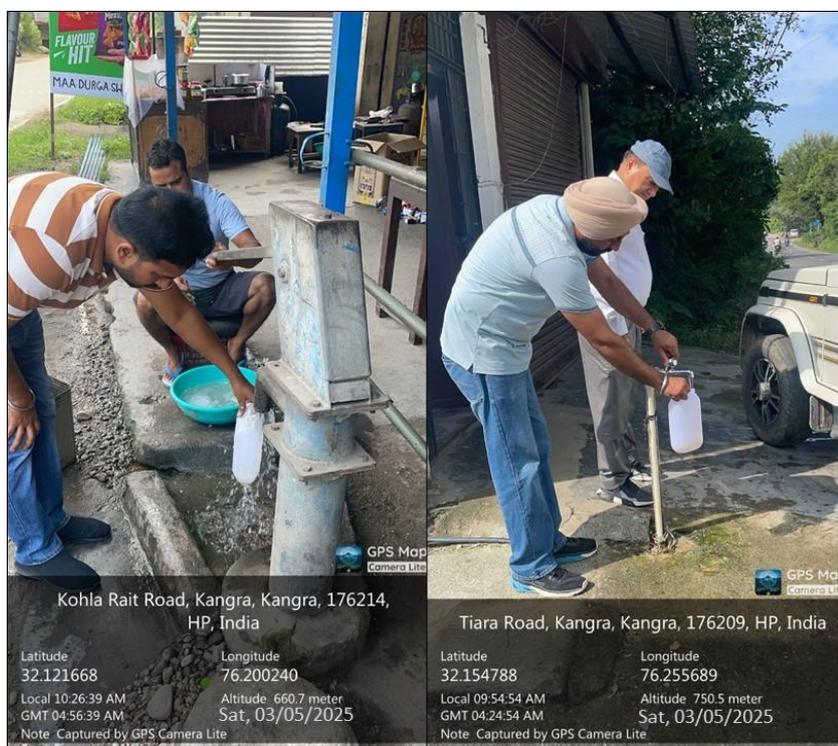
**Table 3.13** shows the details of location of water sampling stations and results of different parameters are given in **Table 3.14**. Photographs of sampling of ground water are shown in **Figure 3.14**.



**Table-3.13 Details of Ground Water Monitoring Stations**

Sample Code	Location	Distance (Km)	Direction	Co-ordinates		Justification For the Selection
				Latitude	Longitude	
GW-1	Project Site	--	--	32°7'13.64"N	76°10'46.34"E	Represent the project site
GW-2	Salwana Tatwani	2.86 Km	N	32° 8'42.80"N	76°10'49.23"E	Upwind direction of the project site.
GW-3	Jhajhroli	3.98 Km	NW	32° 7'23.92"N	76° 8'17.38"E	Crosswind direction of the project site.
GW-4	Jheer Balla	2.60 Km	NE	32° 8'28.10"N	76°11'26.43"E	Crosswind direction of the project site.
GW-5	Bhohar Kawalu	4.02 Km	S	32° 5'0.92"N	76°11'15.69"E	Downwind direction of the project site.
GW-6	Bharth	3.31 Km	SE	32° 6'0.61"N	76°12'25.18"E	Crosswind direction of the project site.
GW-7	Korian	2.65 Km	SW	32° 6'0.04"N	76° 9'49.43"E	Crosswind direction of the project site.
GW-8	Bhandrel	2.03 Km	W	32° 6'57.32"N	76° 9'32.43"E	Crosswind direction of the project site.

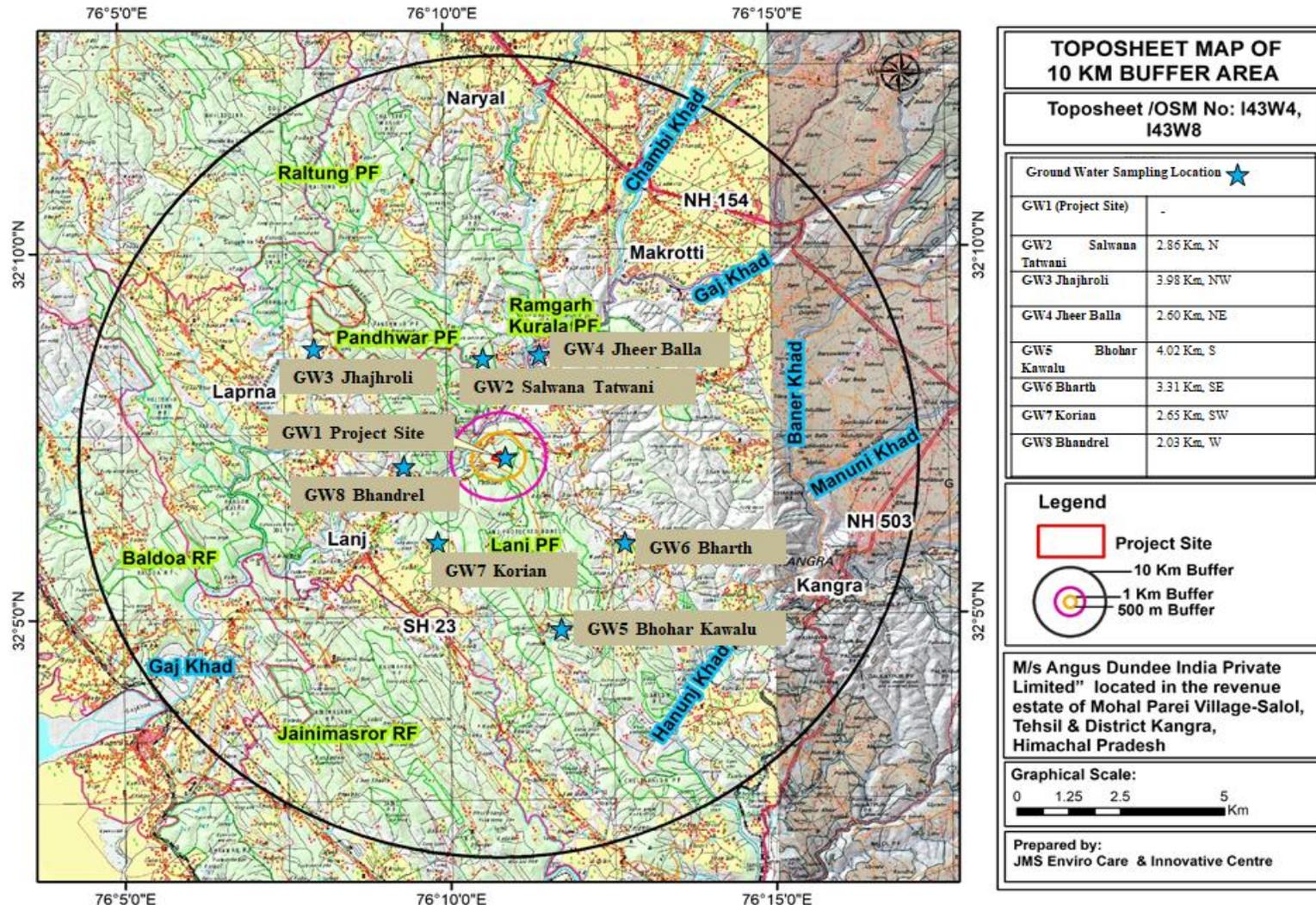
**Fig.3.14 Photographs of Ground Water Sampling**



(Source: Site Visits)



Figure 3.15 Ground Water monitoring Locations





**Table – 3.14 Results of Ground Water Samples**

S.No.	Parameters	Unit	GW <sub>1</sub>	GW <sub>2</sub>	GW <sub>3</sub>	GW <sub>4</sub>	GW <sub>5</sub>	GW <sub>6</sub>	GW <sub>7</sub>	GW <sub>8</sub>	* Limits
1	pH	-	7.53	7.46	7.43	7.56	7.40	7.45	7.53	7.27	6.5-8.5
2	Colour	Hazen	<5	<5	<5	<5	<5	<5	<5	<5	5
3	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	<1	<1	<1	<1	<1	<1	<1	<1	1 Max.
5	Total Dissolved Solids	mg/l	390	395	370	382	384	366	350	330	500 Max.
6	Total Hardness as CaCO <sub>3</sub>	mg/l	375	380	360	360	365	340	330	320	200 Max.
7	Calcium as Ca	mg/l	45.0	42.0	48.0	36.0	49.0	42.0	32.0	36.0	75 Max.
8	Magnesium as Mg	mg/l	20.4	20.4	28.8	25.2	26.4	18.0	26.4	25.2	30 Max.
9	Total alkalinity	mg/l	335	360	350	350	335	290	290	320	200 Max.
10	Chloride as Cl <sup>-</sup>	mg/l	23.0	25.0	17.5	22.5	18.0	25.0	17.5	20	250 Max.
11	Sulphates as SO <sub>4</sub>	mg/l	22.7	16.8	18.4	24.6	26.4	18.2	16.6	14.6	200 Max.
12	Iron (as Fe)	mg/l	0.18	0.28	0.33	0.26	0.19	0.26	0.16	0.15	1.0 Max.
13	Zinc (as Zn)	mg/l	ND (DL-0.02)	5 Max.							
14	Nitrate (as NO <sub>3</sub> )	mg/l	ND(DL-1.0)	45 Max.							
15	Chromium ( as Cr),	mg/l	ND (DL-0.005)	0.05 Max.							
16	Manganese (as Mn),	mg/l	ND (DL-0.09)	0.1 Max.							
17	Mercury (as Hg),	mg/l	ND (0.0.001)	0.001 Max.							
18	Cadmium (as Cd),	mg/l	ND (DL-.001)	0.003 Max.							
19	Fluoride (as F ),	mg/l	ND (DL-0.1)	1.0 Max.							
20	Residual Chlorine (as Cl <sub>2</sub> )	mg/l	ND (DL-0.003)	ND							
21	E.coli	/100ml	Absent	Absent							
22	Total Coliform	MPN/100ml	Absent	<2							

*\* As per IS:10500: 2012 acceptable limit*



## Observation and Analysis

The pH of all groundwater samples was within the prescribed standards, ranging from 7.27 to 7.53, indicating neutral to slightly alkaline conditions.

Heavy metals, including Total Chromium, Mercury, Selenium, and Cadmium, were found to be below detection levels in all samples. Additionally, Iron, Zinc, Manganese, and Fluoride were also below detection levels, confirming the absence of metal contamination in the groundwater.

Total Hardness ranged from 320 to 380 mg/l, which exceeds the acceptable limit of 200 mg/l but remains below the permissible limit of 600 mg/l as per IS:10500-2012. Hence, the groundwater is considered potable, particularly in areas lacking alternative sources.

Total Dissolved Solids (TDS) were recorded between 330 and 395 mg/l, remaining well within the acceptable limit of 500 mg/l, indicating good mineral quality.

### 3.5.3 Rain Water harvesting *(Terms of Reference No. 7.10)*

#### (A) Within the industry

##### 1. Rainfall Intensity

The average normal annual rainfall in district is 1751 mm, out of which 83 % is received during June to September and only 17 % occurs during non-monsoon period.

$$1751/ 1000 = 1.751 \text{ m}$$

2. As per the guideline of CPCB namely “Concepts & practice for rain water harvesting” the runoff Co-efficient of roof top area of buildings/ sheds is 0.85. Calculations of rain water harvesting are provided in Table 3.14.

#### Calculation for rainwater harvesting

Total Covered Area = 11320 m<sup>2</sup>

Annual rainfall = 1751 mm

Annual Runoff Generated within the Premises = 16838.5 m<sup>3</sup>/annum.

**Table 3.15 Calculations of Rain Water Harvesting**

S.No.	Area type	Area in Sqm	Runoff Co-efficient	Annual Rainfall (m)	Total available runoff (m <sup>3</sup> /annum)
1.	Roof top	11320	0.85	1.75	16838.5
				<b>Total</b>	<b>16838.5</b>



The average annual amount of rainy days = 72 days

Rain water harvesting potential per days =  $16838.5/72 = 233.86 \text{ m}^3$  say  $234 \text{ m}^3$

(<https://www.worldweatheronline.com/kangra-weather-averages/himachal-pradesh/in.aspx>)

Storage for 1 day =  $234 \text{ m}^3$

No. of water storage tanks proposed = 1 with capacity 250 KLD

### (B) GROUND WATER RECHARGE OUT SIDE INDUSTRY.

The industry has adopted pond in village Bohar Kawalu for ground water recharge. The Ponds get filled up during rainy days by surface runoff generated from catchment area. After desilting of ponds, 50% water will seep down to form part of ground water. The company having the detailed calculations for rain water harvesting through village ponds are given in table 3.16.

**Table 3.16**

#### Estimation of Available Water Recharge from the Adopted Pond

Number of ponds	Status	Area of Pond (m <sup>2</sup> )	Enhanced depth or depth of pond in meter	Volume of the pond (in cubic meter)	No of fillings	Total water to be filled in the pond during rainy days (Volume of pond* No. of fillings) (m <sup>3</sup> )
1.	Bohar Kawalu	5000	3.5	17,500	3	52,500

Total volume of water available in the pond:  $52,500 \text{ m}^3/\text{year}$ . After desilting of pond 50% water will seep down to form part of ground water:  **$26,250 \text{ m}^3/\text{year}$** .



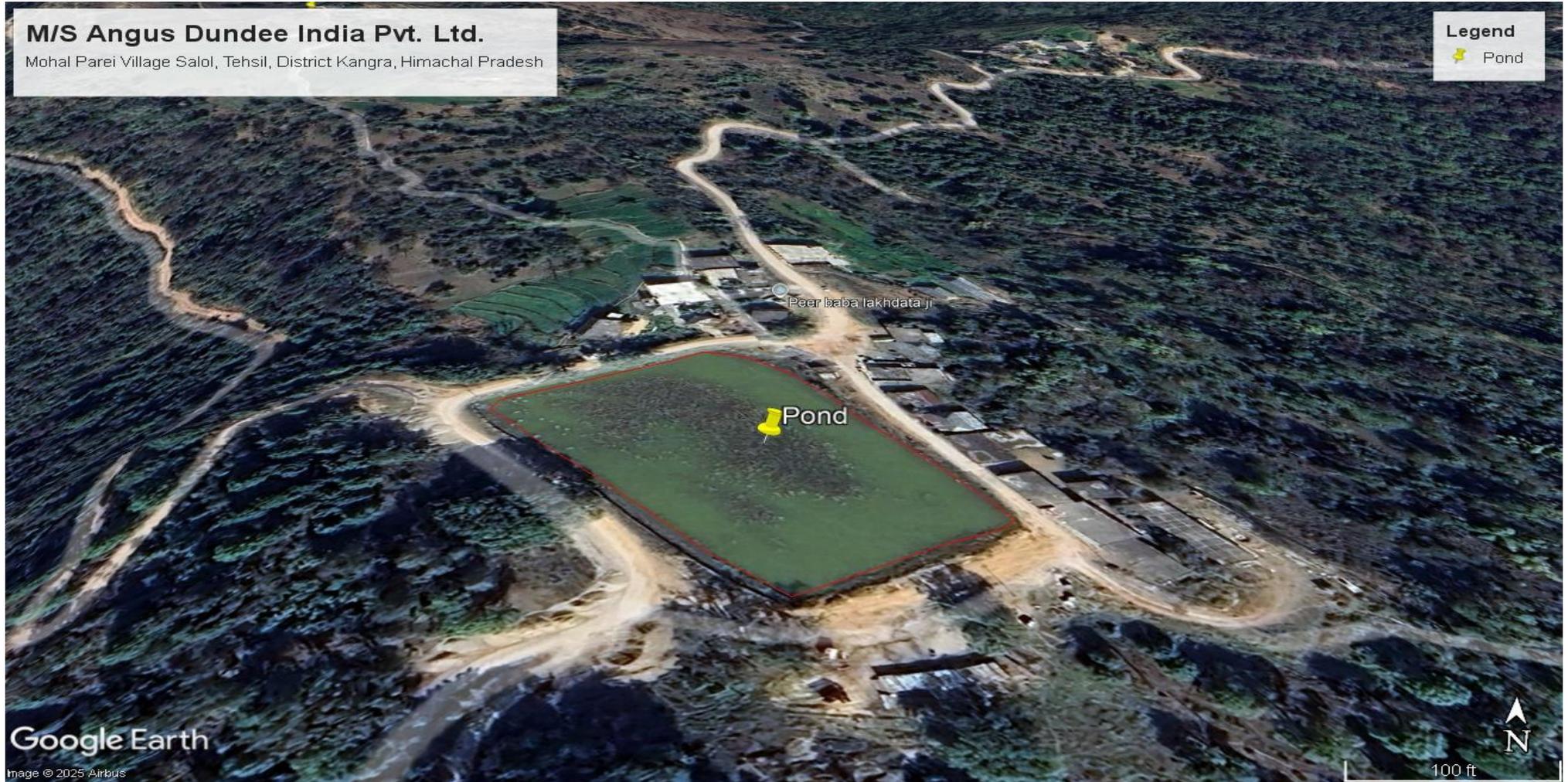
Figure 3.16 Photographs of Village Pond-Bohar Kawalu



(Source: Site Visit)



Fig. 3.17 Google Imagery of Village Pond-Bohar Kawalu





### **3.6 Noise Environment (Terms of Reference No. 6.7)**

Noise is one of the most undesirable and unwanted by-products of our modern life style. It may not seem as insidious or harmful as air and water pollutants but it affects human health and wellbeing and can contribute to deterioration of human well-being in general and cause neurological disturbances and physiological damage to the hearing mechanism in particular. It is therefore, necessary to measure both the quality as well as the quantity of noise in and around the site.

#### **Methodology**

##### **a) Procedure for Ambient Noise Monitoring:**

1. Calibrate the noise meter properly and ensure the instrument is working properly.
2. Select the location of station for noise monitoring. The site should be away from the direct source, vibrations and any other obstructions.
3. Note all the predominant noise sources like road traffic, railway and aero plane.
4. Put the noise meter on tripod at least 1m above the ground.
5. The monitoring should be carried out for minimum 75% of the prescribed day time (6:00 to 22:00) and night time (22:00 to 6:00). The exercise has to carried out for 6-8 hrs.
6. Supervise the equipment continuously and note, date, time and whether conditions regularly.

##### **b) Procedure for Noise Monitoring of DG Set**

1. For DG Sets of capacity upto 800 KW, noise is monitored at 1 m distance from all sides & for DG Sets of more than 800 KW capacity, noise is monitored at about 1 m distance of acoustic enclosures.
2. Take the reading in both conditions i.e., DG set "OFF" and DG Set "ON".
3. Record noise reading, mention date, time, location & distance of the measurement.
4. Handover the datasheet to the customer support cell after reaching laboratory.
5. Take average of all readings and report value in dB(A).

The intensity of sound energy in the environment is measured in a logarithmic scale and is expressed in a decibel, dB (A) scale. In a sophisticated type of sound level meter, an additional circuit (filters) is provided, which modifies the received signal in such a way that it replicates the sound signal as received by the human ear and the magnitude of sound level in this scale is denoted as dB (A). The sound levels are expressed in dB (A) scale for the purpose of comparison of noise levels, which is universally accepted by the international community.



The day noise levels have been monitored during 6.00 am to 10.00 pm and night noise levels, during 10.00 pm to 6.00 am at all the 8 locations, which covers residential areas, commercial area, industrial area and silence zone within 10 km radius of the study area.

### **Sampling Locations**

A preliminary survey was undertaken to identify the major noise generating sources in the area. The noise survey was conducted to assess the background noise levels in different zones. Gazettes Notification {S.O. 123(E)} of MoEF&CC dated February 14, 2000 on ambient air quality standards has different noise levels for different zones viz industrial, commercial, and residential and silence zones. Eight sampling locations were selected for the sampling of noise levels.

Noise levels recorded at each station are computed for Equivalent noise levels. Equivalent noise level is a single number descriptor for describing time varying noise levels. Location of noise monitoring station in Topo sheet is given in **Figure 3.19**. List of noise monitoring stations are shown in **Table 3.17**. Photographs of sampling of noise quality are shown in Figure 3.18.



**Table 3.17 Details of Noise Monitoring Stations**

Sample Code	Location	Distance (Km)	Direction	Co-ordinates		Justification For the Selection
				Latitude	Longitude	
NQ-1	Project Site	--	--	32°7'13.64"N	76°10'46.34"E	Represent the project site
NQ-2	Salwana Tatwani	2.86 Km	N	32° 8'42.80"N	76°10'49.23"E	Upwind direction of the project site.
NQ-3	Jhajhroli	3.98 Km	NW	32° 7'23.92"N	76° 8'17.38"E	Crosswind direction of the project site.
NQ-4	Jheer Balla	2.60 Km	NE	32° 8'28.10"N	76°11'26.43"E	Crosswind direction of the project site.
NQ-5	Bhohar Kawalu	4.02 Km	S	32° 5'0.92"N	76°11'15.69"E	Downwind direction of the project site.
NQ-6	Bharth	3.31 Km	SE	32° 6'0.61"N	76°12'25.18"E	Crosswind direction of the project site.
NQ-7	Korian	2.65 Km	SW	32° 6'0.04"N	76° 9'49.43"E	Crosswind direction of the project site.
NQ-8	Bhandrel	2.03 Km	W	32° 6'57.32"N	76° 9'32.43"E	Crosswind direction of the project site.

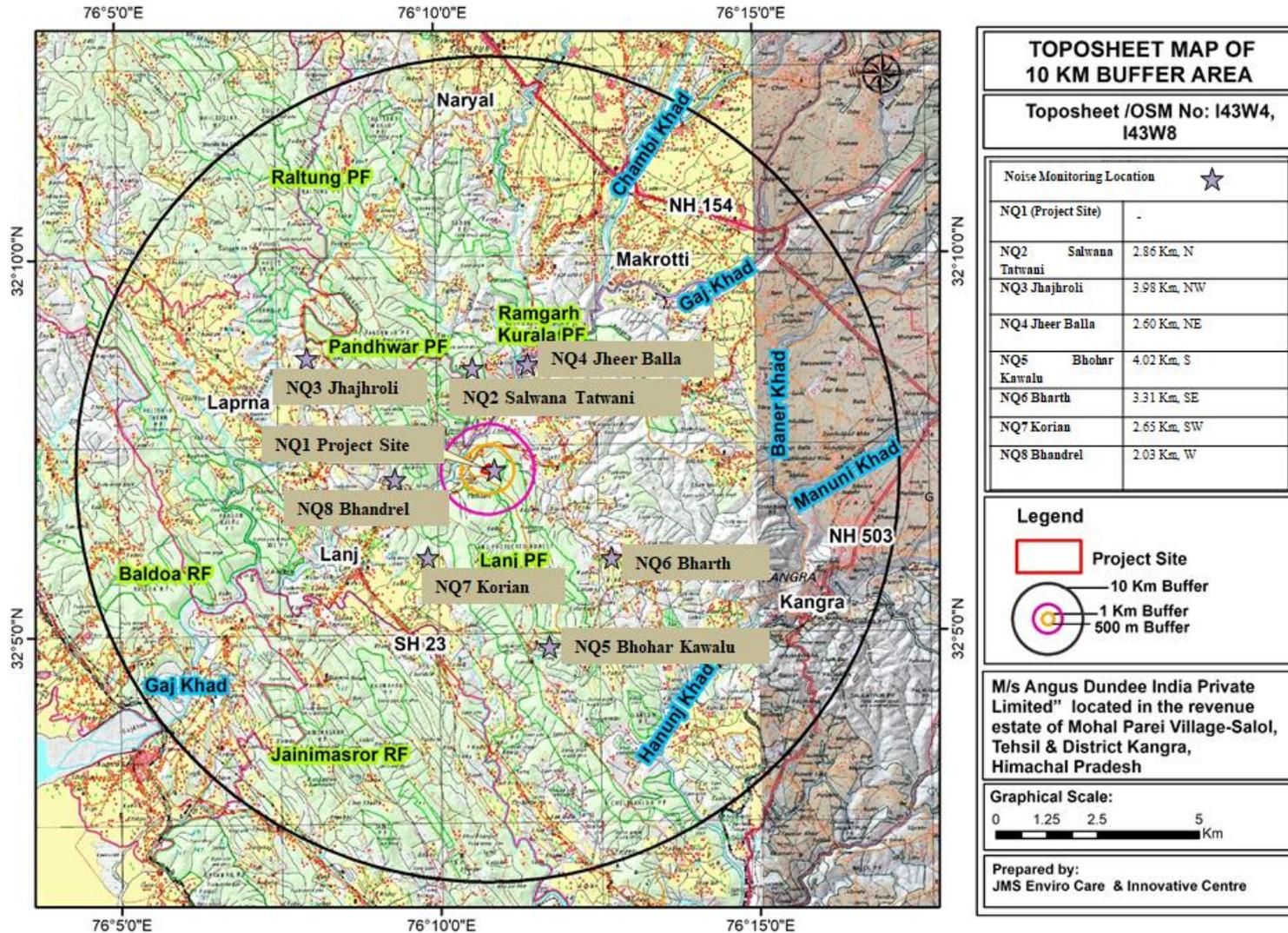
**Fig. 3.18 Photographs of Noise Quality Monitoring**



(Source: Site Visits)



Figure 3.19 - Noise Monitoring locations





**Table 3.18**

**Noise Level Results Leq dB (A) in and Around Project Area**

S. No.	Locations	Coordinates		Value in dB(A)		Test Method
				Day Time (1 Hour)	Night Time (1 Hour)	
1.	Project Site	32°7'13.64"N	76°10'46.34"E	61.6	32.4	IS 9989:1981(R ev.2001)
2.	Salwana Tatwani	32° 8'42.80"N	76°10'49.23"E	53.1	32.2	
3.	Jhajhroli	32° 7'23.92"N	76° 8'17.38"E	53.4	31.9	
4.	Jheer Balla	32° 8'28.10"N	76°11'26.43"E	52.2	31.4	
5.	Bhohar Kawalu	32° 5'0.92"N	76°11'15.69"E	51.9	32.4	
6.	Bharth	32° 6'0.61"N	76°12'25.18"E	52.4	32.2	
7.	Korian	32° 6'0.04"N	76° 9'49.43"E	50.4	31.4	
8.	Bhandrel	32° 6'57.32"N	76° 9'32.43"E	50.1	31.2	

**Table 3.19  
Noise Standards**

Area Code	Category of Area	Noise dB(A) Leq	
		Day Time (6.0 am-10 pm)	Night Time (10.0 pm-6.0 am)
<b>A</b>	Industrial Area	75	70
<b>B</b>	Commercial Area	65	55
<b>C</b>	Residential Area	55	45
<b>D</b>	Silence Zone	50	40

**Interpretation:**

**Project Site:**

The day time noise level at the project premises was observed as 61.6 dB (A), and during night time the noise level was recorded to be 32.4 dB (A). It should be noted that the noise levels during the day time as well as night time were estimated to be under the prescribed standards by Central Pollution Control Board.

**Residential area:**

The noise monitoring at residential zone was conducted at seven locations: Salwana Tatwani, Jhajhroli, Jheer Balla, Bhohar Kawalu, Bharth, Korian and Bhandrel once in a season. The maximum noise level during daytime was recorded at Village Jhajhroli, measured at 53.4 dB(A), which is within the



prescribed limit of 55 dB(A) for residential areas. The slightly elevated noise levels can be attributed to vehicular movement on nearby roads.

During the nighttime, the highest noise level was observed at Village Bohar Kawalu, at 32.4 dB(A). This is also within the CPCB-prescribed limit of 45 dB(A).

### **3.7 Soil Quality** *(Terms of Reference No. 6.8)*

Soil is generally considered as the upper layer of the earth that is dug or ploughed, especially the loose material in which plants grow. It is generally unconsolidated material composed of soil particles produced by disintegration of rocks. The void spaces between the particles may contain Air, Water or both.

#### **Methodology for Soil Sampling:**

The method and procedure for obtaining soil samples vary according to the purpose of sampling. Analysis of soil samples may be needed for engineering and agricultural purposes. In this publication, soil sampling for agricultural purpose is described which is done for soil fertility evaluation and fertilizer recommendations for crops. The results of even very carefully conducted soil analysis are as good as the soil sample itself. Thus, the efficiency of soil testing service depends upon the care and skill with which soil samples are collected. Non-representative samples constitute the largest single source of error in a soil fertility programme. It is to be noted that the most important phase of soil analysis is accomplished not in a laboratory but in the field where soils are sampled.

Soils vary from place to place. In view of this, efforts should be made to take the samples in such a way that it is fully representative of the field. Only one to ten gram of soil is used for each chemical determination and represents as accurately as possible the entire surface 0-22 cm of soil, weighing about 2 million kg/ha.

#### **Selection of a sampling unit**

A visual survey of the field should precede the actual sampling. Note the variation in slope, color, texture, management and cropping pattern by traversing the field. Demarcate the field into uniform portions, each of which must be sampled separately. If all these conditions are similar, one field can be treated as a single sampling unit. Such unit should not exceed 1 to 2 hectares, and it must be an area to which a farmer is willing to give separate attention. The unit of sampling is a compromise between the



expenditure, labour and time on one hand and precision on the other. In view of limited soil testing facilities, it has been suggested to adopt an alternate approach where a sample may be collected from an area of 20-50 ha to be called as composite area soil sample and analyses the same for making a common recommendation for the whole area.

**The locations for collection of representative samples were selected considering:**

- 1) From different types of land uses in the study area.
- 2) From possible polluted & comparatively controlled locations in the study area.
- 3) From the leeward and downward of the predominant wind direction

Locations of soil monitoring stations are given in **Figure 3.20**. List of soil monitoring station are given in **Table 3.20**. Results of soil samples are given in **Table 3.21**.

**Table 3.20 Soil Quality Monitoring Stations**

Sample Code	Location	Distance (Km)	Direction	Co-ordinates		Justification For the Selection
				Latitude	Longitude	
SQ-1	Project Site	--	--	32°7'13.64"N	76°10'46.34"E	Represent the project site
SQ-2	Salwana Tatwani	2.86 Km	N	32° 8'42.80"N	76°10'49.23"E	Upwind direction of the project site.
SQ-3	Jhajhroli	3.98 Km	NW	32° 7'23.92"N	76° 8'17.38"E	Crosswind direction of the project site.
SQ-4	Jheer Balla	2.60 Km	NE	32° 8'28.10"N	76°11'26.43"E	Crosswind direction of the project site.
SQ-5	Bohar Kawalu	4.02 Km	S	32° 5'0.92"N	76°11'15.69"E	Downwind direction of the project site.
SQ-6	Bharth	3.31 Km	SE	32° 6'0.61"N	76°12'25.18"E	Crosswind direction of the project site.
SQ-7	Korian	2.65 Km	SW	32° 6'0.04"N	76° 9'49.43"E	Crosswind direction of the project site.
SQ-8	Bhandrel	2.03 Km	W	32° 6'57.32"N	76° 9'32.43"E	Crosswind direction of the project site.



Figure 3.20 Soil Monitoring Locations

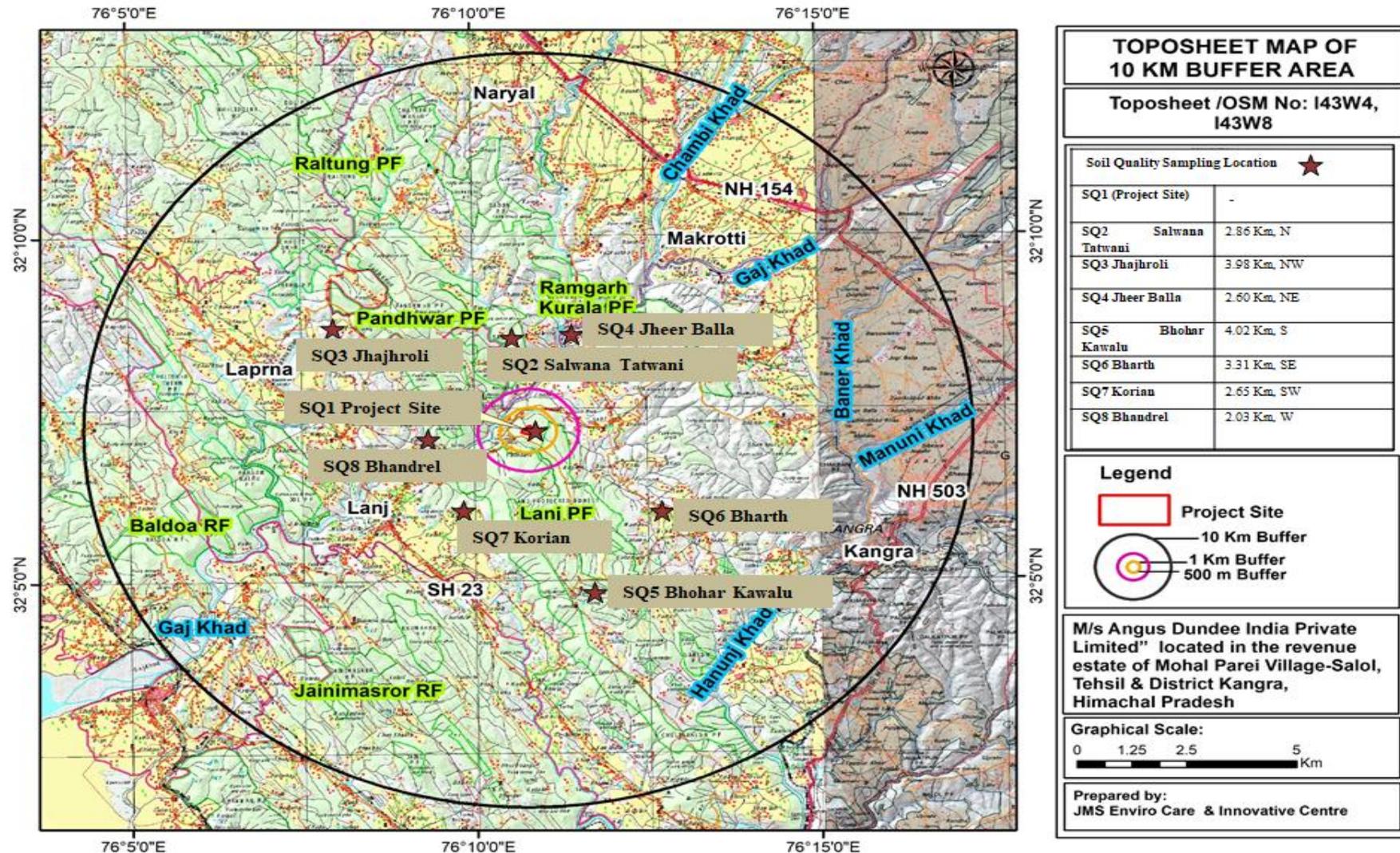




Table –3.21 Result of Soil Samples (% W/W except pH)

S.No.	Parameter	Unit	SQ <sub>1</sub>	SQ <sub>2</sub>	SQ <sub>3</sub>	SQ <sub>4</sub>	SQ <sub>5</sub>	SQ <sub>6</sub>	SQ <sub>7</sub>	SQ <sub>8</sub>	Test Methods
1.	pH (1:2.5)	--	7.27	7.42	7.33	7.45	7.29	7.39	7.43	7.57	IS 2720(P-26),1987
2.	Electrical Conductivity (1:2)	µmhos/cm	289	266	242	253	289	269	273	259	IS 14767,2000
3.	Texture	--	Sandy loam	Methods Manual for Soil Testing Govt. of India: 2011							
4.	Bulk Density	(gm/cc)	1.44	1.36	1.28	1.42	1.56	1.49	1.64	1.39	IS 2720(P-3),1983 (RA-2021)
5.	Soil Moisture Content	%	12.9	14.6	16.4	10.4	12.9	10.5	8.7	6.9	Methods Manual for Soil Testing Govt. of India: 2011
6.	Color/ Visual Observation	--	Brown	Light Brown	Brown	Dark Brown	Brown	Light Brown	Brown	Dark Brown	Methods Manual for Soil Testing Govt. of India: 2011
7.	Available Calcium	(mg/kg)	153	134	150	130	173	159	185	197	Methods Manual for Soil Testing Govt. of India: 2011
8.	Available Magnesium	(mg/kg)	24.7	22.2	18.2	16.4	32.7	24.3	22.5	28.3	Methods Manual for Soil Testing Govt. of India: 2011
9.	Available Sodium	(mg/kg)	68.5	62.2	52.4	60.4	52.5	62.9	54.5	56.4	Methods Manual for Soil Testing Govt. of India: 2011
10.	Available Potassium	(kg/hectare)	34.5	30.4	36.2	40.4	24.3	18.5	26.3	22.3	Methods Manual for Soil Testing Govt. of India: 2011
11.	Available Nitrogen	(kg/hectare)	10.6	8.8	10.6	12.4	10.5	14.3	10.4	12.4	Methods Manual for Soil Testing Govt. of India: 2011
12.	Organic Matter	(%)	0.54	0.55	0.54	0.52	0.54	0.52	0.51	0.50	Methods Manual for Soil Testing Govt. of India: 2011
13.	Available Phosphorus	Kg/hac	51.7	52.4	48.2	48.2	48.5	51.7	43.5	52.3	Methods Manual for Soil Testing Govt. of India: 2011
14.	Cation Exchange Capacity	(meq/100gm)	10.5	14.6	12.2	10.2	12.5	10.5	9.5	8.9	Methods Manual for Soil Testing Govt. of India: 2011
15.	Iron as Fe	(mg/kg)	14.3	10.2	8.8	14.6	12.5	14.4	10.5	12.5	USEPA-3050-B-1996: 1996
16.	Zinc as Zn	(mg/kg)	12.4	8.6	6.8	8.6	6.5	4.2	10.3	10.5	USEPA-3050-B-1996: 1996
17.	Lead as Pb	(mg/kg)	ND (DL-2.0)	IS 2720(P-26),1987							
18.	Manganese as Mn	(mg/kg)	12.3	14.3	16.1	12.1					USEPA-3050-B-1996: 1996
19.	Chromium as Cr	(mg/kg)	ND (DL-2.0)	USEPA-3050-B-1996: 1996							
20.	Cadmium as Cd	(mg/kg)	ND (DL-0.5)	USEPA-3050-B-1996: 1996							
21.	Copper as Cu	(mg/kg)									USEPA-3050-B-1996: 1996



**Table 3.22: Soil Standards as per ICAR**

Sr. No.	Test Parameters	Classifications	
1	pH	< 4.50 extremely acidic 4.51-5.00 very strongly acidic 5.01-5.50 strongly acidic 5.51-6.00 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 neutral*	7.31-7.80 slightly alkaline* 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline > 9.0 very strongly alkaline (*tolerable to crops)
2	Salinity or Electrical Conductivity (mmhos/cm) (1mmhos/cm = 640 ppm)	upto 1.00 average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops > 3.00 sensitive to salts	
3	Organic Carbon (%)	upto 0.30 very less 0.31-0.40 less 0.41-0.50 medium 0.51-0.80 on an average sufficient	0.81-1.00 sufficient > 1.0 more than sufficient
4	Nitrogen (kg/ha)	upto 50 very less 51-100 less 101-150 good	151-300 better > 300 sufficient
5	Phosphorous (kg/ha)	upto 15 very less 16-30 less 31-50 medium	51-65 on an average sufficient 65-80 sufficient > 80 more than sufficient
6	Potassium (kg/ha)	0 very less 120-180 less 181-240 medium	241-300 average 301-360 better > 360 more than sufficient

(Source: Handbook of Agriculture ICAR (Indian Council of Agriculture Research <https://www.icar.org.in/node/2811>)

### 3.7.1 Conclusion

Physico-chemical properties of soil at site and the buffer zone indicates that:

1. The pH values vary from 7.27 to 7.57 against the normal range of 6.0-6.5 which indicates that the soil are neutral to slightly alkaline.
2. Electrical conductivity varies from 242 to 289  $\mu$ mhos/cm which indicates that the soils slightly alkaline in nature and good for germination.
3. Among the basic cations there was predominance of Ca (130 to 197 mg/kg) followed by Na (52.4 to 68.5 mg/kg) and Mg (16.4 to 32.7 mg/kg).



4. The soil is having moderate fertility based on the available Nitrogen, Phosphorus and Potassium.

#### **Interpretation:**

Based on the existing scenario, the soil at the site and the surrounding areas are having sandy loam texture and are slightly alkaline in nature.

### **3.8 Geomorphology & Soils**

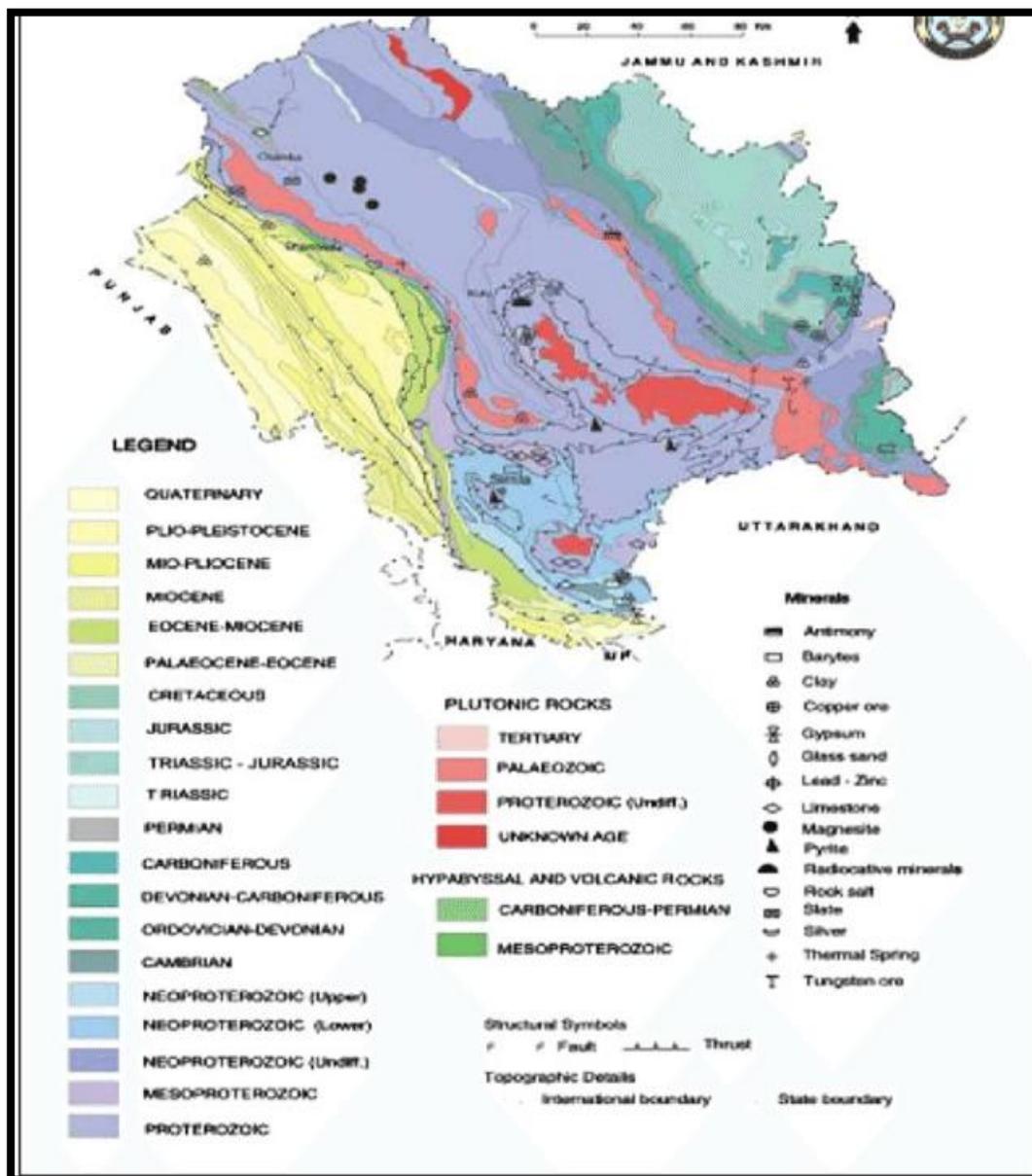
Kangra district presents an intricate mosaic of mountain ranges, hills and valleys. It is primarily a hilly district, with altitudes ranging from 350 m amsl to 4880 m amsl in the hills of Dauladhar. Physiographical, the district can be divided into six units-viz. (i) high hills, which cover almost 60% of the district (ii) Fluvio glacial outwash terraces, which is located in the north eastern part of the district (iii) structural terraces, in the central part (iv) valley fills (v) piedmont plain and (vi) flood plain. Six types of soils are observed in the district, they are:

1. Histosols (Snow field, Peaty and Saline Peaty)
2. Ultisols (Brown red and yellow)
3. Alfisols (Sub Mountain)
4. Ardisols (Grey Brown)
5. Entisols (Younger alluvium)

Geomorphological Map of Study Area is shown in Figure 3.21. Earthquake Hazard Map indicating location of Project site shown in Figure 3.22.



Fig 3.21: Geomorphological Map of Study Area

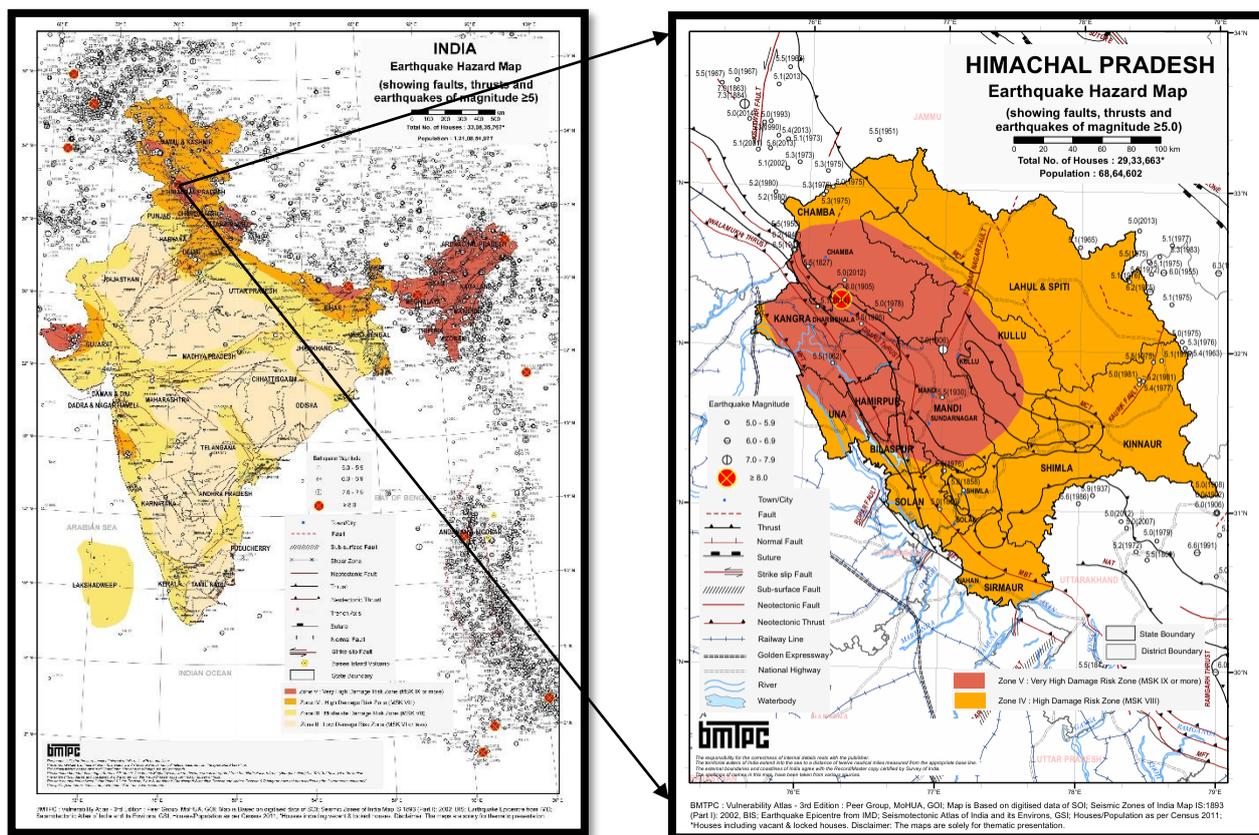


### Seismicity:

The study area falls in Zone-V according to Indian Standards of Seismic Zone Map which is a high damage risk zone. Zone 5 covers the areas with the highest risk of suffering earthquakes of intensity MSK IX or more significantly. The IS code assigns a zone factor of 0.36 for Zone 5. The seismic zone map of India has been prepared by BIS (Bureau of Indian Standards). Earthquake hazard map indication location of project site is shown in Figure 3.22.



Figure 3.22: Earthquake Hazard Map indicating location of Project site



(Source: BMTPC: Vulnerability Atlas, 3<sup>rd</sup> Edition)

### Geology:

The rock formations occupying the district range from pre-Cambrian to Quaternary period. Geological succession in the district is provided below in table 3.23.

Table 3.23 Rock Formations

Age	Formation	Lithology
Post Tertiary (Quaternary)	Fluvioglacial/glacial/Interglacial deposits	Moraine & Fluvial deposits
Tertiary	Upper Shivalik's	Conglomerate, Boulder and Sandstone
	Middle Shivalik's	Micaceous sandstone and shale
	Lower Shivalik's	Hard Sandstone and Shale



	Dharamshala	Maroon Sandstone and Shale
.....Main Boundary Fault.....		
	Subathu	Red and green shales
	Intrusive	Granites and gneisses
.....Chandpur thrust.....		
	Chamba and Chandpur	Slate, Phyllite, Quartzite and schist
Pre-Tertiary	Shali and Sundernagar	Limestone and Quartzite
	Jutogh	Schists and Gneisses
.....Jutogh Thrust.....		
Pre-Cambrian		Granites and Gneisses

Source: [http://cgwb.gov.in/district\\_profile/hp/kangra.pdf](http://cgwb.gov.in/district_profile/hp/kangra.pdf)

**Water level behavior of the district:** Depth of water level in Pre monsoon and Post monsoon are given in Figure 3.23 a) and 3.23 b).

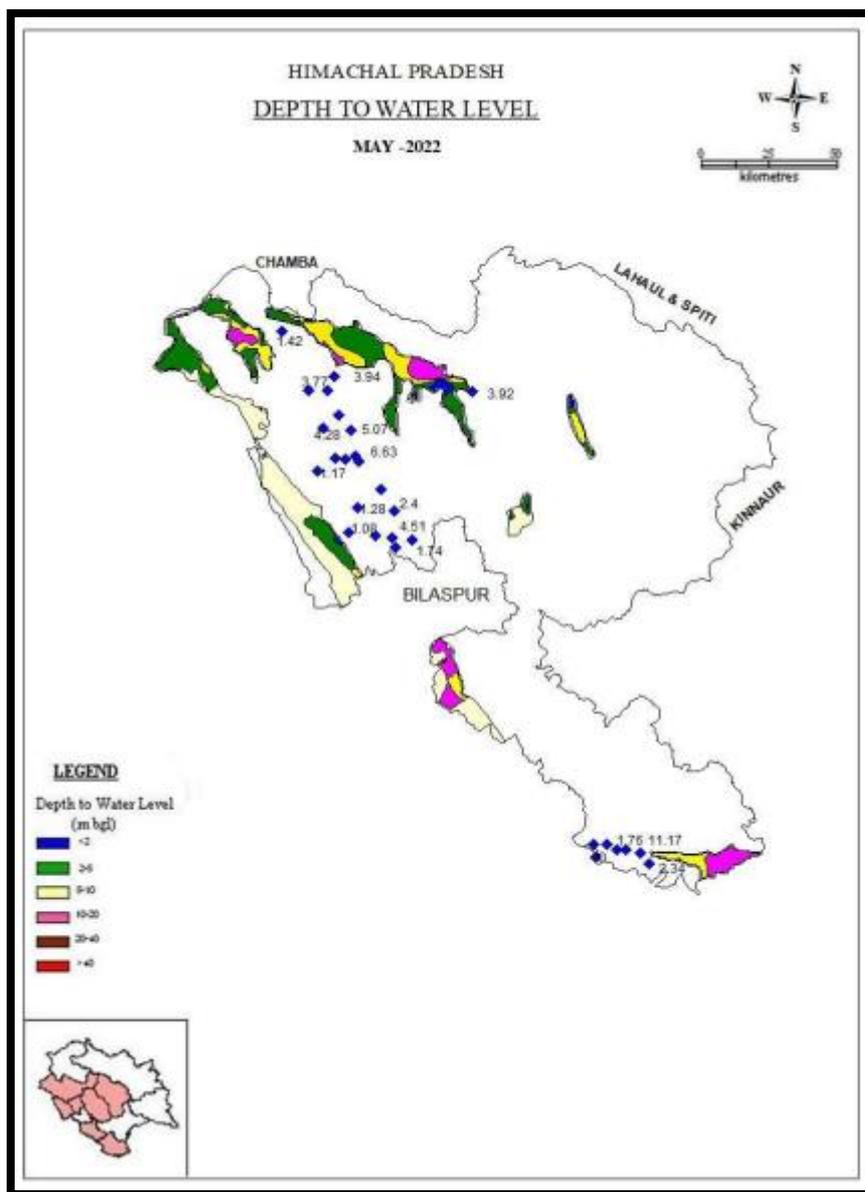
**Table 3.24: Water level behavior of the district**

Major Ground Water Sources	Wells & Tube wells
Pre-monsoon depth to water level (May, 2022)	1.06- 15.00 m bgl
Post-monsoon depth to Water level (Nov., 2022)	0.54-10.05 m bgl

(Source: <https://www.cgwb.gov.in/cgwbpm/public/uploads/documents/17048894401647263263file.pdf>)



Figure: 3.23 (A) Depth of Water level- Pre-monsoon

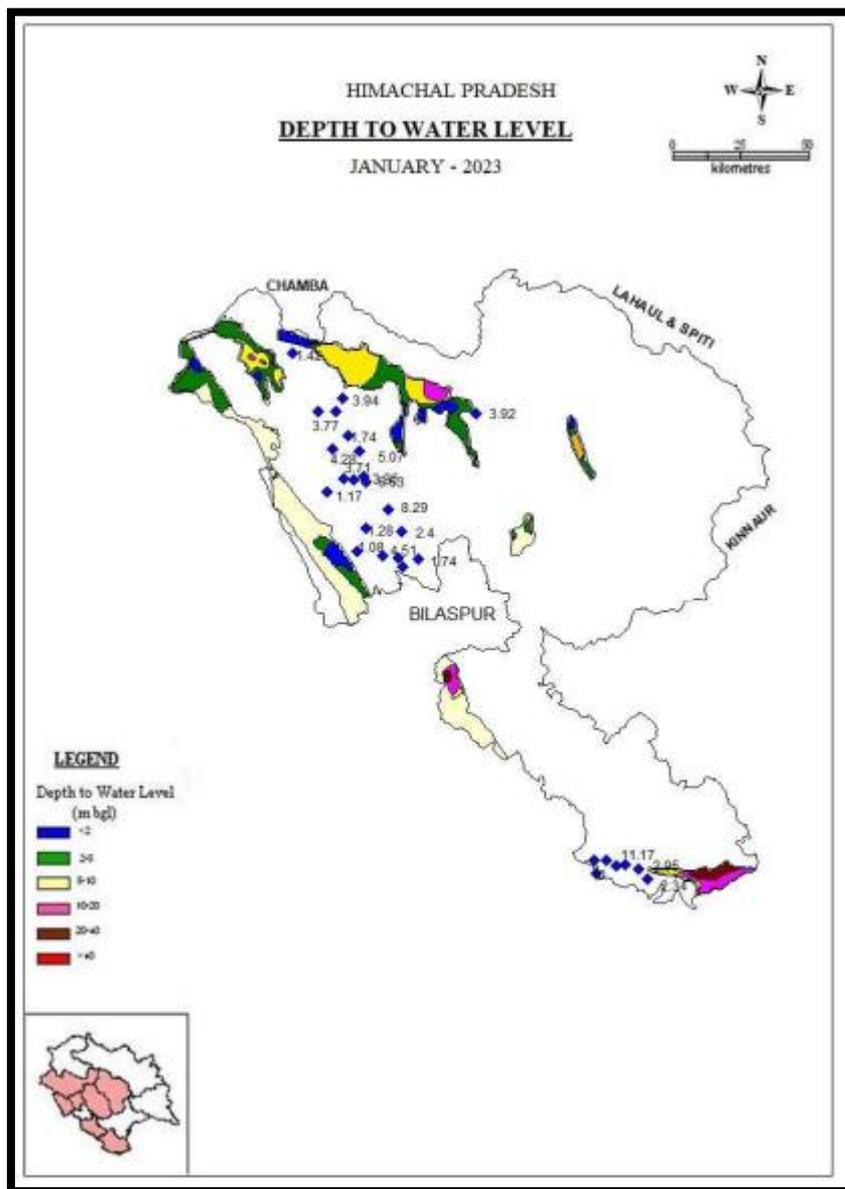


(Source: <https://www.cgwb.gov.in/cgwbpm/public/uploads/documents/17048894401647263263file.pdf>)

During the pre-monsoon period in Kangra, the depth to the water level varies significantly, ranging from 1.06 meters to 15.00 meters below ground level (bgl). This variation highlights the regional differences in groundwater levels, which are influenced by factors such as topography, seasonal precipitation, and local hydrological conditions.



Figure 3.23 (B) Depth of water level-Post monsoon

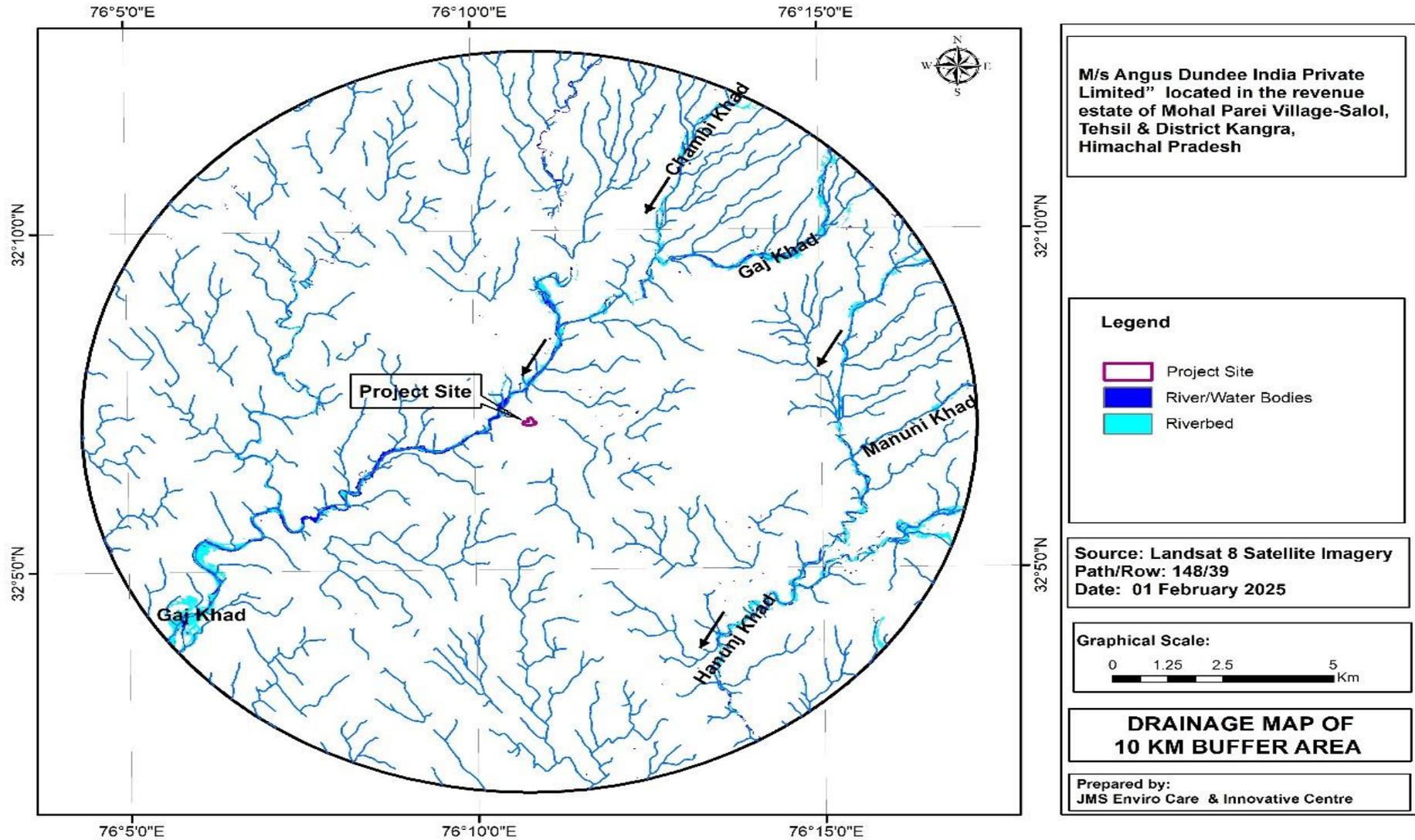


(Source: <https://www.cgwb.gov.in/cgwbpnm/public/uploads/documents/17048894401647263263file.pdf>)

In the post-monsoon period, the depth to the water level in Kangra ranges from 0.54 meters to 10.05 meters below ground level (bgl), reflecting the seasonal recharge of groundwater. Additionally, the annual water level fluctuation for the period from May 2021 to May 2022 indicates a decline of 0 to 2 meters across the district, suggesting a gradual reduction in groundwater levels during the non-monsoon months. Drainage map of the study area is shown in Figure 3.24.



Figure 3.24 Drainage map of the study area





### 3.9 Land Environment:

The objective of assessing the land use details of the area is to know the existing land use pattern of the area and enable one to know about the land that can be used for the proposed development activities in the study area. It also enables to envisage the scenario emerging due to the increase in demand for land with increase in population and the impacts arising due to the interface with the various project activities.

#### a) Geographical location of the study area:

The study area comprises 10km around the project site. The study area is falling in I43W4 & I43W8, Survey of India Topographic sheet.

#### b) Data Collection and Quality Assurance:

##### ▪ Satellite data

The Indian Remote Sensing satellite data Landsat 8 Satellite Imagery is being used for the analysis of Land Use and Land Cover around 10 KM of the study area and a 10 Km radius False Color Composite satellite map surrounding the project site is provided in Fig 3.25 and Fig. 3.26.

##### ▪ Methodology

The land use / land cover map is prepared by adopting the interpretation techniques of the image in conjunction with collateral data such as Survey of India topographical maps and census records. Image classification has been done by using visual interpretation techniques and digital classification using ERDAS image processing 10.0 software and ARC/GIS 10.0 software. The various activities for preparation of LULC include preprocessing, rectification, enhancements and classifying the satellite data for assessing the change in land use land cover due to proposed developmental activities.

The imagery is interpreted and ground checked for corrections. The final map is prepared after field check. The different land use/land cover categories in the study area have been carried out based on the NRSC land use / land cover classification system.

#### Land Use / Land Cover Study *(Terms of Reference No. 4.5)*

The land use land cover study has been done through digital image processing and visual interpretation technique to generate output of Land use / Land cover map of study area on 1:50,000 scale. Land Use / Land Cover Map of Study Area (10 Km Buffer) Fig 3.25 and a 10 Km radius False Color Composite satellite map surrounding the project site is provided in Fig 3.26.



Fig 3.25 Land Use / Land Cover Map of Study Area (10 Km Buffer) (Terms of Reference No. 5.2)

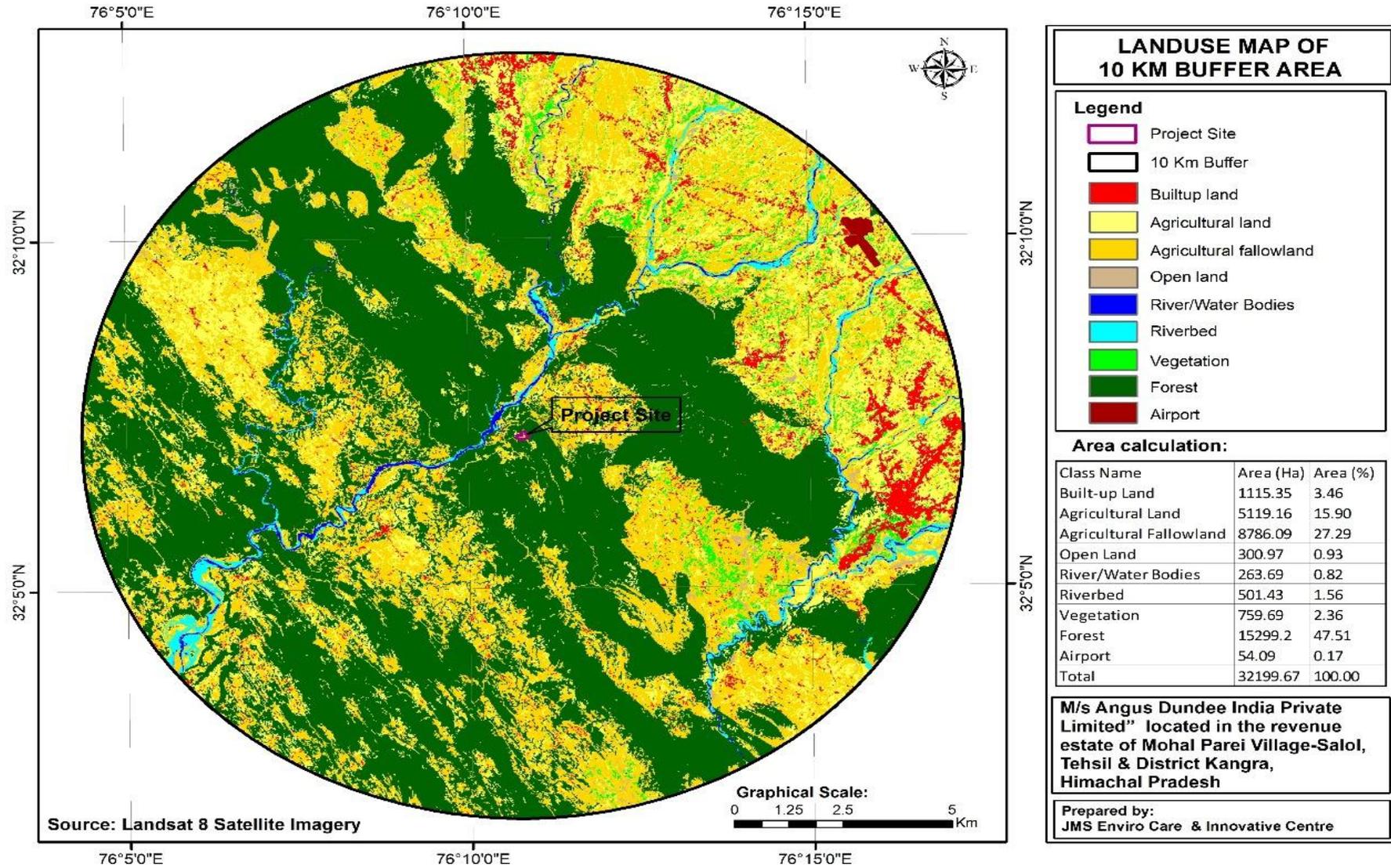




Fig 3.26 10 Km radius False Color Composite Satellite Map

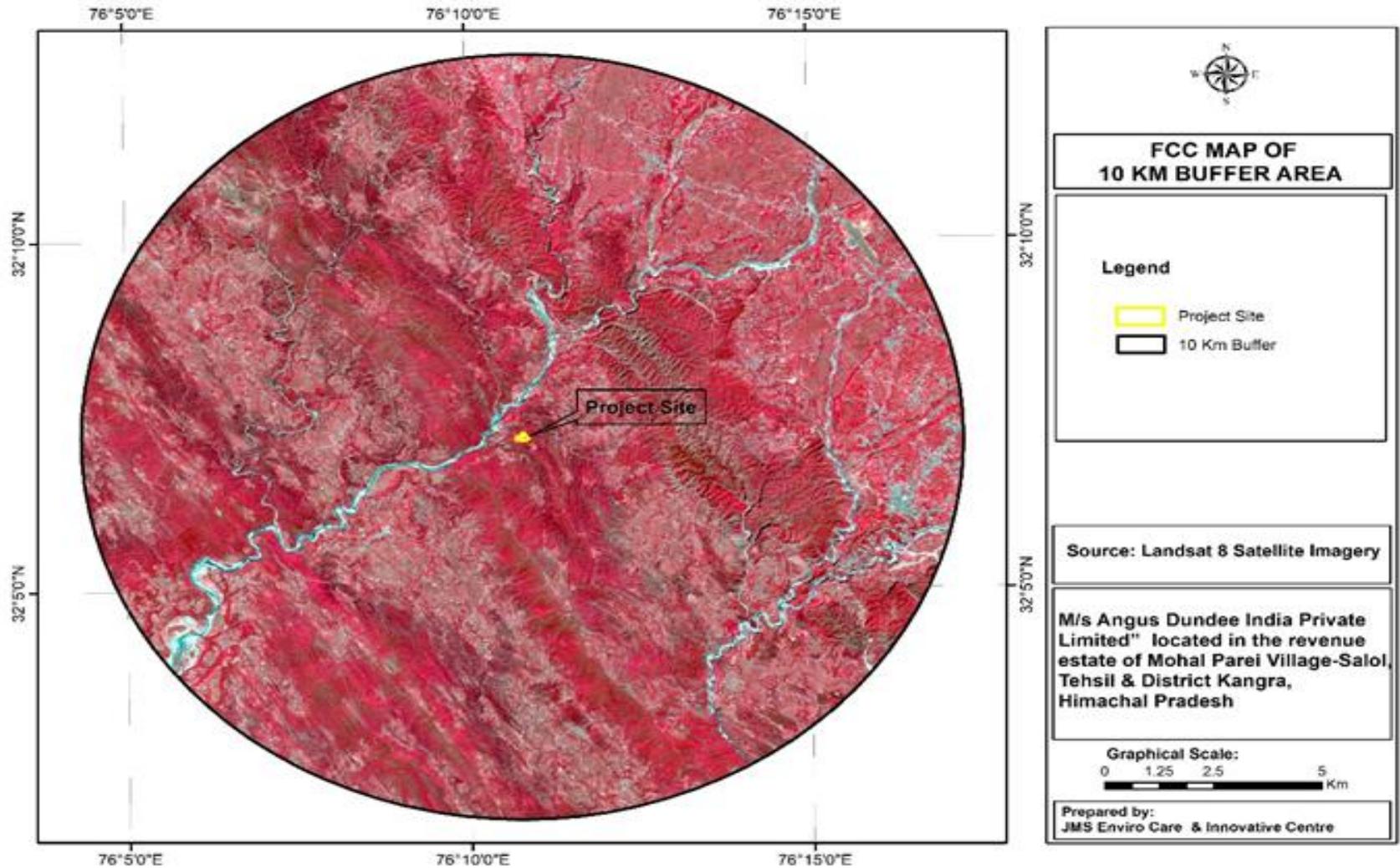




Fig 3.27 Flowchart showing the methodology adopted for land use/land cover mapping

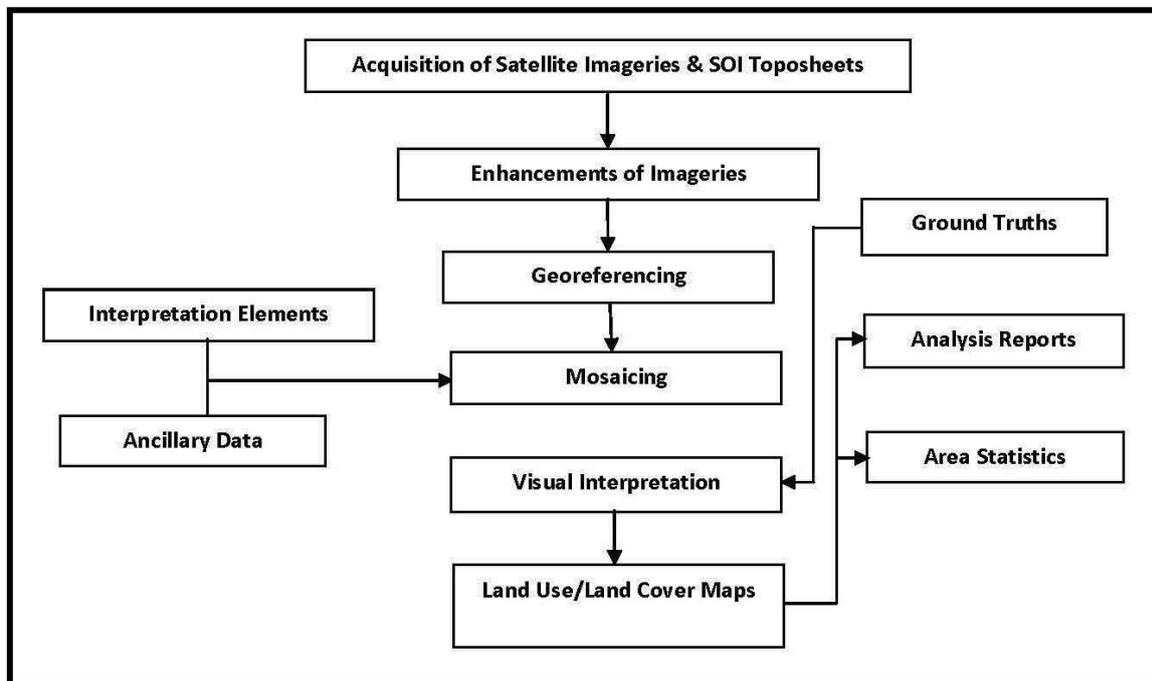


Table 3.25 Land Use/Land Cover Area Statistics

Land Use/Land Cover	Area (Ha)	Area Percentage
Built-up Land	1115.35	3.46
Agricultural Land	5119.16	15.90
Agricultural Fallow Land	8786.09	27.29
Open Land	300.97	0.93
River/Water Bodies	263.69	0.82
Riverbed	501.43	1.56
Vegetation	759.69	2.36
Forest	15299.2	47.51
Airport	54.09	0.17
<b>Total Area</b>	<b>32199.67</b>	<b>100.00</b>

The study area comprises of built-up land of about 1115.35 ha (3.46 %), agricultural land of about 5119.16 ha (15.90%) including agricultural fallow land 8786.09 ha (27.29 %). Open Land in the study area covers an area of 300.97 ha (0.93%) approximately. Study area has 263.69 ha (0.82 %) of water bodies, 501.43 ha (1.56 %) of riverbed, 759.69 ha (2.36 %) of vegetation, 15299.2 ha (47.51%) of forest and 54.09 ha (0.17%) of airport. The land cover pattern and the respective coverage are given in Table 3.25 above.

### Conclusion & Discussion

Based on the perusal of field visit and interaction with framers, it is seen that over the period of time



variants of fruits, vegetable and fodder have been successfully grown in the study area are indicator of healthy & conducive land environment.

### 3.9.1 Industries within study area (10km radius) (Terms of Reference No. 4.6)

A list of Industries within 10 Km radius of the Project site is provided at Table 3.26

**Table 3.26 List of Industries within study area (10km radius)**

S.No.	Name of Industries	Distance and Direction	Address	Type of Industries
1.	M/s Himachal Metal Industry	9.36 Km, SE	Industrial area Kangra, Natehr, Himachal Pradesh 176001.	Home Goods Store
2.	M/s Raina Furniture Industry	8.07 Km, NE	45 Miles Himachal Pradesh 176208	Furniture Manufacturer
3.	M/s Kangra Shoes Industry	7.28 Km, NE	Rait, Thirdi, Himachal Pradesh 176208	Shoe Factory Ward 5
4.	M/s Khalsa Dairy Kangra	9.38 Km, SE	RPGMC Rd Pushp Vihar Colony Kangra, Himachal Pradesh 176001	Milk Delivery
5.	M/s Kaku Dairy Gaggal	9.45 Km, NE	Kaku Dairy Main Chowk District Gaggal, Himachal Pradesh 176209	Dairy Store
6.	Kohli poultry farm kangra	9.05 Km, W	Vill sevkara post office distt, Talpura Kangra, Natehr, Himachal Pradesh 176001	Poultry farm

### 3.10 Biological Environment

A natural ecosystem is a structural and functional unit of nature. It has different biological and physical components, which are interrelated to each other and survive by interdependence. An ecosystem has self-sustaining ability and controls the number of organisms at any level by cybernetic rules. The basic purpose to explore the biological environment under Environmental Impact Assessment (EIA) is to assist the decision-making process and to ensure that the project options under consideration are environmental-friendly. An ecological survey of the study area was conducted, particularly with reference to listing of species and assessment of the existing baseline ecological conditions in the study area. The main objectives of the ecological survey were aimed at assessing the existing flora and fauna components in the study area, to understand the possible impacts on the biological environment caused



by the proposed project activities, and to formulate, if necessary, the appropriate mitigation/preventive measures for such impacts. Data has been collected through secondary sources and by site visits.

The present study was carried out in two separate headings for floral and faunal community. The aspects to be covered in the study for the project are given in Table 3.27.

**Table-3.27 Aspect to be covered in the study Area**

Aspect of Environment	Impacts
<b>A. Terrestrial Ecology</b>	Impacts on terrestrial flora and fauna
	Impacts on Rare-Endangered-Threatened (RET) wildlife
	Impacts on socially /economically /genetically/ biologically important species
<b>B. Aquatic Ecology</b>	Impacts on aquatic fauna/flora
	Impacts on spawning and breeding grounds for aquatic species

The information presented in this Chapter has been collected through field studies, consultation with various government departments and collation of available literature with various institutions and organizations. The summary of data collected from these sources as a part of the EIA study is outlined in Table 3.28.

**Table: 3.28 Summary of Data Collected from various sources**

Aspect	Data	Parameters monitored	Frequency	Source (s)
<b>Terrestrial Ecology</b>	Primary survey field and secondary literature survey	Floral and Faunal Diversity and Their Importance	One Season (Summer)	Field studies, Forest& wild life Department and literature survey.
<b>Aquatic Ecology</b>	Primary survey field and secondary literature survey	Diversity of Species and Their Importance	One Season (Summer)	Field studies, Forest/ wild life Department and literature survey.



With the change in environmental conditions, the vegetation cover as well as animals reflects several changes in its structure, density and composition.

### Sampling:

For field assessment, i.e., primary data collection, a standard statistical sampling method was followed. The sampling design followed random sampling method. The sampling area was decided based on prior land-use map of the project influence zone (within the 10 km radius around the project area), outlining forest areas and other types of habitats, topographic features and build-up area.

#### A) Flora:

##### Methodology for floral study

1. **Secondary literature survey:** Published literature, including those from relevant organizations like the Botanical Survey of India (BSI), the Wildlife Institute of India (WII-Dehradun), the respective Forest Department of the State concerned etc., research papers, articles, books and reliable websites, available within and adjacent to the study area were compiled and inventoried as “Secondary Floral Diversity Database”.
2. **Primary field survey – herbs:** Herbaceous plants were studied using the quadrat method as followed during vegetation survey. The size of each quadrat for herb survey was 1m x 1m. Field identification of the species and later identification through photographs were followed. Unidentified herbs were collected following proper procedure and prepared into herbarium sheets for later identification. For mosses, lichens and other plants the plot size was taken as 0.1m x 0.1m.
3. **Primary field survey – shrubs:** Shrubs were studied using the quadrat method as followed during vegetation survey. The size of each quadrat for shrub survey was 5m x 5m for shrubs of 3m height. Field identification of the species and later identification through photographs were followed. Unidentified shrubs were collected following proper procedure and prepared into herbarium sheets for later identification.
4. **Primary field survey – trees:** Trees were studied using the quadrat method as followed during vegetation survey. The size of each quadrat for tree survey was 20m x 20m. Field identification of the species and later identification through photographs were followed. Samples of unidentified trees were collected following proper procedure and prepared into herbarium sheets for later identification.



5. **Primary database:** Data generated from the field survey within and adjacent to the study area were meticulously compiled and inventoried as “Primary Floral Diversity Database”.
6. **Field instruments/materials for floral study:** Measuring tape/s, herbarium sheets, newspaper, herbarium press, polythene bags (incl. zip-locked pouches), 106clinometers, and magnifying glass, camera, and GPS unit. List of flora is given in Table 3.29.

Table-3.29

List of

Flora

S.No.	Botanical Name	Common Name
<b>Trees</b>		
1.	<i>Albizia lebeck</i>	Siris
2.	<i>Bauhinia variegata</i>	Kachnar
3.	<i>Cassia Fistula</i>	Amaltas
4.	<i>Leucaena leucocephala</i>	Lucenea
5.	<i>Mallotus philippensis</i>	Kamala
6.	<i>Mangifera indica</i>	Mango
7.	<i>Morus alba</i>	Shehtoot
8.	<i>Eucalyptus spp.</i>	Safeda
9.	<i>Dendra calamus spp.</i>	Latti Bans
10.	<i>Bambusa spp.</i>	Maggar
11.	<i>Emblica officinalis</i>	Amla
12.	<i>Ficus spp.</i>	Ficus
13.	<i>Populus deltoids</i>	Popular
14.	<i>Terminalia bellerica</i>	Bahera
15.	<i>Terminalia arjuna</i>	Arjun
<b>Shrubs</b>		
16.	<i>Adhatoda vassica</i>	Basuti
17.	<i>Agave americana</i>	Ramban
18.	<i>Lantana camer</i>	Lantana
19.	<i>Carissa opacea</i>	Garna
20.	<i>Murraya koenigii</i>	Gandela

(Source: DFO, Kangra)

**B) Fauna:**



### Methodology for faunal study:

1. **Secondary literature survey:** Published literature, including those from relevant organizations like the Zoological Survey of India (ZSI), the Wildlife Institute of India (WII-Dehradun), the Forest Department of the State, research papers, articles, books and reliable websites, available within and adjacent to the study area were meticulously compiled and inventoried as “Secondary Faunal Diversity Database”.
2. **Primary field survey – birds:** For avian diversity assessment, point count method was used. The radius of each of the point was 50 m. Birds were identified on-site using field-books, or later through photographs and field-sketches.
3. **Primary field survey – mammals:** For mammalian diversity assessment, direct observations was done on the field. Field identification of species was done on-site and through photographs/sketches and with the help of field-books/other reliable sources.
4. **Primary field survey – amphibians and reptilians:** Direct observation and indirect evidence/sign survey were done for assessing amphibian and reptilian diversity in the field site. Identification of species was done on-site or through photographs/sketches and with the help of field-books or other reliable sources.
5. **Primary database:** Data generated from the field survey within and adjacent to the study area was meticulously compiled and inventoried as “Primary Faunal Diversity Database”.
6. **Field instruments/materials for faunal study:** Range-finder, compass, binoculars, camera, slide-calipers, measuring tape, GPS unit, polythene bags (incl. zip-lock pouches), and field books.

**IUCN Red List Categories and Criteria:** IUCN Red List Categories and Criteria are intended to be an easily and widely understood system for classifying species at high risk of global extinction. List of Birds and Fishes is given in Table 3.30 and 3.31. Flow diagram of IUCN Categories is given in Figure 3.28.

### Objectives of IUCN Red List Categories and Criteria:

- To provide a system that can be applied consistently by different people.
- To improve objectivity by providing users with clear guidance on how to evaluate different factors which affect the risk of extinction.
- To provide a system which will facilitate comparisons across widely different taxa.



- To give people using threatened species lists a better understanding of how individual species were classified.

Fig. 3.28: IUCN Categories

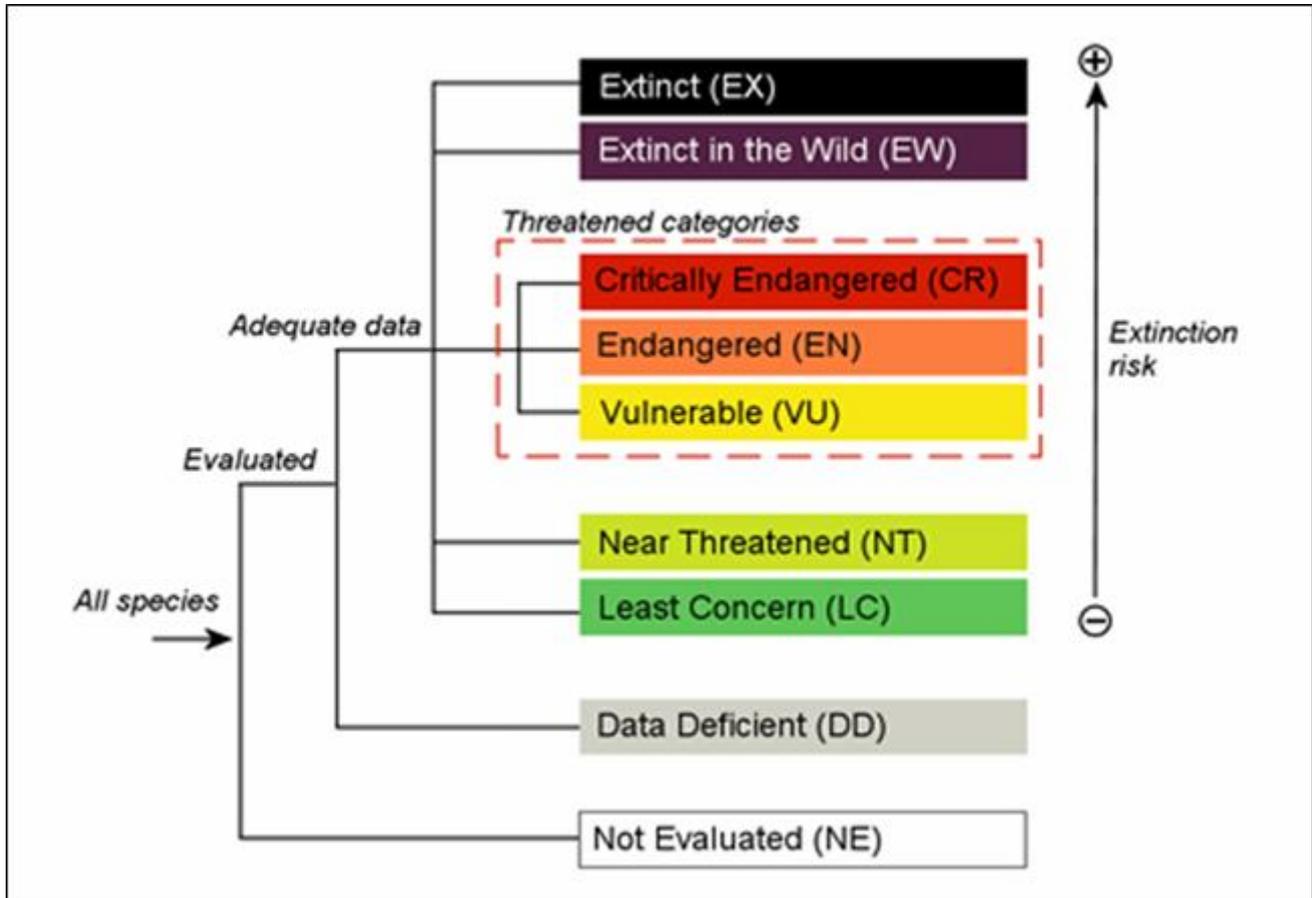


Table 3.30 List of Birds

S.No.	Zoological Name	Common Name	Schedules as per WPA, 1972 as amended till date
1.	Acridotheres tritis	Common Myna	Schedule II
2.	Coracias benghalensis	Indian roller	Schedule II
3.	Corvus splendens	House Crow	--
4.	Cuculumicropterus	Indian Cockoo	--
5.	Eudynamysscolopacea	Koel	Schedule II
6.	Passer domesticus	Sparrow	Schedule II



7.	Psittacula krameri	Rose-Ringed Parakeet	--
8.	Sturnus contra	Pied Myna	--

(Source: DFO, Kangra)

**Table 3.31 List of Fishes**

S. No.	Zoological Name	Common English name	IUCN Status	Schedules as per WPA, 1972 as amended till date
1.	<i>Labeo rohita</i>	Rohu	LC	Not Mentioned in Schedule
2.	<i>Catla catla</i>	Catla	LC	
3.	<i>Barbus (tor) putitora</i>	Mahaseer	LC	
4.	<i>Clarias batrachus</i>	Magur	EN	

(a) Data of mammals and reptiles were collected during field survey:

**Table 3.32: List of Mammals (Mammalia):**



S. No.	Zoological Name	Common English Name	Schedules as per WPA, 1972 as amended till date
1.	<i>Boselaphus tragocamelus</i>	Blue Bull	Schedule II
2.	<i>Cervus unicolor</i>	Sambhar	Not listed in Schedules
3.	<i>Herpestes edwardsi</i>	Common Mongoose	Schedule II
4.	<i>Macaca mulatta</i>	Rhesus Monkey	Not listed in Schedules
5.	<i>Lepus nigricollis ruficaudatus</i>	Rufous tailed hare	Not listed in Schedules
6.	<i>Presbytis entellus</i>	Langur	Schedule II
7.	<i>Funambulus pennant</i>	Five striped Palm Squirrel	Not listed in Schedules
8.	<i>Mus booduga</i>	Indian Field Mouse	Not listed in Schedules
9.	<i>Rattus rattus</i>	Common House Rat	Not listed in Schedules
10.	<i>Mus musculus</i>	House Mouse	Not listed in Schedules
11.	<i>Pteropus giganteus</i>	Flying Fox	Appendix-I (Not listed in Schedules)
12.	<i>Rousettus leschenaultia</i>	Fruit bat	Appendix-I (Not listed in Schedules)

**Table 3.33 List of Reptiles**

S. No.	Zoological Name	Common English name	Schedules as per WPA, 1972 as amended till date
1	<i>Lacerta vivipara</i>	Common lizard	Not listed in Schedules
2	<i>Calotes versicolor</i>	Garden lizard	Schedule II
3	<i>Bangarus caeruleus</i>	Common Indian crait	Not listed in Schedules
4	<i>Ancistrodon himalayanus</i>	Himalayan pit viper	Not listed in Schedules

### Interpretation and Conclusion for Ecology & Biodiversity



## Floral & Faunal Study

### Interpretation:

The project is situated in an area characterized by healthy vegetation, with the majority of the land dedicated to forest and agricultural use. The study area does not include any Reserved or Protected Forests, and there are no National Parks or Wildlife Sanctuaries within the immediate vicinity (the closest being 10.7 km away). Furthermore, the study did not identify or discuss any Rare, Endangered, or Threatened (RET) species among the floral species present in the area

### Interpretation for Faunal Diversity:

The study area is rich in natural diversity, featuring a mix of forests and both perennial and seasonal water bodies. Notably, Baner Khad and Ghaj Khad are the two perennial water sources, while Manuni Khad and Chambi Khad are seasonal. These aquatic systems support a variety of species, including the endangered fish *Magur*, though it is not listed under Schedule I of the Wildlife Protection Act.

While the area shows evidence of wild animal movement, most of the observations are based on secondary data. It's important to note that the study area does not harbor any Schedule-I species or endemic species, which would require special conservation attention.

With ongoing development in the region, it's crucial to focus on protecting and strengthening the existing biodiversity. To minimize potential ecological impacts, it is recommended that project activities be restricted to the core zone, ensuring that the surrounding ecosystems remain undisturbed.

## CONCLUSION

Based on the field study and secondary data and the characteristics of the study area, it is concluded that the existing ecosystem is balanced in terms of co-existence, stability and resilience and the ecosystem is able to recover from disturbances.

**The flora & fauna may be impacted on account of the following:**

### Impacts:

- Noise due to the vehicular traffic & animal collisions due to transportation.
- Noise due to heavy machinery.
- Transportation of Raw materials and finished products.
- Flue gas discharge from stacks & fugitive emissions due to material handling.
- Waste water discharge.
- Unscientific handling & disposal of solid waste.



**Mitigation Measures:**

- Regular maintenance of machines including diesel engines/ D.G. Sets.
- Provision of sound insulated chambers on noisy machines.
- Green belt/ plantation around the project periphery and along internal roads.
- Provisions of all the required air emissions control measures in compliance with MOEF&CC/ CPCB norms.
- Interlocking system on pollution control devices.
- Zero effluent discharge will be maintained.
- All the solid waste will be disposed of accordance with the applicable norms.
- Regular monitoring of environmental components for significant parameters.

With the compliance of all the applicable norms, there will not be any adverse impact on flora & fauna due to the proposed project.

**3.11 SOCIO-ECONOMIC ENVIRONMENT**

**Introduction**

Modern day cities have complex structure comprising of numerous & intertwined/ interwoven relationships due to which town planning judgments cannot be merely treated as technical- oriented as they affect the lives and interests of the whole community. In the present context, the slogan “Planning by the people and Planning for the people” exhibits a shift from Physical design oriented basic concept of town planning to more of a socially relevant and sensitive model of town Planning encompassing socio-economic richness and viability of existing communities.

The economic sectors i.e., primary, secondary and tertiary form the economic base of the town. Nothing can hamper the physical growth/ development of an area more than the economic incompetence. The identity of a town depends upon the character of its population. Demographic profile determines the demographic character of the town area in terms of population, growth rate, density, literary rate etc. which further helps in determining the social as well as the economic character of the area. The natural population growth has special significance because it is a vital index of economic development, social awakening.

**Methodology**

The aim / objectives of the study and how it was done (methodology) are given in Table 3.34.

**Table 3.34: Approach and Methodology for Conducting the Socio-economic study**

S. No.	Aim / Objective	Area		Methodology
		Study Area	Core Area	



			Only	
<b>To Identify and Assess Social status of society in the focused area. To do this it is required to get reliable information with regards to</b>				
1.	People residing in the study area along with key demographic figures as per the secondary data (mainly Census of India) giving information on: population, literacy, gender and occupation	√		Secondary data collection and collation from Census of India
2.	To Identify and Assess Main sub-communities dwelling in the core zone by caste and religion		√	Secondary data collection and collation from Census of India
3.	To Identify and Assess People who are vulnerable classes such as: Below Poverty Line (BPL), Scheduled Castes (SC) and Scheduled Tribes (ST)		√	Secondary data collection and collation from Census of India
<b>To Identify and Assess Economic status of society in the study area. To do this it is required to get reliable information with regards to</b>				
4.	Occupational pattern from secondary data (mainly Census of India) giving information on: main workers / marginal workers /non-working population	√		Secondary data collection and collation from Census of India
5.	Sources of revenue available to Panchayati Raj Institutions (PRIs)	-	-	-
6.	Economic well-being of different classes by gaining an understanding of: prevailing daily wage rates for labor (male /female), status of land holding across different classes / landless households, major crops and farmer support, livestock and animal husbandry	-	-	-
<b>To Identify and access Status of physical and social infrastructure within the core and buffer areas. To do this, it is required to get reliable information with regards to</b>				
7.	Physical infrastructure - reliable information on availability and adequacy with respect to: educational facilities, road infrastructure, power, water for	√		From interviews with PRI representatives



	drinking and irrigation, sanitation, garbage / MSW, banking facilities			
8.	Social infrastructure – reliable information on availability and adequacy with respect to infrastructure associated with: sports, community events and community self-help / support group	-	-	-
9.	Cultural heritage of the area	√		From published literature and site visits
<b>To Identify and Access the Effect of</b>				
10.	Ongoing impacts of other developments in the vicinity of the subject development on people and their lifestyle within the core zone, as determined by the EC in interaction with FAE (WP / AP&AQ / SHW / RH & NV)		√	From focus group discussions
11.	Likely impacts of proposed operations (if a greenfield project) on people and their lifestyle within the core impact zones mentioned above		√	From focus group discussions
12.	To Determine Needs of different communities based on the work done in identification and assessment mentioned above		√	From data analysis, internal / Client discussions
13.	To Propose a Social Management Plan with budgets, timelines and actionable items to achieve the expected outcomes		√	From data analysis, internal / Client discussions

#### ✚ Socio-economic status of District Kangra, Himachal Pradesh

In 2011, Kangra had population of 1,510,075 of which male and female were 750,591 and 759,484 respectively. In 2001 census, Kangra had a population of 1,339,030 of which males were 661,254 and remaining 677,776 were females. Kangra District population constituted 22.00 percent of total Maharashtra population. In 2001 census, this figure for Kangra District was at 22.03 percent of Maharashtra population.

There was change of 12.77 percent in the population compared to population as per 2001. In the



previous census of India 2001, Kangra District recorded increase of 14.05 percent to its population compared to 1991. Socio-economic status of District Kangra, Himachal Pradesh is given in Table 3.35.

**Table: 3.35**

**Socio-economic status of District Kangra, Himachal Pradesh**

Description	2011	2001
Population	15.10 Lakhs	13.39 Lakhs
Actual population	1,510,075	1,339,030
Male	750,591	661,254
Female	759,484	677,776
Population Growth	12.77%	14.05%
Area Sq. Km	5,739	5,739
Density/km <sup>2</sup>	263	233
Proportion to Himachal Pradesh Population	22.00%	22.03%
Sex ratio (per 1000)	1012	1025
Child Sex Ration (0-6 Age)	876	836
Average Literacy	85.67	80.08
Male Literacy	91.49	87.54
Female Literacy	80.02	73.01
Total Child Population (0-6 Age)	164,607	164,566
Child Proportion (0-6 Age)	10.90%	12.29%

*Source: Kangra District Census-2011*

**• Density**

The initial provisional data released by census India 2011, shows that density of Kangra district for 2011 is 263 people per sq. km. In 2001, Kangra district density was at 233 people per sq. km. Kangra district administers 5,739 square kilometers of areas.

**• Literacy Rate**

Literacy rate of Kangra District is 93.31 % higher than state average of 82.80 %. In Kangra, Male literacy is around 95.63 % while female literacy rate is 90.87 %.

**• Sex Ratio**

Kangra is one of districts of Himachal Pradesh in India, Kangra District population in 2023 is



2,099,005 (estimates as per Aadhar uidai.gov.in Dec 2023 data). As per 2011 census of India, Kangra District has a population of 1,510,075 in 2011 out of which 750,591 are male and 759,484 are female.

• **Houseless Census**

In 2011, total 180 families live on footpath or without any roof cover in Kangra district of Himachal Pradesh. Total Population of all who lived without roof at the numbers to 752. This approx. 0.049798851050445% of total population of Kangra district. Kangra District Religion-wise Data is given in Table 3.36.

**Table 3.36**

**Kangra District Religion-wise Data**

Description	Total	Percentage
Time of Census 2011 Hindu	1,461,140	96.76%
Muslims	19,797	1.31%
Christian	3,023	0.20%
Sikh	8,929	0.59%
Buddhist	14,511	0.96%
Jain	194	0.01%
Others	208	0.01%
Not Stated	2,273	0.15%

**District- Kangra (Urban/Rural 2011)**

Out of the total Kangra population for 2011 census, 5.71 percent lives in urban regions of district. In total 86,281 people lives in urban areas of which males are 45,226 and females are 41,055. Sex Ratio in urban region of Kangra district is 908 as per 2011 census data. Similarly, child sex ratio in Kangra district was 856 in 2011 census. Child population (0-6) in urban region was 8,021 of which males and females were 4,322 and 3,699. This child population figure of Kangra district is 9.56 % of total urban population. Average literacy rate in Kangra district as per census 2011 is 89.70 % of which males and females are 92.60 % and 86.52 % literates respectively. In actual number 70,198 people are literate in urban region of which males and females are 37,879 and 32,319 respectively.

As per 2011 census, 94.29 % population of Kangra districts lives in rural areas of villages. The total Kangra district population living in rural areas is 1,423,794 of which males and females are 705,365 and 718,429 respectively. In rural areas of Kangra district, sex ratio is 1019 females per 1000 males. If



child sex ratio data of Kangra district is considered, figure is 877 girls per 1000 boys. Child population in the age 0-6 is 156,586 in rural areas of which males were 83,419 and females were 73,167. The child population comprises 11.83 % of total rural population of Kangra district. Literacy rate in rural areas of Kangra district is 85.42 % as per census data 2011. Gender wise, male and female literacy stood at 91.42 and 79.64 percent respectively. In total, 1,082,442 people were literate of which males and females were 568,564 and 513,878 respectively. District- Kangra Urban & Rural Census 2011 is given in Table 3.37.

**Table 3.37**

**District- Kangra Urban & Rural Census 2011**

<b>Description</b>	<b>Rural</b>	<b>Urban</b>
Population (%)	40.84%	59.16%
Total Population	1,429,031	2,069,708
Male Population	753,444	1,114,372
Female Population	675,587	955,536
Sex Ratio	897	857
Child Sex Ratio (0-6)	859	860
Child Population (0-6)	148,970	235,144
Male Child (0-6)	80,113	126,389
Female Child (0-6)	68,857	108,755
Child Percentage (0-6)	10.42%	11.36%
Male Child Percentage	10.63%	11.34%
Female Child Percentage	10.19%	11.38%
Literates	1,002,069	1,558,156
Male Literates	557,296	871,052
Female Literates	444,773	687,104
Average Literacy	78.28%	84.93%
Male Literacy	82.77%	88.16%
Female Literacy	73.31%	81.16%

*Source: District Census Population, 2011*

**3.11.1 Methodology applied for selection of sample & data collection**

The methodology which is applied for primary source of data collection i.e., gathering data through



field survey for socio- economic environment is depicted below:

**A. Sampling Method**

A judgmental and purposive sampling method was used for choosing respondents of various sections of the society i.e., Sarpanch, Adult Males and Females, Teachers, Medical Practitioners, Businessmen, Agriculture labourers, Unemployed Group etc. Judgmental and purposive sampling methods were adopted to assess the total population that helps to fulfill the purpose of research needs.

**B. Data Collection Method**

For the process of data collection through primary source certain methods were used, amongst that are:

**i. Field Survey and Observations**

Field survey and observations were made in nearby sampling village and the socioeconomic status of that region was studied. Visits are made at Health Centers, Schools, Gurudwaras, Panchayat office etc.

**ii. Interview Method**

Structured interview method was used to collect data regarding the awareness and opinion from the samples selected of the various socio- economic sections of the community. Structured interviews involve the use of a set of predetermined projected questions that includes fixed and alternative questions. The questionnaire mainly highlights the parameters such as income, employment and working conditions, housing, food, water supply, sanitation, health, energy, transportation and communication, education, environment and to assess the standard of living of that particular region and general awareness, opinion and expectation of the respondents about the proposed project. Interview method helps to collect more correct and accurate information as the interviewer is present during the field survey.

**Socio-economic data of study area**

We have chosen 4 villages in the study area for socio-economic study. These villages are situated in different distance & direction from the project site, which is mentioned below and same is shown in Figure 3.30. Nearby villages with distance and direction from the project site is given in Table 3.38.

**Table 3.38: Nearby villages with distance and direction from the project site**

S. No.	Name of the Village	Distance and Direction from Project site
1.	Salol	Project Site.
2.	Salwana Tatwani	2.86 Km N



3.	Jheer Balla	2.60 Km NE
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The criteria for selecting baseline data are as follows:

1. Population density of the village: Villages with higher population densities will be prioritized for employment opportunities.
2. Proximity to the project site: Villages closer to the project site will be considered more impacted.
3. Proximity to Water (Ghaj Khad): Villages near the watercourse will be given special consideration.
4. Wind direction: Villages located along the North to South (N-S) and North East to South East (NW-SE)

**1. Salol Khas: -**

Salol Khas is a medium size village located in Kangra Tehsil of Kangra district, Himachal Pradesh with total 80 families residing. The Salol Khas village has population of 319 of which 131 are males while 188 are females as per Population Census 2011.

In Salol Khas village population of children with age 0-6 is 37 which makes up 11.60 % of total population of village. Average Sex Ratio of Salol Khas village is 1435 which is higher than Himachal Pradesh state average of 972. Child Sex Ratio for the Salol Khas as per census is 1176, higher than Himachal Pradesh average of 909.

Salol Khas village has lower literacy rate compared to Himachal Pradesh. In 2011, literacy rate of Salol Khas village was 81.91 % compared to 82.80 % of Himachal Pradesh. In Salol Khas Male literacy stands at 87.72 % while female literacy rate was 77.98 %. Details of the village is given in table 3.39.

**Table 3.39 Details of Village Salol Khas**

Particulars	Total	Male	Female
Total No. of Houses	80	-	-
Population	319	131	188
Child (0-6)	37	17	20
Schedule Caste	0	0	0
Schedule Tribe	13	7	6
Literacy	81.91%	87.72%	77.98%
Total Workers	227	92	135



Particulars	Total	Male	Female
Main Worker	58	-	-
Marginal Worker	169	46	123

### Work Profile

In Salol Khas village out of total population, 227 were engaged in work activities. 25.55 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 74.45 % were involved in Marginal activity providing livelihood for less than 6 months. Of 227 workers engaged in Main Work, 0 were cultivators (owner or co-owner) while 0 were Agricultural labourer.

**Primary Survey-** During primary survey, we interacted with local people to cross verify the secondary data.

**School:** - The Village has two School: - Govt. Sen. Sec. School Salol, (1.98 Km, E) and Govt. Primary School Salol, (1.92 Km, E)

### 2. Salwana Tatwani:

Tatwani is a small village located in Shahpur Tehsil of Kangra district, Himachal Pradesh with total 43 families residing. The Tatwani village has population of 195 of which 98 are males while 97 are females as per Population Census 2011.

In Tatwani village population of children with age 0-6 is 26 which makes up 13.33 % of total population of village. Average Sex Ratio of Tatwani village is 990 which is higher than Himachal Pradesh state average of 972. Child Sex Ratio for the Tatwani as per census is 733, lower than Himachal Pradesh average of 909.

Tatwani village has higher literacy rate compared to Himachal Pradesh. In 2011, literacy rate of Tatwani village was 88.17 % compared to 82.80 % of Himachal Pradesh. In Tatwani Male literacy stands at 92.77 % while female literacy rate was 83.72 %. Details of Village Salwana Tatwani is given in Table 3.40.

**Table 3.40 Details of Village Salwana Tatwani**

Particulars	Total	Male	Female
Total No. of Houses	43	-	-
Population	195	98	97



Particulars	Total	Male	Female
Child (0-6)	26	15	11
Schedule Caste	0	0	0
Schedule Tribe	19	10	9
Literacy	88.17%	92.77%	83.72%
Total Workers	100	44	56
Main Worker	19	-	-
Marginal Worker	81	28	53

### Work Profile

In Tatwani village out of total population, 100 were engaged in work activities. 19.00 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 81.00 % were involved in Marginal activity providing livelihood for less than 6 months. Of 100 workers engaged in Main Work, 0 were cultivators (owner or co-owner) while 0 were Agricultural labourer.

**Primary Survey-** During primary survey, we interacted with local people to cross verify the secondary data.

**School:** - The Village has one school: Raj Guru Public School Salwana (0.33Km).

**Hot Spring:** - The village has one natural hot spring Tatwani which is a major tourist and religious attraction.

### 3. Jheer Balla:

Balla is a medium size village located in Kangra Tehsil of Kangra district, Himachal Pradesh with total 148 families residing. The Balla village has population of 623 of which 301 are males while 322 are females as per Population Census 2011.

In Balla village population of children with age 0-6 is 54 which makes up 8.67 % of total population of village. Average Sex Ratio of Balla village is 1070 which is higher than Himachal Pradesh state average of 972. Child Sex Ratio for the Balla as per census is 800, lower than Himachal Pradesh average of 909. Balla village has higher literacy rate compared to Himachal Pradesh. In 2011, literacy rate of Balla village was 90.51 % compared to 82.80 % of Himachal Pradesh. In Balla Male literacy stands at 94.10



% while female literacy rate was 87.25 %. Details of Village Jheer Balla is given in Table 3.41

**Table 3.41 Details of Village Jheer Balla**

Particulars	Total	Male	Female
Total No. of Houses	148	-	-
Population	623	301	322
Child (0-6)	54	30	24
Schedule Caste	19	9	10
Schedule Tribe	12	8	4
Literacy	90.51%	94.10%	87.25%
Total Workers	203	145	58
Main Worker	128	-	-
Marginal Worker	75	39	36

**Work Profile**

In Balla village out of total population, 203 were engaged in work activities. 63.05 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 36.95 % were involved in Marginal activity providing livelihood for less than 6 months. Of 203 workers engaged in Main Work, 0 were cultivators (owner or co-owner) while 1 were Agricultural labourer.

**Conclusion:**

Socio- economic survey was conducted in the villages of the study area. The salient observations recorded during socio economic survey in the study areas are depicted below:

- Livelihood of the villagers is primarily based on agriculture sector.
- Majority of main workforce are engaged as cultivators or agriculture labourers.
- Most villages in the project area have access to primary schools, and some are equipped with middle schools as well. Although schools are scattered, they are generally available within a 5–10 km radius. For higher education, reputed institutions are accessible within a 20–25 km stretch of the project area.
- The main source of drinking water supply is through hand pumps and bore wells in addition to the



Government water supply.

- The Government medical facilities in the form of primary health sub-centre and private medical practitioners are available in the villages. Villagers expressed satisfactory opinion regarding the facilities are available at the centre. ANM (Auxiliary Nurse Midwife) frequently visits all the villages and regular vaccination and health checkups camps are organized by the health centre. Bus facility is the main mode of transportation used by natives in the study area. Power supply was available in all the villages in study area. Street lights are also available in all villages but frequent power cut/ load shedding problem is experienced by the people in the area LPG is a major fuel used for cooking purpose. Post office and banking facilities are available in the study area.
- Majority of surveyed population opened positively regarding the proposed project as most of the local population will be given preference in employment and the activity will help in development.
- The people were optimistic about the employment opportunity in Government sector and other welfare schemes to be implemented by the state Government.
- The agricultural operations in the study area were mostly mechanized. No migrant labour is employed.



Figure 3.29: Photographs of Socio- Economic Survey





### 3.12 Traffic Study (Terms of Reference No. 6.9)

Traffic survey is one of the most important parameters to know the present traffic of study area and helps to determine the carrying capacity of existing road and the impact of traffic increases due to the proposed project. The vehicular movement has impact on air quality, water and noise. The traffic study of project development includes comprehensive assessment of potential environment and social impacts especially concerning transportation.

The components of traffic study include baseline traffic assessment, project related traffic, evaluating the potential impacts of the project related traffic on the existing roads, traffic flow and proposed strategies to minimize traffic congestion and improve traffic flow e.g. traffic management, road improvements etc. The study also includes the assessment of impacts of traffic on air quality and noise.

**Project Overview:** M/s **Angus Dundee India Private Limited** has proposed to set up grain-based distillery in the revenue estate of village salol, tehsil & district Kangra (H.P). The project site is adjacent to Gaggal road in N direction at a distance of 410 meters. 3.92 Km in SW direction of State Highway (SH)- 23 (Ranital 32Mile Road) and NH-503 (Jawalamukhi Ji- Kangra) at an approximate distance of 8.41 Km in E direction.

**Existing Traffic Scenario:** Traffic Study was conducted in the connecting roads for three consecutive days 16/05/2025 to 18/05/2025 by including weekend as mandated by the guidelines given in IRC- 108-2015. The local Gaggal road did not have much traffic as the same is being used by adjoining commuters as a means of connectivity to SH- 23 & NH-503. Conventional transportation modeling has been utilized for the impact study forecasting.

#### Relation Codes, Manuals & Guidelines in fall

**Table 3.42 (a) Existing Daily Traffic (ADT) on Gaggal Road**

S.No.	Vehicle Type	Actual Count	As PCU/Day	% of Total Traffic
1	Motor cycle, Scooter, & Bicycle.	240	120	59.6
2	Passenger cars, auto rickshaw & pickup van.	85	85	21.1
3	Agricultural tractor & LCV	50	75	12.4
4	Bus & Truck	28	84	6.4



<b>Total</b>	<b>403</b>	<b>364</b>	<b>100.0</b>
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Equivalency tractors as per IRC-64-1990 “Guidelines for capacity of Road in Rural Areas”

**Table 3.42 (b) Existing Average Daily Traffic on SH- 23**

S.No.	Vehicle Type	Actual Count	As PCU/Day	% of Total Traffic
1	Motor cycle, Scooter, & Bicycle.	480	240	44.5
2	Passenger cars, auto rickshaw & pickup van.	375	375	34.8
3	Agricultural tractor & LCV	130	195	12.0
4	Bus & Truck	94	282	8.7
<b>Total</b>		<b>1079</b>	<b>1092</b>	<b>100.0</b>

**Table 3.42(c) Existing Average Daily Traffic on NH- 503**

S.No.	Vehicle Type	Actual Count	As PCU/Day	% of Total Traffic
1	Motor cycle, Scooter, & Bicycle.	260	130	27.4
2	Passenger cars, auto rickshaw & pickup van.	405	405	42.7
3	Agricultural tractor & LCV	140	210	14.7
4	Bus & Truck	130	390	1.5
5	Truck Trailer, Agricultural Tractor Trailer	14	63	1.5
<b>Total</b>		<b>949</b>	<b>1198</b>	<b>100.0</b>



**Table 3.43 Existing Level Service (LOS) & Performance of Road**

Road	Vol. of traffic (V) PCU/day	Design Service vol. (C) PCU/day	V/C Ratio	Loss	Performance of Road
Gaggal Road	364	1600	0.22	B	Very Good
SH-23	1092	5200	0.21	B	Very Good
NH-503	1198	7000	0.17	A	Excellent

**Table 3.44 Recommended Service Volume as per IRC-106-1990 Criteria of LOS & Performance of Road**

V/c ratio	LOS	Performance of Road
0.0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good
0.6-0.8	D	Average
0.8-1.0	E	Poor
1.0 & above	F	Very Poor

**Additional Traffic Due to Proposed Project:** There will be an increase in the existing volume of traffic on the concerned roads due to project operations as the transportation of raw materials & finished products will be done 100% by road, The details of vehicular addition is given below:

No. of increased trucks per day (inward) = 6(@ 10 ton/truck

No. of increased trucks per day (outward) = 4

Passenger Cars = 4

Motor Cycle/ Scooter = 25

Hence the additional traffic in PCU/day = 44

#### **Impacts on air quality**

Due to the movement on road there is very little load of increase in particulate emission due to surface particles lifting by trucks and their resultant air borne by strong air currents. The air pollution in the project area is primarily due to vehicles used for transportation. However, their generation is limited to project premises and for short duration. The impact of project operations including vehicular has already been included in air quality modelling as per details given in EIA/EMP studies.



## **Impact on Noise Quality**

Noise pollution is one of the major air pollutants that are encountered in daily life and which has direct bearing on human performance. Highway noise is the sum total of noise produced at that point of observation by all moving vehicles on the road which further depend on the type of vehicle and its mode of operational characteristics of vehicle flow & the relative proportion of vehicles types in the flow. Noise levels in the study area including the project site have already been provided in the baseline study w.r.t noise.

The project site is adjacent to Gaggal road in N direction at a distance of 410 meters and the same will be used for all its transportation needs. The vehicle traffic noise within the facility is limited to 100 m distance from the source and the same being localized will be assimilated to the atmosphere. Hence there is no foreseen appreciable impact on noise quality of the surrounding population due to transportation of materials.

## **Traffic Management Measures**

The following measures will be in place

- All the incoming and outgoing vehicles will be managed by efficient security personal.
- Proper Signage on road to guide the employees, drivers and the contract staff as per IRC & Institute of Transportation Engineers (USA).
- Road marking, parking's etc. will be clearly marked to guide the drivers.
- No vehicle parking outside the project premises.
- Adequate street lighting for vehicular parking during night.
- No parking signage at vulnerable locations.
- Overtaking prohibitory sign boards installation for both coming and going vehicles.
- Limiting vehicles speed to 20 KMH within the perfect premises.
- Provision will be mode for calming down the traffic within the industrial premises.
- Adequate turning radius will be provided for loaded vehicle to turn safely to the extent of 1.5 times the length of vehicles.



Fig 3.31: Locations of Traffic Study





## CHAPTER-4

### ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 4.1 General

Prediction of impacts on the environment, due to any project requiring prior EC is an important aspect to be studied. This chapter incorporates both, qualitative and quantitative descriptions of various environmental impacts due to establishment of proposed distillery.

Several scientific techniques and methodologies are available to predict impacts of developmental activities on bio-physical, ecological and socio-economic environment. Such predictions are superimposed over the baseline (pre-project) status of environmental quality to derive the ultimate (post-project) scenario of environmental conditions. The prediction of impacts helps to minimize the adverse impacts on environmental quality during pre and post project execution. Generally, the environmental impacts can be categorized as either primary or secondary. Primary impacts are those, which are attributed directly by the project and secondary impacts are those, which are indirectly induced and typically include the associated investment and changed patterns of social and economic activities by the proposed actions.

The primary function of an environmental impact assessment is to ascertain the potential impacts of project on environmental components such as air, water, noise, soil, flora, fauna, land and Socio-economic and their magnitude during construction and operation for adoption of possible mitigation measures.

The Impacts of project activities are divided into two categories i.e., impacts during construction phase and impacts during operation phase. Major impacts will occur during operation phase as construction work will be done in a staggered manner within a small area and for short duration.

Environmental components considered for impact analysis are:

1. Landform and Topography
2. Air Environment
3. Water Environment
4. Noise Environment
5. Biological Environment
6. Socio-economic Environment



- **Impact Matrix:** Impact matrix for construction phase is given in Table 4.1.

### During Construction Phase

**Table 4.1 Impact Matrix for Construction Phase**

Activities	Environmental Attributes											
	Air	Water	Soil	Noise	LULC	Hydro geology	Geology	SHW	Risk	Hazardous	Ecology and Biodiversity	Socio Economic
Material Supply (Transportation)	✓	-	-	✓	-	-	-	-	✓	-	✓	
Storage	✓	-	-	✓	-	-	-	✓	✓	-	✓	
Movement of Machinery	✓	-	-	✓	-	-	-	✓	✓	-	✓	
Land Development/ Green belt Development	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	
Construction of Building	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	
Garbage Disposal	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	
Operation of DG set	✓	-	-	✓	-	-	-	✓	✓	✓	✓	
Painting and Finishing	-	-	-	✓	-	-	-	✓	✓	✓	✓	

**During operational phase:** Impact matrix for operational phase is given in Table 4.2.

**Table 4.2 Impact Matrix for Operational Phase**

Receptor Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio-Economic
Raw Material & Product Storage & Handling	ST (negative)	-----	-----	-----	-----	ST (negative)	-----



Transportation of Raw material & products	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----	ST (negative)	-----
Production & utilization	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----	ST (negative)	-----
Emergency & Disaster	ST (negative)	ST (negative)	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----
Breakdown of Critical equipments	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----	ST (negative)	-----
Employment	-----	-----	-----	-----	-----	LT (positive)	LT (positive)
Green Belt Development	LT (positive)	LT (positive)	LT (positive)	LT (positive)	LT (positive)	-----	LT (positive)
Infrastructure & CER activities	-----	-----	-----	-----	-----	LT (positive)	LT (positive)

\*ST -Short Term

\*LT – Long Term

#### 4.2 CONSTRUCTION PHASE IMPACTS:

The activities during the construction phase will be confined to the project site and within the boundary of plant. The proposed project will not cause any significant loss of any important flora. Environmental factors as proposed in the project area which possibly could be affected both adversely and beneficially have been done & assessed.

#### 4.3 OPERATIONAL PHASE IMPACTS:

The malt spirit production process has been carefully assessed to identify potential environmental impacts, particularly on water resources, air quality, and other ecological components.

A comprehensive impact assessment has been conducted, evaluating the quality, quantity, timing, and spatial distribution of these impacts. To mitigate adverse effects, targeted measures will be implemented by the plant management. The design of process units incorporates environmentally sustainable features, minimizing ecological footprint at the source. Detailed anticipated impacts, aspects & significance analysis for construction phase and operational phase is given in **Table 4.3**.



**Table 4.3 Anticipated Impacts, Aspects & Significance Analysis for Construction Phase and Operational Phase**

Activity	Environment Attributes	Causes	Impact	Impact Characteristics		Mitigation Measures
				Nature	Duration	
<b>AMBIENT AIR QUALITY: "CONSTRUCTION PHASE"</b>						
<p><b>1. Transportation of raw material</b></p> <p><b>2. Loading, Handling &amp; Storage of raw material &amp; construction activities</b></p>	<p>Air Pollution (Particulate Matter SO<sub>2</sub> &amp; NO<sub>2</sub>).</p> <p>2.Particulate Matter</p>	<p>Due to Transportation of Raw material to site. Unloading, of Raw material &amp; Storage &amp; construction activities.</p>	<ul style="list-style-type: none"> <li>➤ Visibility Reduction</li> <li>➤ Respiratory problems like Asthma etc.</li> <li>➤ Skin problems.</li> <li>➤ Reduction in growth of flora &amp; fauna.</li> </ul>	Direct, Negative	Short Term	<ul style="list-style-type: none"> <li>➤ Provision of wind breaking wall of at least 3m height.</li> <li>➤ Providing water sprinkling system at the vulnerable points.</li> <li>➤ Use of Low Sulphur fuel in the vehicles.</li> <li>➤ Ensuring regular tuning and services of vehicles.</li> </ul>
<b>AMBIENT AIR QUALITY: "OPERATION PHASE"</b>						
<p><b>1. Flue gas emissions due to operation of utilities.</b></p> <p><b>2. Grain cleaning, milling, and mashing operations will release particulate matter (PM) emissions.</b></p> <p><b>3. Distillation processes will emit volatile organic compounds (VOCs).</b></p>	<p>Air Pollution (Particulate matter, SO<sub>2</sub> and NOx).</p>	<p>Due to Operation of Boiler, D.G Sets &amp; Vehicular movement.</p>	<ul style="list-style-type: none"> <li>➤ Deterioration of ambient air quality.</li> <li>➤ Visibility Reduction</li> <li>➤ Respiratory problems like Asthma etc.</li> <li>➤ Skin problems.</li> <li>➤ Stomatal Index may be minimized due to dust deposit on leaf which</li> </ul>	Direct, Negative	Long Term	<ul style="list-style-type: none"> <li>➤ During the operation of the unit, air emissions will be generated from the Boiler of capacity 15 TPH based on Multi fuel like Biomass/Wood Chips /Briquettes. For collection of these emissions, PTFE membrane-based Pulse-jet bag filters house will be provided to control and contain the concentration of pollutants in the emissions within the</li> </ul>



			<p>reduces crop yield &amp; deteriorate crop quality.</p> <ul style="list-style-type: none"> <li>➤ Climate Change.</li> <li>➤ Cancer</li> <li>➤ Increased Pollen Season</li> <li>➤ Odour Generation</li> </ul>		<p>prescribed standards. The bag filter house shall be got designed to achieve emission standard in respect of SPM as 50 mg/Nm<sup>3</sup>.</p> <ul style="list-style-type: none"> <li>➤ In order to assess the impact of these air emissions, mathematical modelling has been done with AMS/EPA REGULATORY MODEL (AERMOD) and the GLC in terms of particulate matter has been found as 2.28 ug/m<sup>3</sup>. Since at present, as per baseline study, the PM10 in the ambient air has been found as 71.5 ug/m<sup>3</sup>. Therefore, even after the operation of the unit the value of PM10 will become 73.78 ug/m<sup>3</sup>, which is below the prescribed standards of 100 ug/m<sup>3</sup>. Thus, the air quality of the area will not be affected with the operation of the unit.</li> <li>➤ Providing water sprinkling system at the vulnerable points.</li> <li>➤ Providing Greenbelt in 36.8 % of the project area.</li> <li>➤ Odour generation is also a problem in the distillery plant due to typical odour bearing compounds like grain skin, alcohol, fuel oils &amp; aldehydes,</li> </ul>
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						ketones and esters formed in the fermentation process
<b>2. Vehicular emissions.</b>	Other gases like CO, SO <sub>2</sub> , NO <sub>x</sub> , PM etc.	Through uncovered trucks and vehicles.		Direct, Negative	Long Term	<ul style="list-style-type: none"> <li>➤ All the roads will be asphalted to control the fugitive dust emissions.</li> <li>➤ The vehicles to be used for transportation purposes will be kept in good condition at all the times and it shall be made mandatory to have valid PUC for all such vehicles.</li> <li>➤ Green Belt in an area of 36.8 %of project area shall be developed to attenuate the fugitive emissions and noise levels.</li> <li>➤ The DG sets shall be attached with stacks of adequate height for dispersion of exhaust emissions into the atmosphere at the required height.</li> </ul>
	CO <sub>2</sub>	Through Fermentation		-	-	<ul style="list-style-type: none"> <li>➤ In proposed distillery, CO<sub>2</sub> generated from the fermenter will be scrubbed, liquified and sold to vendors engaged in manufacture of carbonated drinks.</li> </ul>

**WATER QUALITY: CONSTRUCTION PHASE**

<b>1.Domestic Effluent</b>	Water Pollution	Due to discharge of Domestic Effluent	<ul style="list-style-type: none"> <li>➤ Stagnation of wastewater causes odour problems.</li> <li>➤ Waterborne</li> </ul>	Direct, Negative	Short term	<ul style="list-style-type: none"> <li>➤ During construction phase water for domestic purposes will be met from water supply of groundwater.</li> </ul>
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			diseases due to contamination of groundwater.			<ul style="list-style-type: none"> <li>➤ The workers to be deployed during the construction phase, shall use all the existing sanitary facilities and the domestic effluent to be generated shall be treated in the STP of 10 KLD based on MBBR technology.</li> <li>➤ There shall not be any significant impact on the environment.</li> </ul>
<b>WATER QUALITY-OPERATIONAL PHASE</b>						
<b>Domestic/Industrial wastewater effluent</b>	Water Pollution	Due to discharge of Industrial wastewater effluent	<ul style="list-style-type: none"> <li>➤ Discharge of inadequately treated wastewater may impact the flora/fauna, soil health and ground water quality.</li> </ul>	Direct, Negative	Long term	<ul style="list-style-type: none"> <li>➤ Zero Liquid Discharge (ZLD) treatment system shall be provided for handling of Industrial wastewater.</li> <li>➤ Total water requirement of the project will be 900 KLD (Ground Water + Recycling of Treated Wastewater), out of which 504 KLD will be fresh water which will be sourced from Groundwater.</li> <li>➤ Effluent will be treated in Effluent Treatment Plant/CPU (Capacity 425 KLPD). The treated water will be recycled for cooling tower makeup and floor washing.</li> <li>➤ An STP of capacity 10 KLD based on MBBR technology will be used for treatment of water.</li> </ul>



						<ul style="list-style-type: none"> <li>➤ The treated water from STP will be used for plantation within the premises.</li> </ul>
<b>SOIL QUALITY: CONSTRUCTION PHASE</b>						
<p><b>1. Removal of top soil as a part of construction.</b></p> <p><b>2. Disposal of Construction/demolition/debris material.</b></p>	Soil Pollution	Disposal of debris, construction and demolition material in result of loss of top soil and soil pollution	<ul style="list-style-type: none"> <li>➤ Change in soil texture.</li> <li>➤ Deterioration of soil health resulting into reduction in soil fertility.</li> </ul>	Direct, Negative	Short term	<ul style="list-style-type: none"> <li>➤ Proper collection, storage &amp; use of top soil.</li> <li>➤ Management and handling of construction and demolition waste as per the provisions of the Construction and Demolition Management Rules, 2016.</li> <li>➤ Grading and leveling to prevent erosion and ensure even terrain.</li> </ul>
<b>SOIL QUALITY-OPERATIONAL PHASE</b>						
<p><b>1. Accident leading to leakage/spillage, toxic dispersion, fire/explosion.</b></p> <p><b>2. Generation of wastewater and its handling, treatment &amp; disposal.</b></p> <p><b>3. Handling and management of hazardous waste.</b></p>	Soil Pollution and Contamination.	Due to spillage of chemicals, wastewater and improper handling of HW management.	<ul style="list-style-type: none"> <li>➤ Deterioration of soil quality resulting into decrease in soil abundance.</li> <li>➤ Changes in soil texture.</li> <li>➤ Reduction in soil fertility</li> </ul>	Direct, Negative	Long term	<ul style="list-style-type: none"> <li>➤ Proper leach detection and repair system shall be followed.</li> <li>➤ Zero Liquid Discharge (ZLD) treatment system shall be provided for handling of Industrial wastewater.</li> <li>➤ Effluent will be treated in Effluent Treatment Plant/CPU (Capacity 425 KLPD). The treated water will be recycled for cooling tower makeup and floor washing</li> <li>➤ Boiler Ash @ 3.75 TPD will be generated from boiler and will be sent to brick manufacturers and will be given to the</li> </ul>



						farmers for conditioning of soil ➤ MSW @ 25 Kg/day will be collected, segregated using collection bins and handed over to authorized agency for final disposal at waste disposal site of local authority. ➤ DDGS @ 19 TPD will be sold as Cattle feed. ➤ ETP Sludge @ 3.0 TPD as Cake will be dewatered in sludge drying beds and will be used as manure. ➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in MEE to make DDGS. ➤ Paper waste and Glass culets @ 300 Kg/day will be sold to local supplier for recycle. ➤ Hazardous waste as used oil will be 0.5 Kl/annum and the same will be sent to HPSPCB authorized recyclers for final disposal. ➤ All categories of HW shall be managed and handled as per provisions of HWM Rules, 2016 in letter and spirit.
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**NOISE QUALITY-CONSTRUCTION PHASE**

<b>1. Construction and demolition: Building, repairing, and demolishing</b>	Noise Pollution	Due to construction and demolition,	Constructional equipment may increase noise levels,	Direct, Negative	Short term	➤ Specific control on vehicular movement, avoid high noise generating activities, vehicular
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<p>structures creates noise 2. Installation, testing &amp; commissioning of plant equipment.</p>		<p>installation testing, commissioning of plant equipments</p>	<p>which may have localized affect causing</p> <ul style="list-style-type: none"> <li>➤ Irritation</li> <li>➤ Gradual Hearing Loss</li> <li>➤ Stress and Anxiety</li> <li>➤ Sleep disturbances</li> <li>➤ Annoyance</li> </ul>		<p>movement and operation of machinery during night time.</p> <ul style="list-style-type: none"> <li>➤ Provide paved road on transportation route.</li> <li>➤ Regular maintenance of vehicles.</li> <li>➤ PUC and mandatory registrations.</li> <li>➤ Explore possibilities of alternative use of Cleaner Fuel.</li> <li>➤ Good construction practices and suitable enclosures/barriers.</li> <li>➤ Wind Breakers, Enclosures/barriers around site activities and storages.</li> <li>➤ Water sprinkling in transportation route and on construction waste.</li> <li>➤ Development of Green Belt.</li> <li>➤ Control Plan for storage piles and construction demolition activities.</li> </ul>
<p><b>NOISE QUALITY-OPERATIONAL PHASE</b></p>					



<p>1) Noise from operation of plant &amp; machineries. 2) Material handling: Loading, unloading, and transporting materials can create noise. 3) Vehicles and transportation: Movement of heavy vehicles, trucks, and trains generates noise.</p>	<p>Noise Pollution</p>	<p>Due to operation of plant &amp; machineries like DG Sets, heavy machinery operation, movement of heavy vehicles.</p>	<ul style="list-style-type: none"> <li>➤ It can reduce worker productivity and efficiency.</li> <li>➤ It can reduce overall quality of life for workers and nearby residents.</li> <li>➤ Gradual Hearing Loss.</li> <li>➤ Stress and Anxiety</li> <li>➤ Sleep disturbances</li> <li>➤ Annoyance</li> </ul>	<p>Direct, Negative</p>	<p>Long term</p>	<ul style="list-style-type: none"> <li>➤ Only valid PUC Certificate Vehicles will be used.</li> <li>➤ Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.</li> <li>➤ Personal Protective Equipment like earplugs and earmuffs will be provided to the workers exposed to high noise level.</li> <li>➤ D.G sets will be provided with acoustic to control the noise level within the prescribed limit.</li> <li>➤ Noise monitoring will be carried out regularly.</li> <li>➤ Maintenance of Green Belt.</li> </ul>
<p><b>HAZARDOUS WASTE: "OPERATION PHASE"</b></p>						
<p><b>Servicing of DG Set</b></p>	<p>Waste or Residue containing Oil (Hazardous Waste)</p>	<p>Spent oil used for servicing of sets</p>	<ul style="list-style-type: none"> <li>➤ Soil contamination</li> <li>➤ Habitat destruction</li> <li>➤ Loss of top soil</li> <li>➤ Health impacts</li> </ul>	<p>Direct, Negative</p>	<p>Long term</p>	<ul style="list-style-type: none"> <li>➤ Waste or Residue containing oil will be sent to HPSPCB authorized recyclers for final disposal.</li> </ul>
<p><b>Effluent Treatment Plant</b></p>	<p>ETP Sludge (Hazardous Waste)</p>	<p>Treatment Plant for effluents</p>	<ul style="list-style-type: none"> <li>➤ Air pollution</li> <li>➤ Groundwater Contamination</li> </ul>	<p>Direct, Negative</p>	<p>Long term</p>	<ul style="list-style-type: none"> <li>➤ ETP Sludge as Cake will be dewatered in sludge drying beds and will be used as manure.</li> </ul>
<p><b>Machinery</b></p>	<p>Used Oil (Hazardous Waste)</p>	<p>Machinery used in Manufacturing process for derivatives of Lactose and API</p>		<p>Direct, Negative</p>	<p>Long term</p>	<ul style="list-style-type: none"> <li>➤ Used oil will be sent to HPSPCB authorized recyclers for final disposal.</li> </ul>



**BIOLOGICAL ENVIRONMENT: CONSTRUCTION PHASE**

<p><b>Transportation and movement/ operation of machines Civil Construction activities</b></p>	<p>Ecology and Biodiversity</p>	<p>Noise and vibrations from the machinery activities.</p>	<ul style="list-style-type: none"> <li>➤ Disturb the movement of animal and birds</li> <li>➤ Emissions from vehicles will form a layer on leaves thus reducing the gaseous exchange process. This ultimately affects the growth of plants.</li> </ul>	<p>Direct, Negative</p>	<p>Short Term</p>	<ul style="list-style-type: none"> <li>➤ Transportation of construction material will be scheduled in such a way that minimize the truck trips.</li> <li>➤ Transportation of construction material will be avoided in the night.</li> <li>➤ During the baseline study, primary survey was conducted &amp; there were no Schedule I species found in the study area.</li> <li>➤ Green belt will be developed for the improvement of surrounding nature.</li> <li>➤ Greenbelt &amp; plantation development will begin simultaneously with the initiation of construction activities of the proposed unit.</li> </ul>
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**BIOLOGICAL ENVIRONMENT: OPERATION PHASE**

<p><b>Green Belt development</b></p>	<p>Abatement of air pollution and Noise</p>	<p>Plantation is minimum 33% of project area.</p>	<ul style="list-style-type: none"> <li>➤ Green belt will enhance the aesthetic value and beautify the landscapes.</li> </ul>	<p>Direct, Positive</p>	<p>Long term</p>	<ul style="list-style-type: none"> <li>➤ Out of the total plant area of 34529 sqm, i.e. 33% will be developed under greenbelt &amp; plantation.</li> <li>➤ 3182 no. of Native plant species will be planted in consultation with local DFO for which 32.0 Lakhs of funds will be allocated</li> </ul>
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						<p>for greenbelt.</p> <ul style="list-style-type: none"> <li>➤ Greenbelt development along with the road &amp; plant boundary will attenuate noise level, arrest dust and improve the environment in surrounding.</li> </ul>
<b>SOCIO- ECONOMICS: “CONSTRUCTION PHASE”</b>						
<b>Machinery for Construction Activities</b>	Socio-economic (Noise & Vibrations)	Generation of vibrations & Noise from the machinery used in construction	<ul style="list-style-type: none"> <li>➤ Negative impact through generation of noise can affect the mental status of surrounding village.</li> </ul>	Direct, Negative	Short term	<ul style="list-style-type: none"> <li>➤ Upliftment of Local people.</li> <li>➤ PP will provide facility to the workers.</li> </ul>
<b>Employment generation to local people</b>		For construction activities, employment preference to the local people.	<ul style="list-style-type: none"> <li>➤ Positive impact by providing employment opportunity to skilled or unskilled local people.</li> </ul>	Direct, Positive	Short term	
<b>SOCIO- ECONOMICS: “OPERATION PHASE”</b>						
<b>Employment generation</b>	Socio-Economic	Employment preference to skilled people	<ul style="list-style-type: none"> <li>➤ Positive impact like local people given preference for employment.</li> <li>➤ Upgradation of roads and intersection.</li> <li>➤ Local businessman will get opportunity to supply raw materials.</li> </ul>	Direct, Positive	Long term	<p>----</p> <ul style="list-style-type: none"> <li>➤ Proper transport &amp; storage of chemicals with labeling.</li> <li>➤ Regular maintenance of equipments &amp; machineries will be done.</li> </ul>
				Direct, Negative	Short term	



			<ul style="list-style-type: none"> <li>➤ Major negative impact may occur due to fire and explosive and toxic release of chemicals in transport, storage or processing areas. These impacts will be instantaneous and controllable.</li> </ul>			
<b>Fire or explosion</b>		Accidental fire explosion during manufacturing process	<ul style="list-style-type: none"> <li>➤ Major negative impact may occur due to fire and explosive in transport, storage or processing areas. These impacts will be instantaneous and controllable.</li> </ul>	Direct Negative	Short Term	<ul style="list-style-type: none"> <li>➤ Use of extinguishing media surrounding the fire as water, dry chemicals (BC or ABC powder), CO, Sand, dolomite, etc.</li> <li>➤ The storage shall be at cool &amp; dry temperatures</li> <li>➤ Proper cross air supply i.e. proper ventilated storage and closed containers.</li> <li>➤ Container shall be grounded to eliminate static electric sparks.</li> </ul>



#### **4.4 Air Pollution Impact Prediction through Mathematical Modeling**

##### **Aermod Cloud:**

AERMOD is an air dispersion-modeling package, which seamlessly incorporates the popular USEPA Models, ISCST3, ISC-PRIME and AERMOD into one interface without any modifications to the models. These models are used extensively to assess pollution concentration and deposition from a wide variety of sources.

##### **AERMOD MODEL:**

The AMS/EPA REGULATORY MODEL (AERMOD) was specially designed to support the Environmental Regulatory Modeling Programs. AERMOD is a regulatory steady – state modeling system with three separate components;

- AERMOD (AERMIC Dispersion Model);
- AERMAP (AERMOD Terrain Preprocessor); and
- AERMET (AERMOD) Meteorological Preprocessor.

The AERMOD model includes a wide range of options for modeling air quality impacts of pollution sources, making it popular choice among the modeling community for a variety of applications. AERMOD requires two types of meteorological data files, a file containing surface scalar parameters and a file containing vertical profiles. These two files are provided by AERMET meteorological preprocessor program. PRIME building downwash algorithms based on the ISC – PRIME model have been added to the AERMOD model.

Use of arrays for data storage.

- Incorporation of EVENT processing for analyzing short-term source culpability.
- Explicit treatment of multiple – year meteorological data files and the annual average.
- Options to specify emissions that vary by season, hour-of-day and day-of-week.

Deposition algorithms have been implemented in the AERMOD model results can be output for concentration, total deposition flux, dry deposition flux, and / or wet deposition flux. The model contains algorithms for modeling the effects of settling and removal of large articulates and for modeling the effects of precipitation scavenging for gases or particulates.

##### **AERMET:**

In order to conduct a refined air dispersion modeling project using the AERMOD short term air quality dispersion model, it is necessary to process the meteorological data representative of the study area



being modeled. The collected meteorological data is not always in the format supported by the model; therefore, the meteorological data needs to be pre-processed using AERMET program.

- The AERMET program is a meteorological preprocessor, which prepares hourly surface data and upper air data for use in the AERMOD air quality dispersion model.
- AERMET is designed to allow future enhancements to process other types of data and to compute boundary layer parameters with different algorithms.
- AERMET processes meteorological data in three stages and from this process two files are generated for use with the AERMOD model.
- A surface file of hourly boundary layer parameters estimates a profile file of multiple-level observations of wind speed, wind direction, temperature and standard deviation of the fluctuating wind components.

### **Application of AERMOD**

- AERMOD model with the following options has been employed to predict the cumulative ground level concentrations due to emissions from the proposed activity.
- All terrain dispersion parameters are considered.
- Predictions have been carried out to estimate concentration values over radial distance of 10 km around the project area.
- Uniform polar receptor network has been considered.
- Emission rates from the sources were considered as constant during the entire period.
- The ground level concentrations computed without any consideration of decay coefficient.
- Calm winds recorded during the study period were also taken into consideration.
- 24- hourly mean ground level concentrations were estimated using the entire meteorological data collected during the study period.
- The study area is used to represent the graphical output of the GLC's using the terrain processor.

### **METEOROLOGICAL DATA**

The hourly meteorological data recorded at site is converted to the mean hourly meteorological data as specified by CPCB and the same has been used in the model. Hourly mixing heights are taken from the "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India" published by India meteorological department, 2008, New Delhi. The meteorological data recorded during study period



continuously on wind speed, wind direction, temperature etc., have been processed to extract the data required for simulation by AERMOD using AERMET.

#### DISPERSION MODELING RESULTS:

The 24-hourly average ground level concentration (GLC) values from proposed project have been computed for SPM considering topographical featured around the proposed project and applicable stability classes. Input data for air quality modeling is given in Table 4.4. The predicted 24-hourly short terms Maximum Incremental Concentration values for PM10 from the proposed project are given in Table 4.5. Corresponding isopleths plotted are shown in Figure 4.4.

**Table 4.4 Input data for Air Quality Modeling**

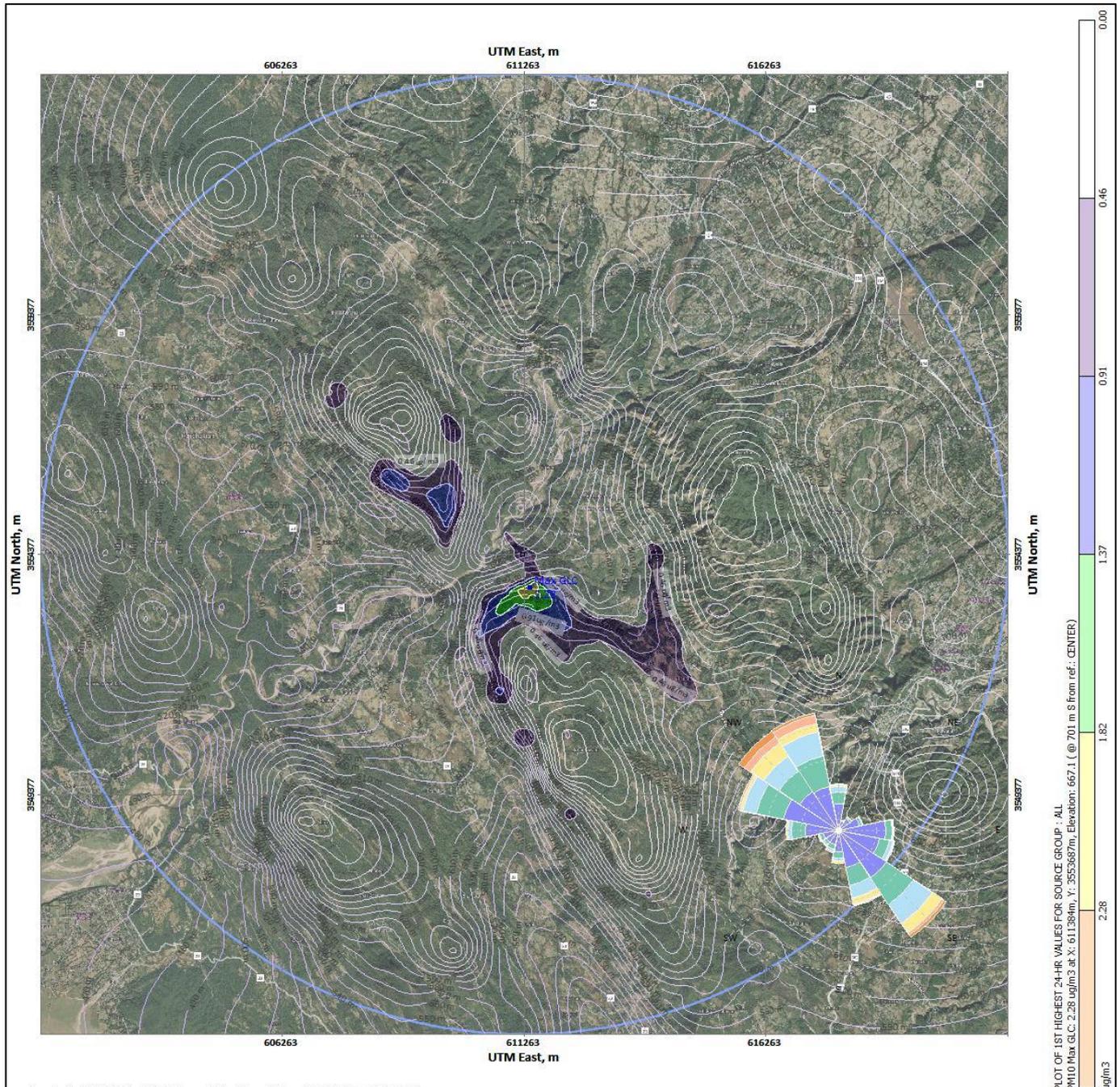
Particulars	Values
Type of Fuel	Biomass/Wood Chips/Briquettes
Fuel Consumption (TPD)	80 TPD
No. of Stacks	1
Height of stack (m)	31 m
Stack diameter	0.9 m
Temperature of stack gas	443°K
Velocity of gases	15 m/sec
Gas Volume (m <sup>3</sup> /Hr)	28837 m <sup>3</sup> /Hr
Load of Particulate Matter as PM (kg/day)	22.464 kg/day
PM Standard	50 µg/m <sup>3</sup>
Emission rate of PM	0.26 g/sec

**Table 4.5 Predicted 24 hourly short terms Maximum Incremental Concentrations on Project Site**

Pollutants	Maximum GLC in µg/m <sup>3</sup>	Baseline concentration in µg/m <sup>3</sup>	Baseline Concentration after project implementation in µg/m <sup>3</sup>
PM <sub>10</sub>	2.28 µg/m <sup>3</sup>	71.5 µg/m <sup>3</sup>	73.78 µg/m <sup>3</sup>



**Fig 4.1: Isopleths showing 24 hourlies predicted GLC's of PM<sub>10</sub> (Terms of Reference No. 7.1)**



### Predicted GLC's of the proposed project

It is predicted that the maximum contribution in GLC's, with units' operation are  $2.28\mu\text{g}/\text{m}^3$  for PM<sub>10</sub> at 701 m in South direction from stack.



#### 4.5 Municipal Solid Waste and its Management

The proposed greenfield project will employ 100 individuals across various roles to meet production targets. It is expected to generate approximately 25 Kg/day of waste, which will be managed and disposed of in compliance with the Solid Waste Management Rules, 2016. Details given in Table 4.6.

**Table 4.6 Details of Biodegradable, Recyclable, Inert waste**

Compositi on	Total Workers - Populati on	Compositi on %	Biodegrada bles	Recyclables	Combusti ble	Inert	Gener ation
			50 %	30 %	15%	5 %	100 %
Generatio n- kg/day	100	Generatio n- kg/day	12.5	7.5	3.75	1.25	25

Each individual is expected to generate about 250 grams of solid waste daily. With the total workforce considered, the daily waste generation is estimated at 25 kg. This includes 12.5 kg of biodegradable waste such as leftover food and fruit peels. Recyclables like paper, plastics, wood pieces, and metals account for about 7.5 kg. Combustible waste, including soiled packaging and light synthetics, makes up around 3.75 kg. Inert waste such as ceramics and glass contributes 1.25 kg. A comprehensive waste management plan is essential to maintain hygiene and cleanliness. Waste will be segregated at source using color-coded bins. Biodegradables will be composted or sent to authorized facilities. Recyclables will go to certified vendors, combustibles to waste-to-energy plants, and inert to landfills. Daily collection, regular monitoring, and proper disposal will be ensured. Awareness programs and staff training will support consistent and responsible waste handling practices.

#### Mitigation Measures

The biodegradable waste generated (12.5 kg/day) will be processed through vermicomposting, where earthworms break down organic matter into nutrient-rich compost. The conversion process typically follows these steps:

1. **Waste Collection & Segregation:** Organic waste like vegetable peels, food scraps, and garden waste will be collected and separated from non-compostable materials.
2. **Pre-composting:** The waste may be partially decomposed for a few days to make it easier for



earthworms to process.

3. **Feeding the Worms:** The pre-composted waste is added to the vermicomposting bed in layers.
4. **Decomposition & Worm Activity:** Earthworms consume the organic matter and excrete worm castings, which are highly nutritious for plants. This process takes 30-45 days.
5. **Moisture & Aeration Management:** Proper moisture (40-60%) and aeration are maintained to ensure efficient composting.

**Harvesting Manure:** After 4-6 weeks, the finished vermicompost is collected, dried, and sieved before use. About 40-50% of the initial waste weight is reduced due to moisture loss and microbial breakdown. From 12.5 kg/day, approximately 6.25 kg/day of vermicompost will be produced. The nutrient-rich compost can be used as an organic fertilizer for agricultural or gardening purposes. This method ensures sustainable waste management while improving soil fertility and plant health. The inert may be disposed of to the local municipal disposal location or alternatively may be disposed off within the project boundaries itself for landscaping and levelling up of the depressions and pits.

#### **4.6 Impact on Occupational Health and Mitigation Measures:**

The distillery operations pose potential health hazards to employees. To ensure their well-being, the company has established a comprehensive occupational health program, which includes:

Annual health check-ups for all employees, encompassing general health assessments and routine examinations of:

- Blood pressure
- Pulse rate
- Vision
- Hearing
- Other vital parameters

These health check-ups will be conducted in accordance with the Factory Act norms, enabling early detection and management of occupational health issues.

#### **Mitigation measures for Occupational health hazards:**

A comprehensive occupational health and safety (OHS) program will be provided to protect employees from workplace hazards. Key components of this program include:

- Regular monitoring of health status to detect potential occupational diseases.
- Effectiveness reviews of preventive and control measures.
- Adequate supply of potable drinking water.
- Pre-employment medical examinations for all new employees and contract laborers.



- Periodic medical hearing checks for workers exposed to high noise levels.
- OHS orientation training for new employees to familiarize them with site rules and work procedures.
- Fully equipped first aid treatment facilities at strategic locations within the factory.
- Provision of personal protective equipment (PPE) to workers exposed to workplace hazards.

These measures demonstrate the company's commitment to maintaining a safe and healthy work environment.



## CHAPTER- 5

### ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

#### 5.1 GENERAL:

Conducting an alternatives analysis enables the identification of the most environmentally friendly and cost-effective options for achieving project objectives, while minimizing adverse environmental impacts. This comparative evaluation helps determine the optimal approach, balancing project goals with environmental sustainability.

#### 5.2 ANALYSIS OF ALTERNATIVE SITES:

The proposed distillery unit will be located within a private land, eliminating the need to select an alternative site. The following factors influenced the site selection decision:

- **Water availability and conservation:** As a water-intensive industry, sourcing water from an alternative location would pose a significant environmental risk.
- **Existing infrastructure:** The facility offers existing cold store building, ETP tank, existing Admin building, semi-furnished structure, RCC water tank (1 Lakh lit.), polyshed and bore well.
- **Administrative convenience:** The location simplifies administrative tasks and reduces logistical complexities.
- **Minimal workforce disruption:** The site selection ensures minimal additional deployment of workers, reducing operational disruptions.
- **Proximity to raw materials:** Local vendors can supply grains, ensuring a reliable source of raw materials.
- **Accessibility and connectivity:** The site's proximity to state and national highways facilitates easy transportation and connectivity.

Considering these factors, the proposed site within the proposed area is deemed the most suitable location for the distillery unit.

#### 5.3 Alternative for Technology and other Parameters

The site selection is feasible in respect of the following:

- No forest land is involved.
- No cultivable land at site.



- No cutting of trees is required.
- No displacement of People.
- No stretch of CPA.
- Away from national Park and Wildlife Sanctuary. (Pong Dam Wildlife Sanctuary 10.7 Km)
- Away from Core zone of Biosphere reserve and migratory corridor of wild animals.
- Away from Archaeological sites (Kangra Fort, 7.86 Km, Archaeological Museum Kangra Fort, 8 Km).

**Conclusion:**

No alternative analysis for the site and technology was deemed necessary, as the proposed project will be located within the most suitable site.



## CHAPTER 6

### ENVIRONMENTAL MONITORING PROGRAMME

#### 6.1 Prelude:

Assessment of environmental and social impacts arising due to implementation of the proposed project activities is at the technical heart of EIA process. An equally essential element of this process is to develop measures to eliminate, offset or reduce impacts to acceptable levels during implementation and operation of projects. The integration of such measures into project implementation and operation is supported by clearly defining the environmental requirements within an Environmental Management Plan (EMP).

#### 6.2 Environment Monitoring Program:

The Continuous monitoring of Environmental parameters like air, water, noise, soil, and meteorological data and performance of pollution control facilities and safety measures in the plant are vital for Environmental management of any industrial project.

Therefore, the company shall create environmental monitoring facilities by the environmental and safety department to monitor air and water pollutants as per the guideline. Moreover, air, noise, drinking water and soil shall be monitored by outside agencies authorized by Pollution Control Board at regular frequencies. This department shall also carry out periodically check of fire and safety equipment.

#### 6.3 Objective of Monitoring Plan:

The basic objective of implementing a monitoring plan on a regular basis is as follows:

- Know the pollution status within the plant and its vicinity. Generate data for corrective action in respect of pollution
- Examine the adequacy of pollution control system
- To verify the results of the Impact Assessment Study with respect to the proposed projects.
- To study the trend of concentrated values of the parameters, which have been identified as critical and then planning the mitigating measures.
- To check and assess the efficacy of pollution control equipment.
- To ensure that any additional parameters, other than those identified in the impact, do not turn critical after the commissioning of proposed project.



**6.4 Schedules for Environment Monitoring:**

As no project can succeed unless it is monitored at regular intervals & results analyzed. Keeping this requirement in view, an elaborate Monitoring programme has been developed for this project. Regular monitoring of all significant environmental parameters will be carried out to check the compliance status vis-à-vis the environmental laws and regulations.

**A comprehensive Environmental Monitoring Program that has been prepared for the purpose of implementation in the proposed Industrial unit is given below:**

- Identification of any environmental problems that are occurring in the area.
- Initiating or providing solution to those problems through designated channels and verification of the implementation status.
- Controlling activities inside the project, until the environmental problem has been corrected.
- Suitably responding to emergency situations.

To implement the EMP, a structured Environment Management Cell (EMC) interwoven with the existing management system will be created. EMC will undertake regular monitoring of the environment and conduct yearly audit of the environmental performance during the construction of the project. It will also check that the stipulated measures are being satisfactorily implemented and operated. It shall also co-ordinate with local authorities to see that all environmental measures are well coordinated. EMC detail is provided at Chapter-10.

**Environmental Monitoring during Construction Phase:**

The environmental monitoring cell of the construction team will be coordinating all the monitoring programs during the construction phase of the proposed project. The proposed monitoring schedule during the construction phase of the project is outlined in Table 6.1.

**Table 6.1**

**Environmental Monitoring Program for Construction Phase**

Source	Monitoring Location	Parameters to be Monitored	Frequency	Budget
Ambient Air Quality	Two locations: upwind direction and downwind	PM <sub>2.5</sub> , PM <sub>10</sub> . SO <sub>2</sub> , NO <sub>x</sub> and CO	Twice a year or as per conditions of EC	0.25 Lakhs
Ambient Noise	Two locations	Day & Night Equivalent Noise Level	Twice a year or as per conditions of EC	0.20 Lakhs



Groundwater	One location	As per standards	Twice a year or as per conditions of EC	0.20 Lakhs
Soil Quality	2 locations outside the project site	As per standards	Twice a year or as per conditions of EC	0.40 Lakhs
DG Stack Monitoring	DG sets used during the construction	Particulate Matter, SO <sub>2</sub> , NO <sub>x</sub>	Twice a year or as per conditions of EC	0.4 Lakhs

### 6.5 Environmental Monitoring during Operation Phase

The environmental management cell will co-ordinate all the monitoring programs at the industry and data thus generated will be regularly furnished to the State Regulatory Agencies. The proposed monitoring schedule during the operation phase of the project is outlined in Table 6.2.

**Table-6.2**

#### Environmental Monitoring parameters and frequency of monitoring during operation phase

Source	Monitoring Location	Parameters to be Monitored	Frequency	Budget
Stationary Emission from Stack	Stack attached to APCD	PM, SO <sub>2</sub> , NO <sub>x</sub> and CO	Twice a year or as per conditions of EC or as per requirement of SPCB	3.0 Lakhs
Process emission	-	Fugitive (PM) and gaseous pollutant expected	Twice a year or as per conditions of EC or as per requirement of SPCB	2.0 Lakhs
Ambient Air Quality	At 2 locations (one inside the project site & one at boundary of the project site along predominant wind direction)	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , Nox & CO	Twice a year or as per conditions of EC or as per requirement of SPCB	2.0 Lakhs
Ambient Noise	At 2 locations (one inside the project site & one at boundary of the project site)	Day & Night Equivalent Noise Level	Twice a year or as per conditions of EC or as per requirement of SPCB	1.5 Lakhs
Occupational Health	Continuous database management of causalities	General Health aspects	Yearly	3.0 Lakhs



DG Stack Monitoring	DG sets used during the construction.	Particulate Matter, SO <sub>2</sub> , Nox	Twice a year or as per conditions of EC	2.0 Lakhs
Water and Wastewater	STP/ETP	pH, Temperature, EC, Turbidity, Total Dissolved Solids, Calcium, magnesium, Total hardness, Total Alkalinity, Chlorides, Sulphates, Nitrates, DO, COD, BOD, oil and Grease, Metals.	Twice a year or as per conditions of EC or as per requirement of SPCB	5.0 Lakhs
Treated Sewage / Effluent		pH, BOD, COD, TSS, TDS, oil and Grease, Metals.	Twice a year or as per conditions of EC or as per requirement of SPCB.	3.0 Lakhs

### 6.6 Plantation

As per TOR Point 7.9, around 12,730 m<sup>2</sup> (36.8%) will be developed as a greenbelt with 3,182 trees planted using the Miyawaki Forest Methodology. This technique promotes fast-growing, dense, native forests with high biodiversity. A minimum 80% survival rate will be ensured through proper soil preparation, irrigation, and maintenance. The greenbelt will enhance the site’s ecology, act as a pollution buffer, and improve the local microclimate.

**Selection of plant species:** Tree species like Arjun, Baheda, Kachnar& Amla, having height of 5-6 feet will be planted.

#### Action plan & estimated budgetary allocation for proposed green belt development

The proposed green belt in an area of 12730 m<sup>2</sup> will start developing in monsoon season after grant of Environment clearance.

**Budgetary allocation: Rs. 32.0 Lakhs** under EMP cost and recurring cost of 32.0 lakhs per annum for 3 years.



## CHAPTER 7

### ADDITIONAL STUDIES

#### 7.1 Introduction

Distillery Industry (Distillery Plant) is associated with potential hazards that can affect the employee and the environment. It will normally require the assistance of emergency services to handle it effectively. The operation shall be taken out under the control of qualified safety manager. Disaster management plan shall be formulated with an aim of taking precautionary steps to avert disasters and also to take such action which limits the damage to the minimum.

In this chapter following topics are discussed:

- Public Consultation: In order to conduct the public consultation Draft EIA report and EMP has been prepared.
- Hazard Identification and Risk Assessment.
- Disaster Management Plan.

#### 7.2 HAZARD IDENTIFICATION AND RISK ASSESSMENT

##### General

Industrial accidents result in great personal and financial loss. Managing these accidental risks in today's environment is the concern of every industry because the real or perceived incidents can quickly jeopardize the financial viability of a business. Many facilities involve various manufacturing processes that have the potential for accidents which may be catastrophic to the plant, work force and environment or public. The main objective of the risk management study is to propose a comprehensive but simple approach to carry out risk analysis and conducting feasibility studies for industries including planning and management of industrial prototype hazard analysis study in the Indian context.

Risk analysis and risk assessment provide details of Quantitative Risk Assessment (QRA) techniques used the world over to determine risk posed to people who work inside or live near hazardous facilities and to aid in preparing effective emergency response plans by delineating a Disaster Management Plan (DMP) to handle on-site and off-site emergencies. It needs extensive study that involves process understanding, hazard identification, consequence modeling, probability, vulnerability model/data, local weather, terrain conditions and local population data. QRA may be carried out to serve the following objectives:

- Identification of safety areas.
- Identification of hazard sources.



- Generation of accidental release scenarios for escape of hazardous materials from the facility.
- Identification of vulnerable units with recourse to hazard indices.
- Hazard and Operability Study (HAZOP) in order to identify potential failure cases of significant consequences.
- Assessment of risk on the basis of above evaluation against the risk acceptability criteria relevant to the situation.
- Risk mitigation measures based on engineering judgment, reliability and risk analysis approaches.
- Safety Reports with external safety report/ occupational safety report.

**The Risk Assessment Report covers the following in terms of the extent of damage:**

- Hazard identification: Identification of hazardous activities, hazardous materials, past accident record set.
- Hazard quantification: Consequence analysis to assess the impacts.
- Risk assessment.
- Risk mitigation measures.
- Disaster Management Plan.

**Identification of Hazards**

Identification of hazards in the proposed plant is of primary significance in the analysis, quantification and cost-effective control of accidents involving materials and process. A classical definition of hazard states that hazard is in fact the characteristics of system /plant/ process that presents potential for an accident. Hence, all the components of a system/ plant/ process need to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/ sequence of events, which can be termed as an accident. Identifications of Hazards are provided in Table 7.1. The following two methods for hazards identification have been employed in the study:

- Identification of major hazardous units based on Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.
- Identification of hazardous units and segments of plants and storage units based on relative ranking technique, viz. Fire-Explosion and toxicity Index (FE &TI).

**Table 7.1**

**Identification of Hazards**

S.No.	Hazards	Threshold limit	Impacts	Mitigation measures
-------	---------	-----------------	---------	---------------------



1.	Sodium hydroxide/acids	2 mg/m <sup>3</sup> Acute toxicity of the vapor	Caustic soda can cause burns. Acids and alkalis can cause severe burns.	<ul style="list-style-type: none"> <li>• Proper PPEs to be provided to workers.</li> <li>• Handling in accordance with good industrial hygiene and safety practice</li> <li>• Avoid contact with water. Direct contact with water may cause an</li> </ul>
2.	Carbon di-oxide	5000 ppm	Headaches, dizziness, restlessness, a tingling or pins or needles, feeling,	<ul style="list-style-type: none"> <li>• In proposed distillery, CO<sub>2</sub> generated from the fermenter will be scrubbed, liquified and sold to vendors engaged in manufacture of carbonated drinks.</li> <li>• Proper monitoring and maintenance of fermentation equipment.</li> <li>• Proper PPEs to be provided to workers</li> </ul>
3.	Ethyl alcohol	1000 ppm	Alcohol storage tank bursting or leakage can cause fire or explosion hazards	<ul style="list-style-type: none"> <li>• Proper flow meter to check the flow of alcohol in storage tanks.</li> <li>• Proper training to employees to act in case of alcohol leakage.</li> <li>• Proper fire extinguishers adequate for the fire that can happen in distillery i.e., foam type.</li> </ul>
5.	Dust exposure	-	Sudden dust cloud can affect the respiratory tract and interfere with breathing. Cause pneumoconiosis Some particles	<ul style="list-style-type: none"> <li>• Proper dust mask for persons handling bagasse.</li> <li>• Regular water sprinkling to avoid dust dispersion.</li> <li>• Storage of biomass in covered sheds and continuous water sprinkling.</li> <li>• Proper greenbelt will be developed in all the areas having the</li> </ul>
6.	Noise exposure	75 dB(A)	Elevated workplace or	<ul style="list-style-type: none"> <li>• Proper PPEs to be provided like ear muffs and ear plugs</li> </ul>
		and 70dB (A)	hypertension, ischemic heart disease, annoyance,	<ul style="list-style-type: none"> <li>• Regular audiometry check-up.</li> <li>• Proper maintenance, oiling &amp; greasing of machines to detect any loosened nuts,</li> </ul>



7.	Heat exposure	-	Prolonged or intense exposure to hot temperatures can cause heat-related	<ul style="list-style-type: none"> <li>• Alternation of duties.</li> <li>• Proper PPEs to the workers.</li> </ul>
8.	Electrocution	-	Electric shock, braindamage	<ul style="list-style-type: none"> <li>• Proper earthing.</li> <li>• Doubly insulated instruments/machinerie.</li> </ul>
9.	Physical	-	Fall, slip trip, physical injuries.	<ul style="list-style-type: none"> <li>• Proper PPEs for workers operating at heights like safety helmets, fall protection etc.</li> </ul>

### a) Exposure Limits

The exposure level of work zone concentrations is within the Permissible Exposure Level (PEL) as specified in Section 41F, Sch-II of Factories Act, 1948 (Permissible Level of certain Chemical Substance in Work Environment) and the OSHA standards for Permissible Noise Exposures which are reproduced in Table 7.2.

**Table 7.2**  
**OSHA Standards for Permissible Noise Exposures**

S. No.	Duration per day in Hours	Sound Level dB(A) slow response	Remarks
1.	8	90	<ul style="list-style-type: none"> <li>• No noise environment excess of 115 dB (A) is to be produced.</li> <li>• For any period of exposure falling between any figures indicated in column I, the permissible sound level will be determined by exposure.</li> </ul>
2.	6	92	
3.	4	95	
4.	3	97	
5.	2	100	
6.	1½	102	
7.	1	105	
8.	½	110	
9.	¼ or less	115	

All effects shall be made to comply with the standards after the operation of proposed expansion.

### b) Hazard Assessment & Evaluation:

A preliminary hazard analysis shall be carried out to identify major hazards associated with storages in the facility. This is followed by consequence analysis to quantify these hazards. Finally, the vulnerable zones are plotted for which risk reducing measures are deduced and implemented.

#### Frequent Causes of Accidents

- Fire and explosion, explosives, flammable material.
- Struck by falling objects.



- Snapping of cables, ropes, chains & slings.
- Handling heavy objects.
- Electricity (electrocution).
- Poor illumination.
- Falls from height inside industrial units or on the ground.
- Struck by moving objects.
- Slipping on wet surfaces.
- Sharp objects.
- Oxygen deficiency in confined spaces.
- Lack of personal protective equipment (PPE), housekeeping practices Safety signs.
- Hackles, hooks & chains.
- Cranes, winches, hoisting and hauling equipment.

#### **Physical Hazards**

- Noise.
- Extreme temperatures.
- Vibration.

#### **Hazardous Substances & Wastes**

- Heavy and toxic metals.
- Organo metallic substances.
- Lack of hazard communication (storage, labeling, material safety datasheets).
- Fire-fighting liquids.
- Welding fumes.
- Volatile organic compounds (solvents).
- Inhalation in confined and enclosed spaces.
- Physical hazards.
- Noise.
- Extreme temperatures.
- Vibration Radiation.
- (UV, radioactive materials).

#### **Mechanical Hazards**

- Trucks and transport vehicles.



- Scaffolding, fixed and portable ladders.
- Impact by tools, sharp-edged tools.
- Power-driven hand tools, saws, grinders and abrasive cutting wheels.
- Failure of machinery and equipment.
- Poor maintenance of machinery and equipment.
  - Lack of safety guards in machines.
  - Structural failure.

**Ergonomic & Psychosocial Hazards**

- Repetitive strain injuries, awkward postures, repetitive & monotonous work, excessive workload.
- Long working hours, shift work, night work, temporary employment.
- Mental stress, human relations (aggressive behavior, alcohol and drug abuse, violence)

**General Concerns**

- Lack of safety and health training.
- Poor work environment.
- Inadequate housing and sanitation.
- Inadequate accident prevention and inspection.
- Inadequate emergency, first-aid and rescue facilities.
- Lack of medical facilities and social protection.

**First Aid Measures**

- **Eye Contact:** Get medical aid. Gently lift eyelids and flush continuously with water.
- **Skin Contact:** Get medical aid. Wash clothing before reuse. Flush skin with plenty of soap and water.
- **Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfull of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
- **Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing. Give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. List of hospitals are provided in Table 7.3.

**Table 7.3: List of Hospitals**

S.No.	Hospitals	Distance and Direction
1	Civil Hospital Kangra	8.92 Km, E



2	Shree Balaji Hospital	9.49 Km, E
3	Fortis Hospital,	9.62 Km, E
4	Tanda Hospital,	11.35 Km, SE

### Fire Fighting Measures

- **General Information:** Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable Liquid can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. List of fire stations are given in Table 7.4.
- **Fire Extinguishing Media:** For small fires, use dry chemical dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.
- **Auto ignition Temperature:** 363°C (685.40°F)
- **Flash Point:** 16.6°C (61.88°F)
- Explosion Limits, lower: 3.3 vol%
- Explosion Limits, upper: 19.0 vol%
- NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

**Table 7.4: List of Fire station**

S.No.	Fire Station	Distance & Direction	Address
1.	FIRE STATION KANGRA HP	9.97 Km, in East	37XM+784 Tanda By Pass Road Teh & Distt Kangra, 176001
2.	Jawali	16.69 Km, in North West	42X4+M6 near SDM court Khairian, Jawali, Himachal Pradesh 176023
3.	Fire Station Near Gupt Ganga Temple	9.45 Km, East	Fire Station Neat Gupat Ganga Teh & Distt Kangra

### Accidental Release Measures

- **General Information:** Use proper personal protective equipment.
- **Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in



suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

### 7.3 Handling and Storage

- **Handling:** Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin and clothing. Empty containers retain product residue (liquid and/or vapor) and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
- **Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Do not store near perchlorates, peroxides, chromic acid or nitric acid.

### Exposure Controls, Personal Protection:

- **Engineering controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Personal Protective Equipment:

- **Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations.
- **Skin:** Wear appropriate protective gloves to prevent skin exposure.
- **Clothing:** Wear appropriate protective clothing to prevent skin exposure.
- **Respirators:** A respiratory protection program that meets OSHA's and ANSI requirements or European Standard must be followed whenever workplace conditions warrant a respirator's use.

### Other Safety Measures:

- Safety training to the workers will be given.
- PPE will be provided to the workers.
- Good housekeeping will be implemented in the plant.



- First aid box will be provided.
- The industry will provide adequate lighting facility inside the plant premises.
- General dilution ventilation to control level of chemicals below exposure limits.
- Fire extinguishers will be provided to withstand the fire or explosion condition and these will be tested regularly and record of this testing to be maintained
- Pre-employment and periodical medical examination of workers will be done by government approved medical practitioners and the records maintained as per the Regulations.
- The industry will prepare an on-site emergency plan.
  - Each working area will have two gates for entry and exit of the workers.

#### **7.4 CONSEQUENCE ANALYSIS**

Major hazards associated with ethanol plant are fire and explosion. Fire hazard due to alcohol storage, fuel storage, boiler operations etc. and explosion due to boiler operations, grain/fuel storage etc. Ethanol is a highly flammable liquid.

Hazards due to ethanol – Flammable, Vapors may form explosive mixtures with air. Vapors of ethanol might travel/spread to a potential source of ignition capability and then flash back immediately. Containers may explode when heated. Vapors may form explosive mixtures with air.

*[Source: MSDS of ethanol]*

Fire due to ethanol leakage can cause irreparable damage within plant premises, Burning of people and property in areas of leakage.

#### **Common terminologies**

##### **Accident Site**

The location either the factory premises or a transportation route where an unexpected event of failure / release of hazardous substance which have the potential of resulting into serious injuries or loss of life, extensive damage to property and/or environment occurs.

##### **Airborne release**

Release of any chemical into the air.

##### **Boiling Liquid Expanding Vapor Explosion (BLEVE)**

A BLEVE is a combination of fire and explosion with an intense radiant heat emission within a relatively short-time interval. The phenomenon can occur within a vessel or tank containing pressurized liquid is ruptured as a result of a weakening of its structure, the contents are instantaneously released from the vessel as a turbulent mixture of liquid and gas, expanding



rapidly and dispersing in air as a cloud. When this cloud is ignited, a fireball occurs, causing enormous heat- radiation intensity within a few seconds. This heat intensity is sufficient to cause severe skin burns and deaths at several hundred meters from the vessel, depending on the quantity of the gas involved. BLEVE can be caused by a physical impact on a vessel or tank, which is already overstressed or damaged.

A BLEVE event is shown below, the liquid of this vessel; heats up, the pressure rises and the relief valve operates, the release being ignited by the flame playing on the vessel. For a time, the metal of this vessel is kept cool by liquid in contact with it, but the level falls as the liquid is vaporized, metal cooled only by vapor is exposed, becomes hot, weakens and ruptures. A large fraction of the flammable liquid gas released, vaporizes and forms a burning vapor cloud, often a fireball, causing enormous heat-radiation intensity within a few seconds. This heat intensity is sufficient to cause severe skin burns and deaths at several hundred meters from the vessel, depending on the quantity of the gas involved.

### **Chemical Abstract Service Number (CAS No.)**

The chemicals will be listed by their common names and also by their Chemical Abstract Service (CAS) Number. While a chemical may be known by several different trade names, the CAS Number provides a unique and unambiguous identification.

### **Domino Effects (Knock-on)**

An event at one site/plant may be the cause of a further event at another site / plant leading to escalation of hazard.

### **Evacuation**

Removal of occupants and other persons from an area of danger. Fire:

### **Pool Fire**

A pool fire occurs when a flammable liquid spills onto the ground and is ignited. A fire in a liquid storage tank is also a form of pool fire, as is a trench fire. A pool fire may also occur on the surface of flammable liquid spilled on to water.

### **Jet Fire**

The ejection of flammable liquid from a vessel, pipe or pipe flange can give rise to a jet flame if the material ignites. Scenarios involving jet flames are not easy to handle, since a large jet flame may have a substantial reach sometimes up to 50 m or more. Jet flame may cause overheating of



adjacent vessel and burst, giving a boiling liquid expanding vapor explosion or BLEVE.

### **Flash Fire / Vapor Cloud Explosion:**

When hydrocarbons' vapor is released accidentally and spread out in the direction of wind, it finds a ignition source before dispersed completely below the LEL (Lower Explosive limit) a flash fire occurs. If such fire occurs under pressure occurs the event is called vapor cloud explosion (VCE).

### **Fireball:**

Fireball usually occurs as part of a BLEVE when a vessel ruptures after it has been engulfed in fire or has been subjected to a direct flame. The fireball may result either by bursting of a pressure vessel that may occurs under fire conditions and be part of a BLEVE /momentum forces predominate if a fireball is formed from bursting of a vessel, and buoyancy forces predominate in one formed from a vapor cloud in the absence of fire or by formation of a vapor cloud.

### **Threshold Limit Value (TLV)**

TLV is a recommended time-weighted average concentration of a substance to which most workers can be exposed without adverse effect on health. The TLV's for gases and vapors are expressed in ppm (parts per million), which stands for parts of gases or vapors per million parts of air. The TLV's for fumes, mists, and some dusts are given as milligrams per cubic meter (mg/m<sup>3</sup>). The following formula converts these two units from one to other.

$$\frac{\text{mg/m}^3 \times 24.45}{\text{Molecular weight of the chemical (mw)}}$$

The TLV's of some dusts, i.e. silica and asbestos, are expressed in millions of particles per cubic foot of air (mppcf)

### **Vapor Cloud Explosion (VCE)**

Clouds of flammable vapors with concentration within LEL and UEL (Upper Explosive Limit) may explode when it finds a source of ignition. Such explosions may occur within or outside the plant depending upon how the vapor has drifted before it finds the source of ignition. The explosion radiates intense heat.

### **Vulnerable Zone**

An estimated geographical area that may be affected by the toxic release at levels that could cause



irreversible acute health effects or death to human population within the area following an accidental release. List of damages envisaged at various heat loads are provided in Table 7.5.

**Table 7.5**

**List of damages envisaged at various heat loads**

S.No.	Heat loads	Type of Damage Intensity	
		Damage to Equipment	Damage to People
1.	37.5	Damage to process equipment	<ul style="list-style-type: none"> <li>• 100% lethality in 1 min.</li> <li>• 1% lethality in 10 sec</li> </ul>
2.	25.0	Minimum energy required to ignite wood	50% Lethality in 1 min. Significant injury in 10 sec
3.	19.0	Maximum thermal radiation intensity allowed on thermally	--
4.	12.5	Minimum energy required to melt plastic	1% lethality in 1 min
5.	4.0	--	First degree burns, causes pain for exposure longer than 10
6.	1.6	--	Causes no discomfort onlong exposures

*Source: World Bank (1988). Technical Report No. 55: Techniques for Assessing Industrial*

Carbon dioxide gas released during fermentation can also cause various hazards if not collected properly and leakage occurs. Carbon dioxide is an odourless, colorless and toxic gas. Effects of blast over-pressure on structure are given in Table 7.6. The consequence analysis at various concentrations is given below:

- Carbon Dioxide is a powerful cerebral dilator.
- Carbon dioxide, if present at concentrations between 2 and 10% might cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate.
- Above 8% nausea and vomiting might appear and above 10% it might cause suffocation and lethality can occur within minutes.

*[Source: SDS of Carbon dioxide]*



**Table 7.6**

**Effects of blast over-pressure on structure**

<b>Structural Element</b>	<b>Failure</b>	<b>Approximate peak side-on overpressure psi</b>
<b>Window Panes</b>	5 % broken	0.1 – 0.15
	50 % broken	0.2 – 0.4
	90 % broken	0.5 – 0.9
<b>Houses</b>	Tiles displaced	0.4 – 0.7
	Doors and window frames broken	0.8 – 1.3
	Inhabitable after repair-some damage to Ceilings, windows and	
	Minor structural damage, partitions	0.2 – 0.4
	Uninhabitable: partial or total collapse of Roof, partial demolition of one or two external walls, severe damage to load	
	50-75 % external brickwork destroyed or rendered	
	Almost complete demolition	0.5 – 0.9
<b>Telephone</b>	Destroyed	10 – 25
<b>Large</b>	Destroyed	24 – 55
<b>Rail freight</b>	Limit of derailment	12 – 27

**Emergency Response Planning Guidelines (ERPGs):**

ERPGs estimate the concentrations at which most people will begin to experience health effects if they are exposed to a hazardous airborne chemical for 1 hour. (Sensitive members of the public such as old, sick, or very young people—aren't covered by these guidelines and they may experience adverse effects at concentrations below the ERPG values.) A chemical may have up to three ERPG values, each of which corresponds to a specific tier of health effects. Emergency Response Planning Guidelines (ERPGs) are provided in Table 7.7.



**Table 7.7**

**Emergency Response Planning Guidelines (ERPGs)**

<b>ERPG-3</b>	The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life- threatening health effects.	
<b>ERPG-2</b>	The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.	
<b>ERPG-1</b>	The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient health effects or perceiving a clearly defined, objectionable odor.	

**7.5 CONSEQUENCE ANALYSIS OF ETHANOL DUE TO STORAGE FACILITY**

Scenario of Ethanol in different forms:

**SITE DATA:**

Location: HIMACHAL PRADESH, INDIA

Building Air Exchanges Per Hour: 0.5 (user specified)

**CHEMICAL DATA:**

Chemical Name: ETHANOL CAS Number: 64-17-5

Molecular Weight: 46.07 g/mol

ERPG-1: 1800 ppm

ERPG-2: 3300 ppm

ERPG-3: N/A IDLH: 3300 ppm

LEL: 33000 ppm



UEL: 190000 ppm

Ambient Boiling Point: 77.7° C

Vapor Pressure at Ambient Temperature: 0.12 atm

Ambient Saturation Concentration: 125,570ppm or 12.6%.

**ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)**

Wind: 4.44 meters/second from SE at 3 meters Ground Roughness: open country Cloud

Cover: 5 tenths Air Temperature: 33° C stability Class: C

No Inversion Height Relative Humidity: 71%.

**SCENARIO 1: LEAKING TANK, CHEMICAL IS NOT BURNING AND FORMS AN EVAPORATING PUDDLE**

Potential hazards from flammable chemical which is not burning as it leaks from tank.

- Downwind toxic effects
- Vapour cloud flash fire
- Over pressure (blast force) from vapour cloud explosion Release Duration: ALOHA limited the duration to 1 hour

**SOURCE STRENGTH:**

- Leak from hole in vertical cylindrical tank
- Flammable chemical escaping from tank (not burning) Tank.
- Diameter: 9.0 meters Tank Length: 13.9 meters
- Tank Volume: 884 cubic meters Tank contains liquid
- Internal Temperature: 33° C
- Chemical Mass in Tank: 683 tons Tank is 90% full
- Circular Opening Diameter: 10 inches Opening is 3.48 meters from tank bottom
- GroundType: Default soil
- Ground Temperature: equal to ambient
- Max Puddle Diameter: Unknown
- Max Average Sustained Release Rate: 1,480 kilograms/min (averaged over a minute or more) Total Amount Released: 58,526 kilograms



- Note: The chemical escaped as a liquid and formed an evaporating puddle. The puddle spread to a diameter of 163 meters.
- When, Flammable chemical escaping from tank chemical is **NOT** on fire Choose Hazard to Analyze: Toxic Area of Vapour Cloud.

### **THREAT ZONE**

#### **Model Run: Gaussian**

Red: no recommended LOC value --- (N/A = ERPG-3) Orange: 82 meters --- (3300 ppm = ERPG-2)

Note: Threat zone was not drawn because dispersion predictions are unreliable for lengths less than the maximum diameter of the puddle.

Maximum diameter of the puddle: 163 meters Yellow:  
112 meters --- (1800 ppm = ERPG-1)

Note: Threat zone was not drawn because dispersion predictions are unreliable for lengths less than the maximum diameter of the puddle.

Maximum diameter of the puddle: 163 meters

When, Flammable chemical escaping from tank chemical is NOT on fire Choose Hazard to Analyze: Flammable Area of Vapour Cloud

Local areas of flame can occur even though the average concentration is below the LEL. Model finds the flammable area by using 60% of LEL.

### **THREAT ZONE:**

Threat Modeled: Flammable Area of Vapor Cloud Model Run: Gaussian

Red: 81 meters --- (19800 ppm = 60% LEL = Flame Pockets)

Note: Threat zone was not drawn because dispersion predictions are unreliable for lengths less than the maximum diameter of the puddle.

Maximum diameter of the puddle: 163 meters Yellow:  
116 meters --- (3300 ppm = 10% LEL)

Note: Threat zone was not drawn because dispersion predictions are unreliable for lengths less than the maximum diameter of the puddle.



Maximum diameter of the puddle: 163 meters

When, Flammable chemical escaping from tank chemical is NOT on fire Choose Hazard to Analyze: Blast Area of Vapour Cloud Explosion

#### **THREAT ZONE:**

Threat Modeled: Overpressure (blast force) from vapor cloud explosion Type of Ignition: ignited by spark or flame

Level of Congestion: conges

Model Run: Gaussian

No explosion: no part of the cloud is above the LEL at any time.

#### **SCENARIO 2: LEAKING TANK, CHEMICAL IS BURNING AND FORMS A POOL FIRE**

Potential hazards from chemical which is burning as it leaks from tank:

- Thermal radiation from pool fire
- BLEVE (if heat rises the internal tank temperature and causes the tank to fail)
- Downwind toxic effects of fire byproducts

#### **SOURCE STRENGTH:**

Leak from hole in vertical cylindrical tank

Flammable chemical is burning as it escapes from tank Tank Diameter: 9.0 meters Tank Length: 13.9 meters

Tank Volume: 884 cubic meters Tank contains liquid

Internal Temperature: 33° C Chemical Mass in Tank: 683 tons Tank is 90% full

Circular Opening Diameter: 10 inches Opening is 3.48 meters from tank bottom Max Puddle Diameter: Unknown

Max Flame Length: 23 meters

Burn Duration: ALOHA limited the duration to 1 hour Max Burn Rate: 2,330 kilograms/min Total Amount Burned: 134,734 kilograms

Note: The chemical escaped as a liquid and formed a burning puddle. The puddle spread to a diameter of 42 meters.



### THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire

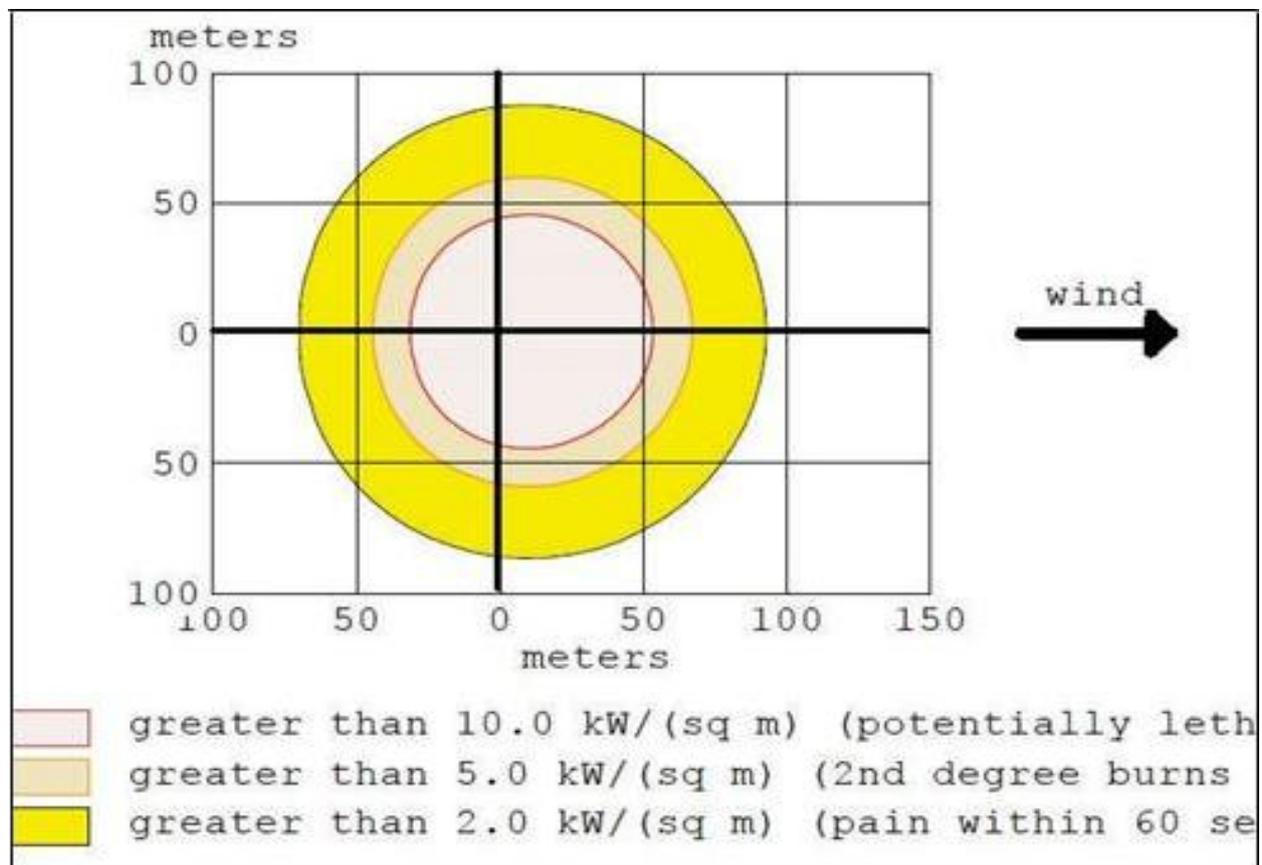
Red: 54 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 68 meters --- (5.0 kW/(sqm) = 2nd degree burns within 60 sec)

Yellow: 94 meters --- (2.0 kW/(sq m) = pain within 60 sec)

Figure 7.1

### Visual Representation of Thermal Radiation from pool fire



### SCENARIO 3: BLEVE, TANK EXPLODES AND CHEMICAL BURNS IN A FIREBALL

#### Potential hazards from BLEVE:

- Thermal radiation from fireball and pool fire
- Hazards fragments and blast force from explosion
- Downwind toxic effects of fire by-products

BLEVE/Fire ball Scenario: The higher the internal tank pressure/temperature at the time of tank



failure, the larger the fire ball. Any liquid not consumed by the fire ball will form a pool fire.

### **SOURCE STRENGTH:**

BLEVE of flammable liquid in vertical cylindrical tank

- Tank Diameter: 9.0 meters
- Tank Length: 13.9 meters
- Tank Volume: 884 cubic meters
- Tank contains liquid Internal Storage Temperature: 33° C
- Chemical Mass in Tank: 683 tons Tank is 90% full
- Percentage of Tank Mass in Fireball: 100%
- Fireball Diameter: 494 meters
- Burn Duration: 25 seconds

### **THREAT ZONE**

Threat Modeled: Thermal radiation from fireball

Red: 757 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 1.1 kilometers --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 1.7 kilometers --- (2.0 kW/(sq m) = pain within 60 sec)

### **Conclusions Scenarios**

When ethanol is leaking from tank and is NOT burning, forms an evaporating puddle; the threat zone for the Ethanol tank does not recommend the LOC value as per the Emergency Response Planning Guidelines ERPG- 3, ERPG-2 and ERPG-1. Hence, the red, orange and yellow colored level of concern is not recommended.

### **Scenario –2**

When ethanol is leaking from tank and is burning forms a pool fire; the thermal radiation for the Ethanol tank confined to the maximum at 54 meters only for which the thermal radiation intensity of 10 kW/m<sup>2</sup> is potentially lethal within 60 seconds. Similarly, the other threat zone of 5.0 kW/m<sup>2</sup> causes 2<sup>nd</sup> degree burns within 60 seconds at 68 m and the rest is 2.0 kW/m<sup>2</sup> at 94 m which causes pain within 60 seconds. Hence, all the red, orange and yellow colored level of concern is almost within plant premises only and no nearby areas will be affected.

### **Scenario-3**

When tank explodes and ethanol is in a fireball due to BLEVE; the thermal radiation for the Ethanol tank is confined to the maximum at 0.757 km for which the thermal radiation intensity



of 10 kW/m<sup>2</sup> is potentially lethal within 60 seconds. No villages are falling within 0.757 km which is likely to be affected. Similarly, the other threat zone of 5.0 kW/m<sup>2</sup> causes 2<sup>nd</sup> degree burns within 60 seconds at 1.1 km and the rest is 2.0 kW/m<sup>2</sup> subjected at 1.7 km within the study area, which causes pain within 60 seconds. Places likely to be slightly affected in yellow threat zone.

## **7.6 Disaster Management & Emergency Preparedness Plan:**

Disaster is an unplanned event that can cause death or significant injuries to employees, customers or public. It is a catastrophic situation in which suddenly, people are plunged into helplessness and suffering. As a result, they need protection, clothing, shelter, medical, social care and other necessities of life.

Disasters can be divided into two main groups, namely, natural and manmade. There can be no set criteria for assessing the gravity of a disaster, since it depends to a large extent on the physical, economic and social environment in which it occurs. However, all disasters bring in similar consequences that call for immediate action, whether at the local, national or international level for the rescue and relief of the victims.

**Scope:** The most important element of mitigation of a disaster is emergency planning and preparedness. M/s Angus Dundee India Private Limited fully endorses this fact and hence while formulating DMP, it will be ensured that the standards appropriate to safely legislative are in places.

### **Objectives of Disaster Management Plan**

Disaster Management Plan (DMP) is the process of preparing for mitigating measures, responding to and recovering from an emergency. The DMP is aimed at ensuring safety of life, protection of environment, protection of installation, restoration of production and salvage operations, in the same order of priorities. For effective implementation of the DMP, it will be widely circulated and personnel training should be provided through rehearsals/drills. The DMP is therefore a dynamic, changing demand focusing on continual improved of emergency response, planning and preparedness. The DMP will reflect the probable consequences of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further the management will be able to demonstrate that their assessment of the consequences uses good supporting evidence and is based on available and reliable information, incident data from internal and external sources, and, if necessary, the reports of outside agencies.

The objective of the industrial DMP is to make use of the combined resources of the plant and the outside services to achieve the following:



- Effect the rescue and medical facilities.
- Safeguard other people.
- Minimize damage to property and the environment.
- Initially contain and ultimately bring the incident under control.
- Provide authoritative information to the media.
- Secure the safe rehabilitation of affected area.
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.
- In effect, it is to optimize the operational efficiency to rescue, rehabilitate and render medical help and restore normalcy.

### **7.7 Risk Assessment and hazard manufacturing**

Basically, hazard analysis is the identification and quantification of unsafe conditions that exists in the plant whereas risk analysis deals with identification and quantification of risk due to the accident from the hazards. This analysis pertains to the risks to the population exposed to hazards. This assessment is based on failure probability, credible accident scenario and vulnerability of population. Though in-depth information in this regard is difficult to get or generate. This assessment is limited to maximum credible accident scenario and the safety issues related to proposed grain-based distillery. Most probable instances both onset and off site are listed below.

#### **A) On site**

- Explosive to fugitive dust and secondary emissions
- Housekeeping practices related to contact with hazardous materials.
- Emission and Spillage from storage and handling.

#### **B) Off Site**

- Contamination due to accidental release from offsite storage and associated failure during normal operation and natural calamities.
- Explosive to pollutants released from offsite facility.
- Deposition of toxic pollutants on vegetation due to sudden releases.

#### **A) On-Site Emergency Plan:**

On-site emergency is caused by an accident that takes place in a hazardous installation and the effects are confined to factory premises involving the people working in the factory. Preparation of On-site



Emergency plan is the responsibility of Factory Management. When the consequences of an emergency situation are restricted essentially within plan boundaries/ premises, it becomes an onsite emergency. Site - Emergency is under the control of senior officer of the organization not below the rank of General Manager. Separate cell will be created to handle emergency which may occur due to natural or man-made disasters. Evacuation plan will be prepared. Fire tenders, ambulance and mobile hospital facilities will be provided to the victims at the shortest time. One Health Centre equipped with modern technology will be identified which has tied up with Government district hospital to get services of the various areas.

### **Emergency Communication**

Whoever notices an emergency situation such as fire, growth of fire, leakage etc. should inform his immediate superior and Emergency control center. The person on duty in the Emergency Control Centre should appraise the Site Main Controller (SMC).

### **Emergency Responsibilities:**

#### **a) Site Controller:**

On receiving information about emergency, he will rush to Emergency Control Center (ECC). Declares Emergency and orders for operation of emergency siren. He will organize announcement by public address system about the location of emergency. He will assess which areas are likely to be affected, or need to be evacuated or are to be alerted.

#### **b) Incident Controller:**

The incident controller assembles the incident control team, directs operations within the affected areas, directs the shutting down and evacuation of plant, ensures that all key personnel help is sought, provides advice and information to the Fire and Security Officer, coordinates with emergency services at the site.

#### **c) Emergency Coordinator:**

- Rescue, Fire Fighting.
- Medical, Mutual Aid, Rehabilitation, Transport and Communication.
- Updating emergency plan, organizing mock drills verification of inventory of emergency facilities and furnishing report to site controller.
- Maintains liaison with Civil Administration.
- Controls rehabilitation of affected areas on discontinuation of emergency.
- Maintains essential services like Diesel Generator, Water, Firewater, Compressed Air/ Instrument Air, Power Supply for lighting.
- Ensures availability of adequate quantities of protective equipment and other emergency materials & spares.



#### **d) General Responsibilities of Employees during an Emergency:**

It becomes more enhanced and pronounced when an emergency warning is raised, the workers, if they are in-charge of process equipment, should adopt safe and emergency shut down and attend any prescribed duty as essential employee. If no such responsibility is assigned, he should adopt a safe course to assembly point and wait for instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

#### **Emergency Facilities**

##### **a) Emergency Control Centre:**

Emergency Control Centre (ECC) with intercom, telephone, self-contained breathing apparatus, fire suit, hand tools, wind direction indications, public address megaphone, hand bell, telephone directories, factory layout, site plan, emergency lamp, hazard chart, emergency shut-down procedures, address with telephone numbers and key personnel, emergency coordinator, and essential employees.

##### **b) Assembly Point:**

Number of assembly point depending upon the plant location will be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water, etc. would be organized there.

##### **c) Emergency Power Supply:**

Plant facilities will be connected to DG and would be placed in auto mode. Thus, water pumps, plants lighting and emergency control centre, administrative building and other auxiliary services will be connected to emergency power supply.

##### **d) Fire Fighting Facilities**

First Aid and Fire Fighting equipment suitable for emergency should be maintained in each and at bulk storage of fuel.

##### **e) Location of Wind Sock**

On the top of the administration block / security block / production blocks, wind socks will be installed to indicate direction of wind for emergency escape.

##### **f) Emergency Medical Facilities**



Stretchers, gas masks and general first aid materials for dealing with fire burns etc. Apart from plant first aid facilities, external facilities will be augmented. Names of medical personnel, medical facilities in that particular area will be prepared and updated.

#### **g) Emergency Warning**

Communication of emergency will be made familiar to the personnel inside the plant and people outside. An emergency warning system will be established.

#### **h) Emergency Shutdown**

There could be a greater number of persons in the storage area and other areas in the vicinity. The area will have adequate number of exits, staircases, etc.

#### **i) All Clear Signal**

At the end of an emergency, the Site Controller orders for an all-clear signal. When it becomes essential, the Site Controller communicates to the District Emergency Authority, Police and Fire Service personnel regarding help required or development of the situation into an Off-Site Emergency.

#### **j) Mutual Aid**

Mutual aid in the form of technical personnel, runners, helpers, special protective equipment, transport vehicles, communication facility, etc., should be sought from the neighbouring industrial management.

#### **k) Mock Drills**

Emergency preparedness is an important aspect of planning in Industrial Disaster Management. Personnel would be trained suitably and prepared mentally as well as physically in emergency response through carefully planned and simulated procedures. Similarly, the key personnel and essential personnel should be trained in the operations. List of Key persons during emergency situation will be mentioned in the **Table 7.8**

**Table-7.8**  
**List of Key persons**

<b>S.No.</b>	<b>Emergency Coordinator</b>
1.	General Manager
2.	Manager (Project)
3.	Manager (Maintenance)
4.	Shift In charge



## **B) Off-Site Emergency Plan**

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency go beyond the plant boundaries, it becomes an off-site emergency.

Major emergencies like explosion involving the nearby area & overturning of trucks etc. are classified as offsite emergency and it is not possible for single factory to handle the situation. The task of preparing the off-Site Emergency Plan lies with the District Collector. However, the off-site plan could be prepared as a Composite off-site Emergency Plan with the help of the local district authorities and the nearby industries in the Industrial Estate.

Off-site emergency is essentially the responsibility of the public administration. However, the factory management should provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighbouring population.

The off-site plan in detail should be based on those events, which are most likely to occur, but other less likely events, which have severe consequence, should also be considered. An early decision will be required in many cases on the advice to be given to people living within the range of the accident.

The main aspects, which should be included in the emergency plans, are:

### **a) Organization**

Details of command structure, warning systems, implementation procedures, emergency control centres should be there. Names and appointments of the incident controller, site main controller, their deputies and other key personnel should be available.

### **b) Communications**

Identification of personnel involved, communication centre, call signs, network and list of telephone numbers.

### **c) Specialized Knowledge**

Knowledge includes details of specialist bodies, firms and people upon whom it may be necessary to call, for example those with specialized knowledge, laboratories.

### **d) Chemical Information**

Details of the hazardous substances stored or procedure on each site and a summary of the risk associated with them.

### **e) Meteorological Information**



Arrangements for obtaining details of whether conditions prevailing at the time and weather forecasts.

**f) Humanitarian Arrangements**

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances and temporary mortuaries.

**g) Public Information**

Arrangements for dealing with the media press office and informing relatives.

**h) Assessment**

Arrangements for: (a) collecting information on the causes of the emergency and reviewing the efficiency and effectiveness of all aspects of the emergency plan.

**i) Role of the Emergency Co-ordination Officer (ECO)**

The ECO should co-ordinate various emergency services. The ECO should coordinate closely with the site main controller. The external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

**j) Role of the Local Authority**

The duty to prepare the off-site plan lies with the local authorities. The Emergency Planning Officer (EPO) appointed should carry out his duty in preparing for a whole range of different emergencies within the local authority area. Rehearsals for off-site plans shall be organized by the EPO.

**k) Role of Police**

Formal duties of the police during an emergency include protecting life and property as well as controlling traffic movements and avoid overcrowding.

**l) Role of Fire Authorities**

The cessation of a fire should normally be the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site.

**m) Role of Health Authorities**



Health authorities including doctors, hospitals, and ambulances and so on are a vital part of the emergency plan. Major off-site incidents are likely to require medical equipment and facilities additional to those available locally. A medical “mutual aid” scheme should exist to enable the assistance of neighbouring authorities to be obtained in the event of an emergency.

**n) Role of Government Safety Authority**

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. List of key persons will be mentioned in the Off- Site Emergency Plan in **table 7.9**.

**Table-7.9**

**List of Key persons of offsite EP**

<b>S.No.</b>	<b>Emergency Coordinator</b>
1.	District Magistrate
2.	Fire Brigade
3.	Controller of Explosive
4.	SP
5.	DHO
6.	SPCB

**7.8 EMERGENCY PLANNING**

The complete distillery unit has a provision of interlocking system where failure of an equipment or machinery shutdown the whole process instantly and after rectifying only, the whole process will be started.

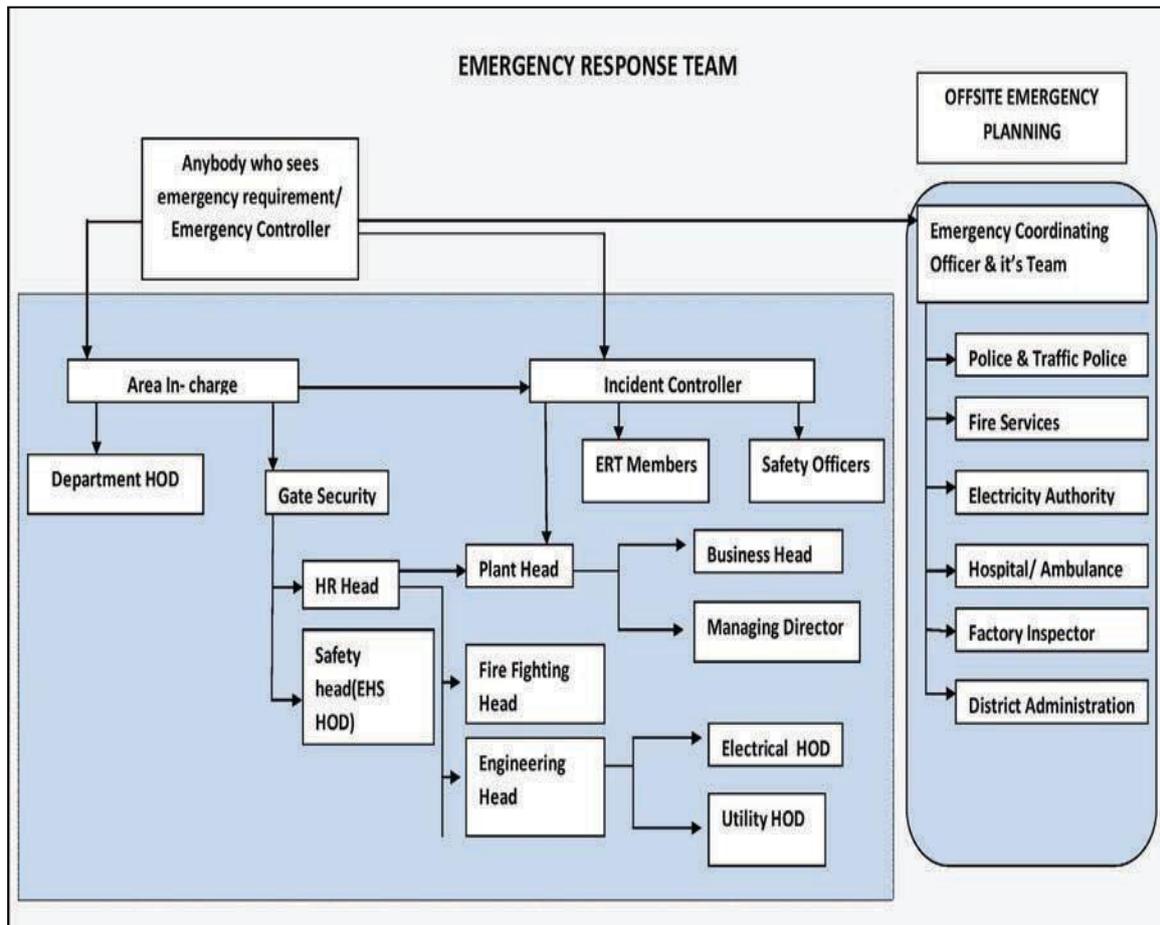
- During an emergency, the Emergency Management Staff, including the site controller shall gather in the ECC.
- The ECC shall be equipped with adequate communication systems in the form of telephones and other equipment in order to respond quickly and inform the whole plant instantly.
- The communication systems of Emergency Control Centre will be protected from possible shutdown.
- The ECC has its own emergency lighting arrangement and electric communication system operation.
- There are automatic fire detectors leading to fire alarms and proper control system.
- The hydrant pipeline network are provided at all danger prone areas.



- All emergency valves and switches and emergency handling facilities are already made easily accessible.

Figure 7.2

Flowchart showing Emergency Response Team



### 7.9 OCCUPATIONAL HEALTH AND SAFETY (Terms of Reference No. 8.3)

The distillery unit will have few potentially hazards associated which is given below:

- Exposure to dust
- Noise exposure
- Boiler heat exposure
- Physical hazards
- Others

These hazards are concerned with the workers working within the industry majorly, though some hazards can also affect local & regional public if hazard occurs at a larger scale. During handling, storage, transportation of chemical, accidental exposure can occur in the workplace which may cause acute or long-term detrimental health effects. Biological agents, including microorganisms and toxins produced by living organisms, can cause health problems in workers. Viral infection through



Influenza virus is an example of suffering which affects a broad population of workers. Psycho-social hazards are occupational hazards that affect someone's social life or psychological health. Psycho-social hazards in the workplace include occupational burnout and occupational stress, which can lead to burnout.

The medical health checkup will be carried out regularly to find out any previous symptoms related to any disorder or disease. Medical health records and annual the industry will have all the SDS of hazardous chemicals and employees will be given proper training pertaining to medical emergencies and situations. The exposure levels of hazardous chemicals will never be surpassed and in case of leakage or sudden emergency, proper measures will be taken to avoid emergency situations.

### **Occupational Health Centre**

The industrial premises will have one Occupational Health Centre for regular check-up of employees and to deal in case of emergency. Qualified doctors and staff will be available. One ambulance will also available at the factory. The medical action team consists of Medical Officer, first aiders at factory and medical staff. In case the condition of the affected person goes or seems beyond control the victim will be shifted to outside hospital for further necessary medical facilities under the supervision of Factory Medical Officer.

### **7.10 OCCUPATIONAL HEALTH SURVEILLANCE:**

In distillery plant, the occupational health surveillance of the employee will be done on a regular basis and record of the same will be maintained as per the Factories Act.

#### **Pre placement and periodical health check-up tests to be undertaken**

The check-ups will be dependent on age, sex, duration of exposure and department wise. Following tests will be done regularly:

**Table 7.10**  
**List of Tests**

<b>S. No.</b>	<b>Name of the test</b>
1.	Physical Fitness Certificate
2.	Pulse Rate
3.	Blood Pressure
4.	Complete Blood Examination Hemoglobin % (Hb%), WBC, RBC, etc.
5.	Vision
6.	Central Nervous System (CNS)
7.	Respiratory System-Lung Function (RS)
8.	Cardio Vascular System (CVS)
9.	Electro Cardio Gram (ECG)



10.	Chest X-ray
11.	Total Leucocyte Count (TC)
12.	Differential Leucocyte Count (DLC)
13.	Absolute Eosinophil Count (AEC)
14.	Complete Urine Examination [Physical / Chemical /Albumin, Sugar & Bile Salt
15.	Random blood Sugar (RBS)

### **Frequency of Medical Examination**

- Once in a year
- Personal Protective Devices
- Measures Industrial Safety helmets, Crash helmets Goggles
- Safety Shoes & Rubber Gumboots Aprons
- Leather hand gloves, Heat Resistive hand gloves, Chemical hand gloves and Cut resistance hand gloves Safety belt / line man's safety belt.

### **7.11 SOCIAL IMPACT ASSESSMENT**

The impact of the proposed activity will begin with the starting up of the construction activities at the site. The proposed activity will provide employment to considerable number of skilled, semi-skilled and un-skilled construction labourers. In normal circumstances, the local people will be given preference for the unskilled activities as well as skilled activities (depending upon the availability), as there are many construction labourers in the vicinity of the project and are expected to be available with normal wages.

Provision of wage employment to the local populace during construction period of the project will benefit the local area to some extent. This will enhance the income levels of the local people and lead for their socio-economic wellbeing, which will be positive impact of the project. Tertiary sector employment and requirement of goods and services for daily need, including transport will also generate additional employment and source of income for the local population.

In line with the above, some more recommendations are given below:

- Local people will be given preference;
- All the guidelines under the Labour Act and Safety Rules as specified under Factories Act, 1948 will be implemented to avoid any accidents;
- The contractor will be instructed to provide basic amenities like drinking water, cooking fuel, health check-ups etc. to the workers. This will be part of the contractual agreement between the project proponent and the contractor engaged for construction and operational.



- The construction site will be secured with fencing and will have guarded entry Points.

## **7.12 REHABILITATION & RESETTLEMENT PLAN**

The proposed project does not involve any displacement of persons and no rehabilitation and resettlement are required.



## **CHAPTER -8 PROJECT BENEFITS**

### **8.1 Introduction**

This chapter is focused on those points which become beneficial to the surrounding area or community in terms of infrastructural development, social development, employment generation and other tangible benefits due to upcoming project activities. Various benefits associated with proposed project can be summarized in following heads:

- a.** Indirect Employment by support businesses like increased supply of goods & services
- b.** Social awareness & workshops, health checkup programs, skill development, direct funding support for health and education sector NGOs'
- c.** Economic increased revenue for government, increased economic activity in the impact zone.

#### **8.1.1 Benefits to the Infrastructure:**

The proposed project will have numerous induced impacts on society. It will also attract other entrepreneurs to establish their venture in the region. The proposed project will attract large industries to the area in the form of equipment suppliers, Raw material suppliers, etc. For their accommodation, the infrastructural facilities like lodging, eateries and transport facilities on the outskirts of nearby villages up to the plant area is expected to improve. These will also benefit the local population.

#### **8.1.2 Benefits to the Socio-Economic Status**

Economic infrastructure is essential for improving the productive capacity of the nation but infrastructure is also required to improve the quality of human resources. It consists of services like education, medical facilities, sanitation, housing, drinking water supply, connectivity etc and all these together constitute the social infrastructure of an economy.

The project promoters are keen to satisfy the basic requirements of the social infrastructure via CER activities.

#### **8.1.3 Employment Opportunities:**

The project will have potential for indirect employment. Manpower will be required during construction and operation phase and also in other activities such as transportation, day to day operations etc. A total of 100 persons will be employed directly and indirectly. Preference will be given to the local people for employment based on their qualification and eligibility. This project is expected to yield a positive impact on the socio-economic environment of the region.



#### **8.1.4 Corporate Environment Responsibility (CER):**

Requisite amount against the CER activities will be deposited in the account of Directorate of Environment, Science & Technology (DEST), GoHP along with the Environment Clearance of the proposal. The CER activities will be decided and executed by the Department of Environment, Science & Technology itself.

#### **8.2 Litigation And Pending Cases**

The unit has never violated the provisions under the environmental protection rules. Neither any litigation is pending against the project nor any directions /order has ever been passed by any court of law.



## CHAPTER -9

### ENVIRONMENT COST BENEFIT ANALYSIS

#### 9.1 General

Pursuant to the Environmental Impact Assessment (EIA) Notification dated September 14<sup>th</sup>, 2006, the chapter on Environmental Cost-Benefit Analysis is only applicable if recommended during the Scoping stage. As this analysis was not recommended during Scoping, it has not been conducted.





## CHAPTER -10

### ENVIRONMENT MANAGEMENT PLAN

#### 10.1 INTRODUCTION

Environmental management plan (EMP) describes the administrative aspects of ensuring that mitigation measures are implemented and their effectiveness monitored, after grant of Environmental Clearance. It consists of various policies, control measures etc. for abatement of critical environmental impacts arising out of the proposed project. Mitigation measures are proposed on the basis of identified impacts. Further a suitable environment management plan will be introduced in the project to implement measures to protect and enhance the quality of environment. The EMP is only as effective as its implementation. An appropriate environmental management strategy is developed and presented in the form of an EMS. It is the responsibility of the project proponent to optimize the utilization of resources and discharges of waste by adopting suitable control measures in the plant to avoid adverse effects of industrial activities on the environment and in turn to enhance the quality of the existing environment. The formulation of EMP is critical as India has to support 16 % of total population on 2.4% of global market area, with 0.5% as meagre energy resource.

#### 10.2 Summary of Potential Impacts with Mitigation Measures during Construction Phase:

##### 1. Air Environment:

Air quality around the project will be marginally impacted during the construction phase. Various activities related to construction are likely to generate dust and may adversely affect the air quality of the surrounding area of the project site. Following measures shall be taken to minimize such impacts:

- All the loose material either stacked or transported will be provided with suitable covering such as tarpaulin.
- For dust suppression due to vehicular movements, water sprinkling will be done from time to time.
- To minimize the occupational health hazard, proper mask will be provided to the workers who are engaged in activities that may lead to dust generation.

##### 2. Water Environment:

During the construction period, run-off from site shall not be allowed to stand (water logging) or enter into the roadside or any surface drains. Adequate measures will be taken to avoid any adverse impact on surface or ground water during construction phase. Domestic waste water generated through manpower engaged in construction will be treated in STP of capacity 10 KLD based on MBBR technology and reused within green area.





### **3. Noise Environment:**

During the construction stage, increase in ambient noise levels is expected, which will decrease with increase in distance. All the construction activities will be carried out during the daytime. There will be some noise generation due to the traffic movement carrying construction material, which is a temporary phenomenon. To prevent the occurrence of any occupational hazard, earmuff/earplug will be given to the workers working around and operating machinery emitting high noise levels. Careful planning of machinery operation and scheduling of operations will be done to minimize such impacts. Development of green belt will be helpful in abatement of noise and act as barrier for noise generated from plant machinery.

### **4. Solid Waste Management:**

During the construction phase, the following measures shall be taken for solid waste Management:

- All metal, wooden, paper, plastic wastes, debris and metal cuttings shall be collected from site as soon as particular construction activity is over and disposed in suitable manner.
- Municipal waste generated will be collected and disposed in environmentally sound manner as per Solid Waste Management Rules, 2016.

### **5. Sanitation, Welfare and Safety Measures for Construction Workers**

Construction workers will be made aware of possible hazards and safety measures that need to be taken during construction activities through routine training. Personal Protective Equipment (PPEs) such as dust masks, goggles, earplugs/ earmuffs, safety gloves, safety belts, shoe with toe protection, gumboots will be made available at construction site. Construction workers and vehicle drivers will be provided with drinking water, canteen and toilet / washroom facility. Rest room facility for truck drivers will be provided.

## **10.3 Summary of Potential Impacts with Mitigation Measures during Operational Phase:**

### **1. Air Environment:**

The major pollutants of air in distillery plant are the suspended particulate matters from boiler stacks, CO<sub>2</sub> from fermentation process and fugitive emissions due to material handling and movement.

#### **Management Plan:**

- Bag Filter with stack of adequate height of 31 m will be installed with the proposed boiler (15 TPH) to control the particulate matter to less than 50 µg/m<sup>3</sup> emissions due to combustion of fuel.
- In proposed distillery, CO<sub>2</sub> generated from the fermenter will be scrubbed, liquified and sold to vendors



engaged in manufacture of carbonated drinks.

- DG Set (2X750 KVA) will have adequate stack height (15 m above the canopy) as per CPCB guidelines.
- Roads within the plant will be concreted to control the generation of fugitive emissions.
- Adequate greenbelt will be developed in the plant area.
- Continuous Emission Monitoring System (CEMS) on stacks will be installed and connected to the server of CPCB/SPCB.
- The overall quality of the ambient air will be monitored and maintained within the limits prescribed under NAAQS-2009 prescribed by CPCB.

## **2. Water Environment:**

The proposed project is a water intensive industry and water will be required at different stages of the process. Wastewater will be managed as per the planned recycling & Zero discharge scheme for wastewater management.

### **Management Plan:**

- The proposed plant will be based on achieving “Zero Liquid Discharge” norms.
- Spent wash coming out of distillation plant will be taken through Centrifuge Decanters for separation of Suspended Solids separated as Wet Cake/ DWGS.
- Wet cake / DWGS (65 TPD with 75% moisture) will be sold as by Product for cattle/ Poultry /Fish or Prawn feed.
- Effluent will be treated in Effluent Treatment Plant (Capacity 425 KLD). The treated water will be recycled back in plant activities.
- Sewage from domestic activity will be treated in proposed sewage treatment plant (Capacity 10 KLD) and treated water will be reused in Greenbelt.
- Rainwater harvesting will be done within the plant premises by collecting rainwater from rooftop and used for non- process operations after required treatment.

## **3. Solid & Hazardous Waste Management Plan:**

- Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.



- MSW @ 25 Kg/day will be collected, segregated using collection bins and handed over to authorized agency for final disposal at waste disposal site of local authority.
- DDGS @ 19 TPD will be sold as Cattle feed.
- ETP Sludge @ 3.0 TPD will be dewatered in sludge drying beds as Cake and will be used as manure.
- DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in MEE to make DDGS.
- Paper waste and Glass culets @ 300 Kg/day will be sold to local supplier for recycling.
- Hazardous waste as used oil @ 0.5 Kl/annum will be generated and the same will be sent to HPSPCB authorized recyclers for final disposal.

#### **4. Noise Management Plan:**

- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.
- Personal Protective Equipment like earplugs and earmuffs will be provided to the workers exposed to high noise level.
- D.G sets will be provided with acoustic to control the noise level within the prescribed limit.
- Greenbelt inside the plant premises and at the plant boundary will be developed.
- Regular monitoring of noise level will be carried out.

#### **5. Odor Management Plan:**

- Adequate green belt all around the periphery of the plant will be maintained.
- Flower and fruit bearing plants will be planted for good aroma around the maturation warehouses.
- Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment.
- Longer storages of any product/ by-products will be avoided & use of efficient biocides to control bacterial contamination.
- Regular use of disinfectants in the drains to avoid generation of putrefying micro- organisms.

#### **6. Traffic Management Plan:**

Though, traffic will increase due to proposed project the so the roads and transport system will be carefully designed to include following precautionary principles:

- Plant location will have adequate hierarchical road network and connectivity.





- The trucks carrying Biomass/Wood chips/Briquettes will be covered, and transport contractor(s) will be bound by contract conditions for PUC compliance.
- Good internal parking spaces and traffic management system will be provided and the permit system will be rigidly implemented for all the incoming and outgoing vehicles.

**7. Greenbelt Development:**

- Out of the total land area of 34529 Sqm, 12730 Sqm i.e., 36.8% will be developed as greenbelt.
- Native plant species will be planted in consultation with local DFO.
- Greenbelt will be developed as per Central Pollution Control Board (CPCB) guidelines.
- Greenbelt development along with the road & plant boundary will attenuate noise level, arrest dust and improve the environment in surrounding.
- Greenbelt development will begin simultaneously with the initiation of construction activities of the proposed unit.

**Table 10.1: Planning Schedule of Green Belt**

Planning Schedule	Approx. number of saplings	Area (Ha)	Width of greenbelt (along the boundary of plant)	Fund allocation
1 <sup>st</sup> Year	1591	0.6365	10 m	Funds to be allocated for greenbelt development and all miscellaneous requirement will be 32.0 lakhs as capital cost for 2 years.
2 <sup>nd</sup> Year	1591	0.6365	10 m	
<b>Total</b>	3182	1.273		

**10.4 BUDGETARY PROVISION FOR ENVIRONMENT MANAGEMENT PLAN (EMP):**

*(Terms of Reference No. 8.1)*

To maintain the environmental parameters within the stipulated standards, regular monitoring of various environmental components is necessary which will be complied as per conditions.



**Table 10.2**

**ENVIRONMENT MANAGEMENT PLAN ALONG WITH BUDGET**

S. No.	Title	Activity	Capital Cost (Rs. Lakhs)	Recurring Cost annually (Rs. In Lakhs)	Items covered
<b>CONSTRUCTION PHASE: -</b>					
1.	<b>Air Pollution Control and its Management:</b>	<ul style="list-style-type: none"> <li>➤ Regular water sprinkling will reduce the dust generation.</li> <li>➤ Personal protective equipment for workers.</li> <li>➤ Wind breaking curtain.</li> <li>➤ All internal and external roads will be asphalted and cleaned daily, so there will be less generation of re-suspended road dust.</li> </ul>	6.0	1.0	Sprinklers, pipeline and smog gun Wind breaking wall at vulnerable areas
2.	<b>Water Pollution Control and its Management:</b>	<ul style="list-style-type: none"> <li>➤ Proper sanitation facilities are/will be provided.</li> <li>➤ Temporary drainage work will be maintained, removed and reinstated as required, and all other precautions will be taken for avoidance of damage by flooding and silt.</li> <li>➤ The wastewater will be reused for dust suppression by adopting suitable mechanism.</li> </ul>	8.0	1.5	Movable toilet Pipeline mechanism for reuse of treated domestic water
3.	<b>Noise Pollution Control and its Management:</b>	<ul style="list-style-type: none"> <li>➤ Construction equipment's and transport vehicles would be properly maintained so that noise generation is minimized.</li> <li>➤ Construction activity to be restricted in day time only.</li> <li>➤ Proper servicing of vehicles.</li> </ul>	3.0	1.0	Maintenance of construction equipment's
4.	<b>Solid/</b>	<ul style="list-style-type: none"> <li>➤ Careful design, planning and good site management would minimize</li> </ul>	3.0	1.0	Providing different





	<b>Hazardous Waste Management:</b>	waste of materials such as concrete, mortars and cement grouts. ➤ Muck shall be generated and disposed within the plant premises for plinth raising purpose. ➤ Litter disposal and collection points shall be established around the all-construction work sites.			colored bins
5.	<b>Environment Monitoring and Management:</b>	➤ Ambient air quality monitoring twice a year or as per conditions of EC. ➤ Ambient noise monitoring twice a year or as per conditions of EC. ➤ Groundwater quality monitoring twice a year or as per conditions of EC. ➤ Soil Quality monitoring twice a year or as per conditions of EC. ➤ DG Stack monitoring twice a year or as per conditions of EC.	--	1.5	Analysis of different parameters from NABL approved lab
6.	<b>Occupational Health, Safety and Risk Management:</b>	➤ Plant personnel working in dust prone areas shall wear personnel protective equipment like air filters over their nose. ➤ Proper illumination shall be maintained at each and every nook and corner of the work places. ➤ PPE like earplugs and muffs shall be provided to workers.	3.0	1.0	Provisions of PPE to workers and their health check-up
<b>TOTAL</b>			<b>Rs 23.0 Lakhs</b>	<b>Rs 7 Lakhs</b>	
<b>OPERATIONAL PHASE: -</b>					
1	<b>Air Pollution Control and its</b>	➤ <b>Installation of air pollution control device:</b> Pulse Jet Bag filters with offline cleaning technology, air cooled ducts,	140.0	10.0	Installation of Bag House & their



	<b>Management:</b>	spark arrester, ID fan, Chimney etc. Adequate spares (bags, cages, compressors, pumps, and machine parts, etc) shall be maintained.			maintenance, operator salary and disposal of APCD dust.
2	<b>Water Pollution Control and its Management:</b>	<ul style="list-style-type: none"> <li>➤ <b>Installation of water pollution control plant:</b></li> <li style="padding-left: 20px;">Sewage treatment plant (10KLD)</li> <li style="padding-left: 20px;">CPU(Condensate Polishing Unit) (425 KLD)</li> <li style="padding-left: 20px;">Water softener plant.</li> </ul>	100.0	20.0	Civil work construction, Modular sewage treatment plant based on MBBR technology & maintenance
3	<b>Noise Pollution Control and its Management:</b>	<ul style="list-style-type: none"> <li>➤ Equipment's will be designed to conform to noise levels prescribed by regulatory agencies.</li> <li>➤ High noise generating equipment should be acoustically treated or housed.</li> <li>➤ Acoustic enclosure will be provided for DG sets.</li> <li>➤ Ear plugs/ear muffs will be provided to employees working in high noise areas as protective device.</li> </ul>	5.0	2.0	Maintenance of machinery, provide PPE to worker, green belt and Acoustic enclosure
4	<b>Solid/Hazardous Waste Management:</b>	<ul style="list-style-type: none"> <li>➤ Boiler ash will be generated from boiler and same will be sent to brick Manufacturer.</li> <li>➤ MSW will be sent to authorize recyclers for final disposal.</li> <li>➤ DWGS and DDGS will be sold as cattle feed.</li> <li>➤ Used oil will be generated from servicing of DG Sets and will be sent to HPSPCB authorized recyclers for final disposal.</li> </ul>	50.0	10.0	Making arrangement for solid & hazardous waste disposal. Contaminated drums disposal



		<ul style="list-style-type: none"> <li>➤ Provision of vermicomposting will be provided for municipal solid waste management.</li> </ul>			
5	<b>Occupational Health, Safety and Risk Management</b>	<ul style="list-style-type: none"> <li>➤ PPE like earplugs and muffs shall be provided to workers.</li> <li>➤ Workers exposed to mechanical accident-prone areas are given personal protective equipment (PPE) like tight rubber goggles, safety helmets, welders hand shields and welding helmets, plastic face shields, ear plugs, ear muffs, rubber aprons, rubber gloves, shoes with non-skid soles, gum boots, safety shoe with toe protection.</li> <li>➤ Automation to minimize risk associated with material handling or casting.</li> <li>➤ Proper labeling of risky areas w.r.t radiation.</li> <li>➤ Safety switches.</li> <li>➤ Firefighting arrangement will be provided.</li> <li>➤ First aid kit shall also be available within the industry.</li> </ul>	15.0	5.0	Provisions of PPE to workers and their health check-up. Provision of First Aid medical facility with medical officer
6	<b>Green Belt development:</b>	<ul style="list-style-type: none"> <li>➤ Development of green belt in area of 12730 sqm i.e., 36.8 %</li> <li>➤ Plantation of 3181 trees with 80-85% survival rate using the Miyawaki Forest Methodology.</li> </ul>	32.0	32.0	Development of green belt, watering & manuring as per Miyawaki Forest methodology. Salary of Gardner.
7	<b>Rain Water Harvesting:</b>	<ul style="list-style-type: none"> <li>➤ The unit will adopt a pond in village Bohar Kawalu for rejuvenation for ground water recharge.</li> </ul>	40	5.0	Cleaning & desilting and regular



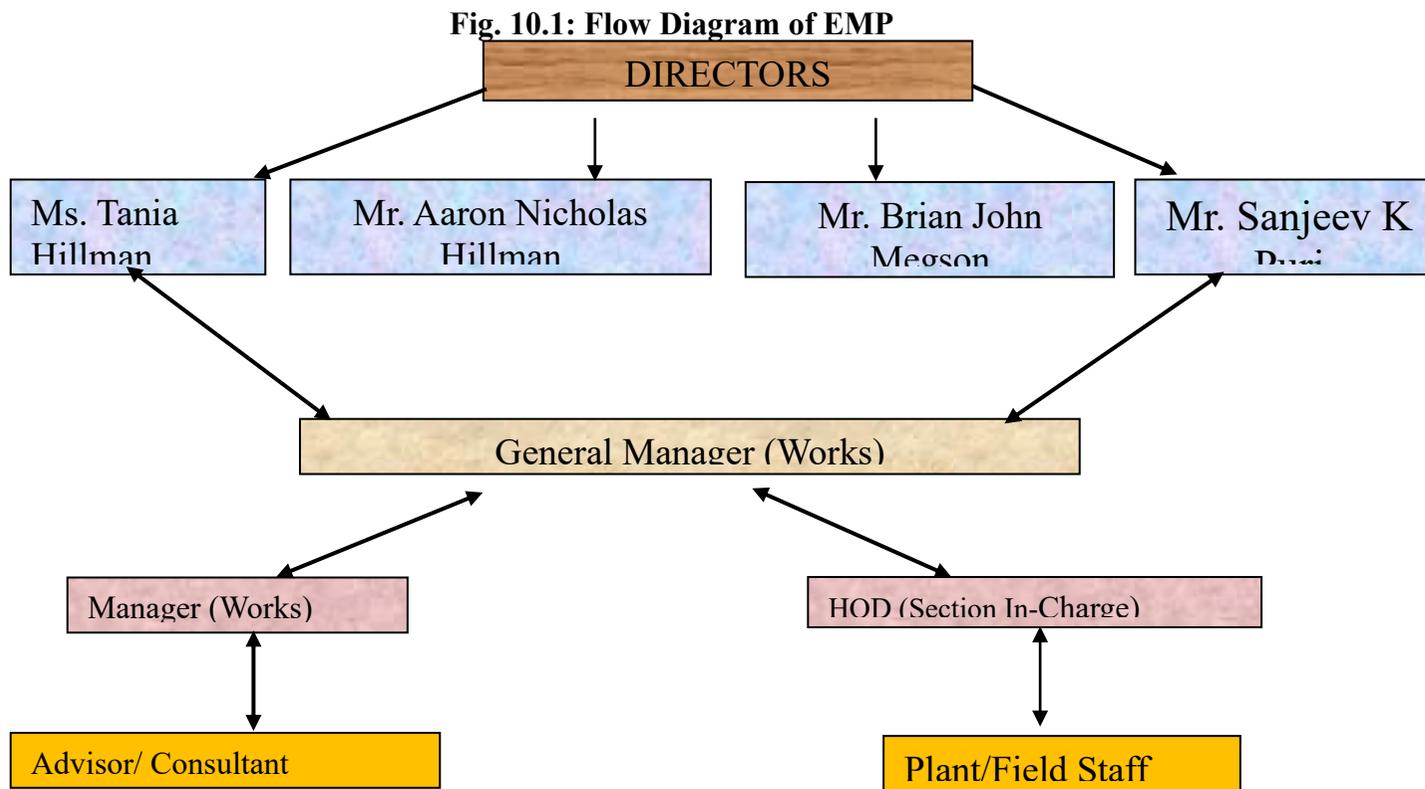
		➤ Also, the unit proposed 1 storage tanks for collection of rain water and collected water will be reused in the industry for irrigation and other purposes.			maintenance
8	<b>Energy Conservation</b>	➤ LED lighting shall be adopted to replace traditional inter-lighting systems, enhancing energy efficiency and reducing maintenance requirements. All street lighting installations shall be powered entirely by solar energy, promoting sustainability and minimizing environmental impact.	10.0	5.0	Installation, maintenance, monitoring, training, and safe disposal related to LED and solar street lighting systems.
9	<b>Environment Monitoring and Management:</b>	<ul style="list-style-type: none"> <li>➤ Ambient air quality monitoring twice a year or as per conditions of EC.</li> <li>➤ Ambient noise monitoring twice a year or as per conditions of EC.</li> <li>➤ Groundwater quality monitoring twice a year or as per conditions of EC.</li> <li>➤ Soil Quality monitoring twice a year or as per conditions of EC.</li> <li>➤ DG Stack monitoring twice a year or as per conditions of EC</li> <li>➤ EC Compliance report</li> </ul>	20.0	5.0	Analysis of different parameters from NABL approved lab. Provision of small Environment lab
<b>Total</b>			<b>Rs 412.0</b>	<b>Rs 94.0</b>	



**10.5 STRUCTURE AND ADMINISTRATIVE RESPONSIBILITIES OF ENVIRONMENT MANAGEMENT CELL (EMC):** *(Terms of Reference No. 9.3)*

M/s Angus Dundee India Private Limited will be run by qualified and experienced personnel in environmental management and pollution control. The company has environmental monitoring cell for environment monitoring and legal compliances. The details of cell are given below:

The EMC will be headed by four directors. He will be assisted by General Manager (GM) and Consultant. However, actual responsibility for execution of environmental mitigation measures will be General Managers, Manager, Section-in charge and their subordinates as per the following block diagram in fig. 10.1.





## CHAPTER -11 SUMMARY AND CONCLUSION

### 11.1 Project Name, Location:

M/s. Angus Dundee India Private Limited proposes to set up a new grain/barley-based distillery for production of 30 KLD of Malt Spirit, 2 KLD of Craft Gin and bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village-Salol, Tehsil and District Kangra, Himachal Pradesh.

**Table 11.1**

#### Salient features of the Project

S. No.	Particulars	Details																								
1.	<b>Name of Project</b>	M/s Angus Dundee India Private Limited																								
2.	<b>Location</b>	Mohal Parei Village- Salol Tehsil & district Kangra, Himachal Pradesh																								
<b>A. Location details</b>																										
1.	Location																									
a	Village/ Town/Plot No.	Mohal Parei Village- Salol																								
b	Tehsil	Kangra																								
c	District	Kangra																								
d	State	Himachal Pradesh																								
2.	Toposheet No.	I43W4 I43W8																								
3.	Project Area	34,529 Sqm																								
C.	<b>Production Capacity</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Particulars</th> <th style="width: 30%;">Capacity</th> <th style="width: 40%;">Product</th> </tr> </thead> <tbody> <tr> <td colspan="3"><b>Product</b></td> </tr> <tr> <td><b>Malt Spirit Distillery</b></td> <td>30 KLPD</td> <td>Malt spirit</td> </tr> <tr> <td><b>Craft Gin Plant</b></td> <td>2 KLD</td> <td>Craft Gin</td> </tr> <tr> <td><b>IMFL Bottling Plant</b></td> <td>1000 cases per day</td> <td>IMFL Bottling</td> </tr> <tr> <td colspan="3"><b>By-product</b></td> </tr> <tr> <td><b>DWGS</b></td> <td>65 TPD</td> <td></td> </tr> <tr> <td><b>CO<sub>2</sub></b></td> <td>7 TPD</td> <td></td> </tr> </tbody> </table>	Particulars	Capacity	Product	<b>Product</b>			<b>Malt Spirit Distillery</b>	30 KLPD	Malt spirit	<b>Craft Gin Plant</b>	2 KLD	Craft Gin	<b>IMFL Bottling Plant</b>	1000 cases per day	IMFL Bottling	<b>By-product</b>			<b>DWGS</b>	65 TPD		<b>CO<sub>2</sub></b>	7 TPD	
Particulars	Capacity	Product																								
<b>Product</b>																										
<b>Malt Spirit Distillery</b>	30 KLPD	Malt spirit																								
<b>Craft Gin Plant</b>	2 KLD	Craft Gin																								
<b>IMFL Bottling Plant</b>	1000 cases per day	IMFL Bottling																								
<b>By-product</b>																										
<b>DWGS</b>	65 TPD																									
<b>CO<sub>2</sub></b>	7 TPD																									
D.	<b>Environmental settings</b>																									
1.	Nearest Village	Salol																								
2.	Nearest City	Kangra, 8.43 Km in North East direction from the project site. Dharamshala, 16.72 km in North direction from the project site																								



3.	National Highway/State Highway/Express Highway	NH-503 Jawalamukhi Kangra ji road is approx. 8.41 km in E direction from the project site. SH-23, approx. 4.06 Km in South direction from the project site.
4.	Nearest Railway Station	Kangra, approx. 8.52 km in South East direction from the project site.
5.	Nearest Airport	<b>Kangra (Gaggal):</b> - Airport approx. 9.05 km in North East direction from the project site.
6.	National Parks/ Wild Life Sanctuaries/ Biosphere Reserves within 5 km radius	Pong Dam Wildlife Sanctuary is located approx. 13.5 Km, SW from the project site.
7.	Reserved / Protected Forest within 5 km radius (Boundary to boundary distance)	<ul style="list-style-type: none"> <li>• Raltung Protected Forest, 8.44 Km, NW</li> <li>• Ramgarh Kurala Protected Forest, 3.69 Km, N</li> <li>• Lanj Protected Forest, 1.75 Km, S</li> <li>• Pandhwar Protected Forest, 4.21 Km, NW</li> <li>• Baldoa Reserved Forest, 8.51 Km, W</li> <li>• Jainimasror Reserved Forest, 7.22 Km, SW</li> </ul>
8.	Nearest water bodies	<ul style="list-style-type: none"> <li>• Baner Khad, 6.91 Km, East</li> <li>• Ghaj Khad, 0.54 Km, W</li> <li>• Chambi Khad, 6.22 Km, N</li> <li>• Manuni Khad, 8.43 Km, E</li> <li>• Pong Dam, 13.5 Km, SW</li> </ul>
9.	Water Requirement & Source	900 KLPD Source – Ground water: Tube-well
10.	Seismic Zone	Seismic <b>Zone – V</b>
<b>D. COST DETAILS</b>		
1.	Capital Cost of the project	Rs. 297 Crores
2.	Total cost for Environmental Management Plan (EMP)	<b>Capital cost:</b> Rs 4.12 Cr. <b>Recurring cost:</b> Rs 0.94 Cr.

## 11.2 Products and capacities:

Details of products and capacities will be given as under in table 11.2.

**Table 11.2**  
**Details of Products and their capacities**

S. No.	Particular	Units	Capacity
<b>Product</b>			
1.	Malt Spirit	<b>KLD</b>	30
2.	IMFL Bottling	<b>Cases/day</b>	1000
3.	Craft Gin	<b>KLD</b>	2
<b>By-product</b>			
1.	DWGS	<b>TPD</b>	65
2.	CO <sub>2</sub>	<b>TPD</b>	7



### 11.3 Raw Material Requirement:

**Table 11.3**

**Details of raw material and their storage capacity**

Particulars	Quantity (TPD)	Storage Capacity	Source & Mode of transportation of raw material
Grain/Barley Malt	60	1200 MT	Grain/Barley shall be procured from local market and will be transported through trucks.
CIP Chemicals	6 Kg/day	180 Kg	These chemicals shall be procured from local market and will be transported through trucks.
Caustic soda	6 Kg/day	180 Kg	
Enzyme	12 Ltr/day	600 Ltr.	
Yeast	75 Kg/day	1000Kg	

### 11.4 Water Requirement:

Total water consumption for the proposed distillery unit will be 900 KLD and the requirement which will be met through own Borewell.

### 11.5 Power Requirement:

The power requirement will be 1.5 MW, which will be sourced from Himachal Pradesh State Electricity Board.

### 11.6 Steam Requirement:

The steam requirement will be met from 15 TPH biomass-based steam boiler.

**Table 11.4**

**Steam Requirement**

S.No.	Process/Section	Steam Requirement
1	Mash Tun	30 TPD
2	Wash Still	240 TPD
3	MEE	32.8 TPD
4	Dried	7.2 TPD



**11.7 Boiler Details:**

Boiler of 15 TPH capacities with Bag filter as Air Pollution Control Equipment will be installed. Details regarding boiler are mentioned in the table 11.5:

**Table 11.5  
Details of Boiler and its fuel**

PARTICULARS	DESCRIPTION
Capacity of Boiler	15TPH
Fuel used	Multifuel (Biomass/Wood Chips /Briquettes) 80TPD
Stack Height	31m (AGL)
APCD	Bag filter

**Details regarding the D.G. Sets:**

D.G. sets of 2X750 KVA will be installed for the power backup. Details regarding the D.G. Sets are mentioned in the table given below:

**Table 11.6**

**Details Regarding the D.G. Sets**

S. No.	Particulars	Details
1.	Type of Fuel	HSD
2.	Capacity	2X750 KVA
3.	Stack Height (above roof level)	15 meters
4.	Pollution Control Equipment Measures	Adequate stack height & Acoustic

**11.8 Manpower Requirement:**

The proposed project will bring employment for 100 persons.

**11.9 Environmental impacts & mitigation measures:**

**Table 11.7**

**Environmental Impacts & Mitigation Measures**

Particulars	Mitigation measures to be adopted
-------------	-----------------------------------



<p><b>Air Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Bag filter with a stack of height of 31 m will be installed with the proposed (15 TPH) boiler to control the particulate matter emissions below 50 mg/m<sup>3</sup>.</li> <li>➤ In proposed distillery, CO<sub>2</sub> generated from the fermenter will be scrubbed, liquified and sold to vendors engaged in manufacture of carbonated drinks.</li> <li>➤ DG Set (2X750 KVA) will have adequate stack height (15 m above the canopy) as per CPCB guidelines.</li> <li>➤ All internal roads will be paved and mechanically swept to control the generation of fugitive emissions.</li> <li>➤ Adequate greenbelt will be developed in the plant area.</li> <li>➤ Continuous Emission Monitoring System (CEMS) will be installed on stacks and connected to the server of CPCB/SPCB for real time monitoring.</li> <li>➤ The overall quality of the ambient air will be monitored and maintained within the limits prescribed under NAAQS-2009 prescribed by CPCB.</li> </ul>
<p><b>Water Environment</b></p>	<ul style="list-style-type: none"> <li>➤ The distillery will be based on “ZERO LIQUID DISCHARGE”.</li> <li>➤ Domestic effluent will be treated in STP of 10 KLD based on MBBR technology and reused for plantation within the premises.</li> <li>➤ Treated wastewater from the ETP will be used in the process as well as utility.</li> <li>➤ Spent wash will be generated from the distillation after passing through centrifugal decanter and separation of solids as DWGS/ Wet cake will be treated in ETP/CPU.</li> </ul>
<p><b>Solid/Hazardous Waste Environment</b></p>	<ul style="list-style-type: none"> <li>➤ Boiler ash will be generated to the tune of 3.75 TPD and will be sent to brick manufacturers and farmers for soil conditioning.</li> <li>➤ Municipal solid waste @ 25 Kg/day will be collected, segregated using collection bins. The biodegradable component will be converted into compost, which shall be used in the plantation area as manure.</li> <li>➤ DWGS @ 65 TPD will be mixed with Spent Wash/Thin Slope in Multiple Effect Evaporator (MEE) to produce DDGS.</li> <li>➤ DDGS @ 19 TPD will be sold as cattle feed.</li> <li>➤ ETP Sludge @ 3.0 TPD will be dewatered as cake in sludge drying beds and used as manure.</li> <li>➤ Paper waste and Glass Culletts @ 300 Kg/day will be sold to local supplier for recycling.</li> <li>➤ Used oil/spent oil @ 0.5 Kl/annum will be handed over to HPSPCB authorized</li> </ul>



	recyclers.
<b>Noise Environment</b>	<ul style="list-style-type: none"> <li>➤ Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.</li> <li>➤ Personal Protective Equipment like earplugs and earmuffs will be provided to the workers exposed to high noise level.</li> <li>➤ D.G sets will be provided with acoustic to control the noise level within the prescribed limit.</li> <li>➤ Greenbelt inside the plant premises and at the plant boundary will be developed.</li> <li>➤ Regular monitoring of noise level will be carried out.</li> </ul>
<b>Odour management</b>	<ul style="list-style-type: none"> <li>➤ Adequate greenbelt will be developed &amp; maintained all around the periphery of the plant</li> <li>➤ Regular housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment.</li> <li>➤ Longer storages of any product will be avoided &amp; use of efficient biocides to control bacterial contamination.</li> <li>➤ Regular use of eco-friendly disinfectants in the drains to avoid generation of putrefying micro-organisms.</li> </ul>
<b>Flue gas Management</b>	During combustion of fuel in the boiler furnace, there will be generation of flue gas emissions and to contain the concentration of particulate matter within the prescribed standards of 50 mg/Nm <sup>3</sup> , Bag filter will be installed as APCD.

### 11.10 Environmental Management Plan (EMP)

Capital cost of EMP cost will be Rs. 412.0 Lakhs and recurring Cost will be Rs. 94 lakhs.

### 11.11 Conclusion

M/s Angus Dundee India Pvt. Ltd. will generate a fair amount of direct, indirect and induced employment in the region. The local economy will receive a boost due to employee spending and services generated by the Firm. Due to the implementation of the project activity, there shall be improvement in the standard of living viz. better education, improved health, sanitation facilities etc. This is envisaged as a major positive benefit. The Firm's management shall recruit semi-skilled and unskilled workers from the nearby villages due to availability of local labors. The employment provided due to the proposed project would rapidly increase the social status of the villagers.



Firm commitment towards environment & using the latest technology, along with optimal usage of available resources will reduce the impact and makes the project viable.



## CHAPTER-12

### DISCLOSURE OF CONSULTANTS ENGAGED

#### 12.1 Organizational Profile:

M/s JMS Enviro Care and Innovative Centre was established in 2024 and has been floated by the vast experienced technical experts to provide consultancy services in the field of environment matters. The registered office of the consultancy firm is located at SCO No: 6, Motia Plaza, Baddi, District Solan, Himachal Pradesh. The consultancy firm is accredited by QCI-NABET as Category-A under QCI-NABET scheme for accreditation of EIA consultant organization, Version-3, for preparation of EIA/EMP reports for the 10 sectors including Distillery Industry, vide certificate NABET/EIA/24-27/IA 0142 dated 01.10.2024 and Valid upto 20.06.2027.

The consultancy firm is an ISO 14001-2015 & ISO 9001-2015 certified. The firm has scope to work anywhere in the country but the entrepreneurs/ project proponents on the State of Himachal Pradesh especially will have opportunity to get hassle free 'Environment Clearance.

The consultancy firm has qualified and experienced inhouse and empaneled manpower.

#### 12.2 Scope of Services

In addition to the consultancy services for preparation of EIA/EMP Reports for which the consultancy firm is accredited by QCI-NABET, the consultancy firm is also providing services with regard to following thematic areas:

Provide guidance and act as Environmental consultants for obtaining 'Environmental Clearance 'and' No Increase in Pollution Load Certificate' under EIA Notification

- Environmental consultants for projects for obtaining environmental clearance under EIA
- Preparation of environmental Statement Reports as required under rule 14 of the Environment (Protection) Rules,1986.
- Designing of pollution control devices/ equipment based on latest technologies
- Preparation of feasibility reports of the pollution control equipment
- Legal guidance of environmental matters
- Filing of application for obtaining statutory clearances
- Preparation of adequacy report of pollution control devices



- Guidance about implementation of cleaner technologies
- Adoption of waste minimization techniques

In order to get the samples of water/ wastewater / soil/ noise/ ambient air, the consultancy firm has executed an agreement with M/s Chandigarh Pollution Testing Laboratory Mohali. This laboratory has well equipped laboratory with modern instruments and experienced staff, and is accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL), a constituent Board of Quality Council of India. Besides, this laboratory is accredited by MoEF&CC as well as CPCB.

### EIA Team Member

The work presented in this Final EIA report was carried out by JMS Enviro Care and Innovative Centre, with active corporation from **M/s Angus Dundee India Pvt. Ltd.** by involving following EIA Coordinator and FAEs:

The manner of EIA coordinator and FAE’s engaged for the project has already been detailed in Table 12.1.

**Table 12.1 Disclosure of Engaged Consultants**

Functional Areas	Name of the Expert	Task
Project Coordinator	Mr. Surinder Singh Matharu	Site visit, identification of the project, assist in identification of impacts of projects and suggestions of mitigation measures, preparation of EMP & environment Budgetary issues.
Air Pollution Prevention, Monitoring & Control (AP),	Mr. Rajiv Kumar Garg	Finalization of monitoring locations, checking air quality data, evaluation of result of Ambient Air Quality Monitoring (AAQM) and contribution to EIA documentation.
Meteorology, Air Quality Modeling & Prediction (AQ)	Mr. Surinder Singh Matharu FAA: Ms. Nitasha Thakur	Finalization of monitoring locations, checking air quality data, evaluation of results of Ambient Air Quality Monitoring (AAQM).



Water Pollution, Prevention, Control & Prediction of Impacts (WP)	Mr. Jagir Singh	Finalization of sampling locations for Ground water and Surface water, water balance for the project, evaluation of water pollution management, identification of impact, suggestions and finalization of mitigation measures, contribution to EIA documentation.
Risk and hazard Management (RH)	Mr. Punit Lal Mahto	Assistance in perfection of risk Assessment report and developing. and interpreting consequence analysis
Socio-Economics (SE)	Mrs. Ramandeep Kaur	Site visit, assist in identification of report and suggesting mitigation measures, preparation of EMP and environmental budgetary issue, identification of Project
Solid and Hazardous waste management	Mr. Surinder Singh Matharu FAA: Ms. Shivani Thakur	Identification of water generation from the proposed plant, suggesting adequacy of mitigation measures and management of wastes, contribution to EIA documentation.
Ecology & Biodiversity (EB)	Mr. Durga Singh Verma FAA: Ms. Nitasha Thakur	Site visit, field services, assessment of impacts of proposed project as biological environment, preparation of EIA report.
Hydrogeology (HG)	Mr. Punit Lal Mahto	Understanding and reporting Ground water conditions, finalization of Ground water sampling locations
Geology (Geo)	Mr. Punit Lal Mahto	Geology & Geomorphologic analysis based on the secondary data, Finalization of sampling locations,



		analysis of collected data, identification of mitigation measures.
Noise and Vibration (NV)	Mr. Jagir Singh	Site visit, checking of noise monitoring results, analysis of data, identification of impacts and mitigation measures
Land Use (LU)	Mr. Punit Lal Mahto	Site visit, development of land use maps of study area using GIS, related tasks, site visit for ground truth survey, finalization of land use maps, contribution of EIA documents.
Soil Conservation (SC)	Mr. Samarjit Kumar Goyal	Site Visit, Finalization of soil sampling locations, finalization of survey findings, identification of impacts, suggestion of mitigation measures and contribution to EIA documentation
Laboratory	Chandigarh Pollution Testing Laboratory & Team	Sample analysis of water, soil and air collected from the study area as per MoEF&CC requirement.
Independently review	Mr. Surinder Singh Matharu	Independent review of EIA report against pre-set structure.



## NABET CERTIFICATE



भारतीय गुणवत्ता परिषद्  
**QUALITY COUNCIL  
OF INDIA**  
Creating an Ecosystem for Quality



**NABET**

### National Accreditation Board for Education and Training

## Certificate of Accreditation

### JMS Enviro Care and Innovative Centre, Solan

Building No./Flat No.: SCO6, Road/Street: 2nd Floor Motia Plaza, Saraj Majra Lavan, Baddi, Solan,  
Himachal Pradesh-173205

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors.

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast/underground mining	1	1 (a) (i)	B
2.	Mining of minerals-opencast mining only			A
3.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
4.	Cement plants	9	3 (b)	B
5.	Synthetic organic chemicals industry	21	5 (f)	A
6.	Distilleries	22	5 (g)	A
7.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	B
8.	Highways,	34	7 (f)	A
9.	Building and construction projects	38	8 (a)	B
10.	Townships and Area development projects	39	8 (b)	B

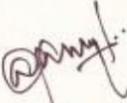
**Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IAAC minutes dated July 12, 2024, and Supplementary Assessment minutes dated September 20, 2024 posted on QCI-NABET website.**

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3373 dated October 1, 2024. The accreditation needs to be renewed before the expiry date by JMS Enviro Care and Innovative Centre, Solan following due process of assessment.

Issue Date  
October 1, 2024

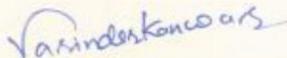


Valid up to  
June 20, 2027



Mr. Ajay Kumar Jha  
Sr. Director, NABET

Certificate No.  
NABET/EIA/24-27/IA 0142



Prof (Dr) Varinder S Kanwar  
CEO-NABET

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.



ANNEXURE-I

LAND PAPERS



**INDIA NON JUDICIAL**

**Government of Himachal Pradesh**

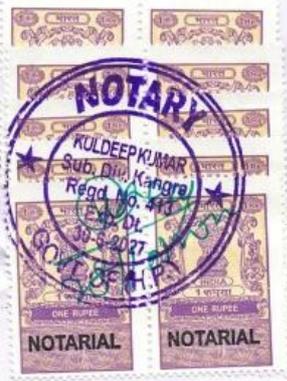
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**e-Stamp**

<b>Certificate No.</b>	: IN-HP28757610791844W
<b>Certificate Issued Date</b>	: 24-Oct-2024 03:35 PM
<b>Account Reference</b>	: NEWIMPACC (SV)/ hp19027904/ DHARAMSALA/ HP-KG
<b>Unique Doc. Reference</b>	: SUBIN-HPHP1902790451963846122840W
<b>Purchased by</b>	: MADAN LAL KAPOOR
<b>Description of Document</b>	: Article 5 Agreement or Memorandum of an Agreement
<b>Property Description</b>	: Not Applicable
<b>Consideration Price (Rs.)</b>	: 0 (Zero)
<b>First Party</b>	: MADAN LAL KAPOOR
<b>Second Party</b>	: ANGUS DUNDEE INDIA PVT LTD
<b>Stamp Duty Paid By</b>	: MADAN LAL KAPOOR
<b>Stamp Duty Amount(Rs.)</b>	: 1,000 (One Thousand only)



A.Y.S. No. *[Signature]*  
**Parveen Kumar**  
**Stamp Vender**  
**D/Shala**



**NOTARY**  
**KULDEEP KUMAR**  
 Sub. Dist. Kangra  
 Regd. No. 440  
 Exp. Dt. 30-6-2027  
**NOTARIAL** **NOTARIAL**

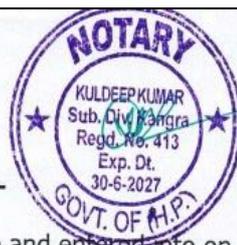
Please write or type below this line

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*28/10/2024*

**Statutory Alert:**

- The authenticity of this Stamp certificate should be verified at [www.e-stamp.com](http://www.e-stamp.com) or using e-Stamp Mobile App of Stock Holding.
- Any discrepancy in the details on this Certificate and as available on the website/ Mobile App renders it invalid.
- The onus of checking the legitimacy is on the users of the certificate.
- In case of any discrepancy please refer to the Competent Authority.



### AGREEMENT TO SELL

This Agreement to Sell ("**Agreement**") is made and entered into on 28<sup>th</sup> day of October 2024 at Dharamshala, District Kangra, Himachal Pradesh, India, by and between:

**Mr. MADAN LAL KAPOOR**, son of Mr. Ranjha Ram, resident of Great Himalayan Resort, Bhagsunag, Mcleodganj, Bhagsunag Road, PO Bhagsunag, Tehsil Dharamshala, District, Kangra, Himachal Pradesh - 176219, India, having Aadhar No. 4407 1476 4708 and PAN No. AHFPK6602G (hereinafter referred to as the "**Seller**", which expression shall unless repugnant to the context or meaning thereof, mean and include its respective administrators);

**AND**

**ANGUS DUNDEE INDIA PVT. LTD.**, a company incorporated under the laws of India with CIN No. U15511DL2012FTC230186 and having registered office at 127, DLF Galleria Mall, Mayur Vihar, Extension, New Delhi - 110091, India, through its director authorized as per Board Resolution dated 10.06.2024 (hereinafter referred to as the "**Purchaser**" / "**Company**", which expressions shall unless repugnant to the context or meaning thereof, mean and include its respective administrators).

(The term "**Parties**" shall mean a collective reference to the Seller and the Purchaser / Company, and the term "**Party**" shall be construed accordingly.)

#### WHEREAS:

- A. The Seller is the absolute owner of the land and building parcels comprising of Khata No. 4, Khatauni No. 5, comprising of Khasra Nos. 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, and 92 and Khatauni No. 6 comprising of Khasra No. 89 total admeasuring 3.45.29 Hectares, situated at Mohal Parei, Patwar Circle, Salol, Tehsil Kangra, District Kangra, Himachal Pradesh, India (hereinafter referred to as the "**Scheduled Land**"). The parcels comprising of the entire Scheduled Land are tabulated in the "**Jamabandi**" (land records) for the years 2017 - 2018 maintained by the Revenue Department of Government of Himachal Pradesh, which is annexed herewith and marked as **Appendix I** of this Agreement. The details

ATTEST  
NOTARY PUBLIC  
Kangra (H.P.)

For Angus Dundee India Private Limited

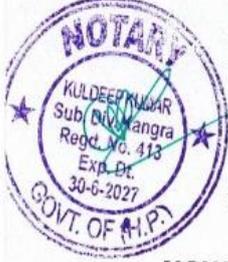
*[Signature]*

Director

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J. Vide board resolution dated 10.06.2024 ("**Board Resolution**"), the Company has duly authorized its director, namely, Mr. Sanjeev Kumar Puri, son of Mr. Rajinder Kumar Puri, resident of Flat No. 46, Pocket E, Near Sanjay Park, Mayur Vihar Phase 2, New Delhi - 110091, India, having AADHAR No.8136 7446 8303, to execute this Agreement, and to negotiate with the Seller regarding the sale of the Scheduled Land. The Seller has satisfied himself with the contents of the Board Resolution and the Seller undertakes to not to dispute the Board Resolution at any subsequent event(s). The Board Resolution forms part of this Agreement and is annexed to this Agreement as **Appendix II**.



**NOW, THEREFORE**, in consideration of the mutual covenants and the agreements contained therein, the Parties agree as follows: -

**1. SALE OF SCHEDULED LAND:**

The Seller agrees to sell and transfer the Scheduled Land (described in **Appendix I**) along with all built up structures and machineries attached to / lying upon the Scheduled Land (as stated in **Schedule I**) to the Company, and the Company agrees to purchase from the Seller the Scheduled Land (described in **Appendix I**) along with all built up structures and machineries attached to / lying upon the Scheduled Land (as stated in **Schedule I**) for a total Sale Consideration of Rs. 35,00,00,000/- (Rupees Thirty Five Crores Only), and subject to the terms and conditions of this Agreement.

**2. SALE CONSIDERATION:**

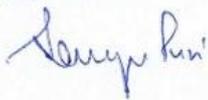
The total Sale Consideration of the Scheduled Land along with all built up structures and machineries attached to / lying upon the Scheduled Land shall be Rs. 35,00,00,000/- (Rupees Thirty Five Crores Only).

**3. LOAN SETTLEMENT APPLICATION:**

(a) After execution of this Agreement and within fifteen (15) days thereof, the Seller shall submit to the J&K Bank an application to settle the outstanding dues of the Loan Facility ("**Loan Settlement Application**").

ATTESTED  
NOTARY PUBLIC  
Kangra (H.P.)

For Angus Dundee India Private Limited

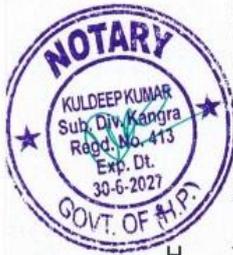
 Director

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agreement for selling the Scheduled Land (either in whole or in part) to other potential buyers, agents, or parties interested in purchasing the Scheduled Land.

- G. The Seller has offered to sell and transfer the Scheduled Land (along with all built up structure and machinery attached to / lying upon the Scheduled Land) to the Company for a sale consideration of Rs. 35,00,00,000/- (Rupees Thirty Five Crores Only) ("**Sale Consideration**") and the Purchaser has agreed to purchase the Scheduled Land (along with all built up structures and machineries attached to / lying upon the Scheduled Land) on the above Sale Consideration and subject to the terms of this Agreement. The sale of Scheduled Land (along with all built up structures and machineries attached to / lying upon the Scheduled Land) shall be on "as is what is" and "as is where is" basis. The details of the Scheduled Land, Building (Built Up), and Machinery is specified in **Schedule I** of this Agreement.



- H. The Seller represents that J&K Bank has no objection to the execution of this Agreement, and that J&K Bank has no objection if the Scheduled Land is sold to the Company after the Seller satisfies the outstanding dues of J&K Bank.

- I. The Seller entered into an agreement dated 31.10.2018 with the Ministry of Food Processing and Industries ("**MOFPI**") for creation of infrastructure of 'Agro Processing Units' on the Scheduled Land ("**MOFPI Agreement**"). For this purpose, MOFPI disbursed to the Seller a grant of Rs. 7,20,81,677/- (Rupees Seven Crores Twenty Lakhs Eighty One Thousand Six Hundred and Seventy Seven Only) ("**Grant**"). The Seller represents that the MOFPI Agreement permits the Seller to withdraw from the above project and from the MOFPI Agreement, provided the Seller refunds to the MOFPI the entire Grant with applicable interest. The Seller represents that by executing the present Agreement the Seller is not violating any of the terms of the MOFPI Agreement. The Seller represents that MOFPI has no objection to the execution of this Agreement, and that MOFPI has no objection if the Scheduled Land is sold to the Company after the Seller obtains a No Objection Certificate from MOFPI by refunding to MOFPI the entire Grant with applicable interest.

ATTESTED  
NOTARY PUBLIC  
Kangra (H.P.)  
For Angus Dundee India Private Limited  
Director

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(b) Vide the Loan Settlement Application, the Seller shall explicitly request the J&K Bank to execute a One Time Settlement ("OTS") agreement to settle and close the Loan Facility, and to release the mortgage over the Scheduled Land.

(c) Approval or rejection of the Loan Settlement Application, as the case may be, shall be intimated in writing by the Seller to the Company, within ten (10) days of such approval or rejection, as follows: -

(i) In the event of approval, the Seller shall explicitly state the sum payable by the Seller to J&K Bank as agreed between the Seller and J&K Bank under the OTS terms.

(ii) In the event of rejection, the Seller shall explicitly state the entire outstanding amount payable by the Seller as on that date to J&K Bank to close the Loan Facility.

(d) The Parties agree that if the J&K Bank does not render a final decision upon the Loan Settlement Application within Ninety (90) of the issuance of the Loan Settlement Application, then it will constitute Seller's failure to obtain Necessary Permissions under Clause 12 of this Agreement.

(e) Notwithstanding the above and with the prior consent of the Company in writing, the Seller may request the J&K Bank to settle the entire Outstanding Amount of the Loan Facility.

**4. SALE CONSIDERATION TO BE PAID IN INSTALMENTS:**

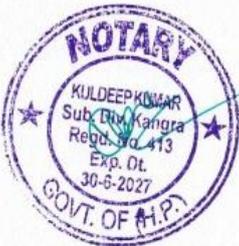
(a) The total Sale Consideration shall be payable in five (5) instalments, in the manner specified below.

(b) All the instalments payable by the Company to the Seller shall be transferred vide Real Time Gross Settlement (RTGS) Transfer in the Seller's Bank Account detailed in **Schedule II** of this Agreement

For Angus Dundee India Private Limited  
Director

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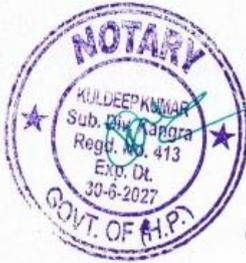
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**(c) First Instalment:**

- (i) Upon execution of this Agreement, the Company shall pay to the Seller as First Instalment a sum of Rs. 2,00,00,000/- (Rupees Two Crores Only).
- (ii) The entire First Instalment shall be deposited by the Seller with J&K Bank along with the Loan Settlement Application to be submitted with J&K Bank as per Clause 3 of this Agreement.
- (iii) Any additional payment, charges, or fees payable to J&K Bank along with the Loan Settlement Application shall solely be borne by the Seller.



**(d) Second Instalment:**

- (i) Upon acceptance of the Loan Settlement Application by J&K Bank, the Company shall pay to the Seller as Second Instalment a sum of Rs. 13,00,00,000/- (Rupees Thirteen Crores Only) or any other sum as agreed between the Seller and J&K Bank under the OTS terms and payable by the Seller to J&K Bank pursuant to the OTS terms ("**OTS Amount**").
- (ii) In the event of rejection of the Loan Settlement Application by J&K Bank, the Company shall pay to the Seller as Second Instalment a sum equivalent to the entire outstanding amount of the Loan Facility as on the date of payment of the Second Instalment ("**Outstanding Amount**").
- (iii) The Second Instalment shall be utilized by the Seller to repay the entire Loan Facility and to close the Loan Facility for releasing the mortgage over the Scheduled Land in terms of Clause 6 of this Agreement.

**(e) Third Instalment:**

Upon closure of the Loan Facility and release of the mortgage over the Scheduled Land, and at the time of filing an application

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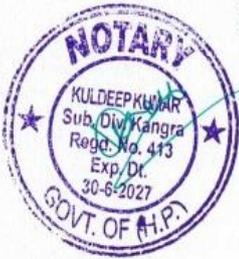
Angus Dundee India Private Limited  
Sangeet Par  
Director

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to obtain permission under Section 118 of the Himachal Pradesh Tenancy and Land Reforms Act, 1972, the Company shall pay to the Seller a sum of Rs. 4,00,00,000/- (Rupees Four Crores Only) as the Third Instalment.

**(f) Fourth Instalment:**



(i) Upon closure of the Loan Facility ; release of mortgage over the Scheduled Land ; issuance of permission under Section 118 of the Himachal Pradesh Tenancy and Land Reforms Act, 1972, and at the time of applying to the MOFPI for issuance of an NOC to withdraw from the MOFPI Agreement, the Company shall pay to the Seller a sum of Rs. 12,00,00,000/- (Rupees Twelve Crores Only) as the Fourth Instalment.

(ii) The Fourth Instalment shall be utilized by the Seller to refund the Grant received by the Seller from MOFPI under the MOFPI Agreement, along with applicable interest. Upon making this payment, the Seller shall obtain the NOC from the MOFPI.

(iii) Over and above the Fourth Instalment, any short fall in the amount due to MOFPI by the Seller shall solely be borne by the Seller.

**(g) Fifth Instalment:**

(i) Upon obtaining all Necessary Permissions as stated in Clause 11 of this Agreement and at the time of execution of the Sale Deed, the Company shall pay to the Seller a sum of Rs. 4,00,00,000/- (Rupees Four Crores Only) as the Fifth Instalment.

(ii) The Fifth Instalment shall be the final instalment of the Sale Consideration, and thereafter the Company shall not be liable to pay to the Seller any further amounts towards the Sale Consideration.

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Kangra (H.P.)

For Angus Dundee India Private Limited

*Sandeep Kumar*

Director

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**5. TERM:**

This Agreement shall commence on the date of execution by both Parties ("**Effective Date**") and shall continue until the execution of the Sale Deed, unless terminated earlier.

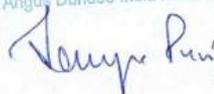
**6. RELEASE OF MORTGAGE OVER SCHEDULED LAND:**

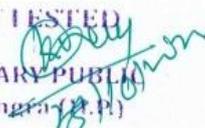
- (a) After receiving the Second Instalment, the Seller shall pay to J&K Bank the OTS Amount or the Outstanding Amount to close the Loan Facility and to release J&K Bank's mortgage over the Scheduled Land.
- (b) Upon payment of the OTS Amount or the Outstanding Amount and closure of the Loan Facility, the Seller shall obtain from J&K Bank the title deeds of the Scheduled Land along with a No Dues Certificate.
- (c) In addition to above, the Seller shall take all ancillary and administrative steps to release J&K Bank's mortgage over the Scheduled Land.
- (d) The Seller undertakes to release J&K Bank's mortgage over the Scheduled Land, within sixty (60) days of the receipt of the Second Instalment.

**7. HANDING OVER OF TITLE DEEDS:**

- (a) Within ten (10) days of the release of the title deeds of the Scheduled Land by J&K Bank, the Seller shall hand over the title deeds of the Scheduled Land to the Company.
- (b) The title deeds of the Scheduled Land shall act as a security against the refund (under Clauses 12 and 13 of this Agreement) of the Instalment amounts paid by the Company to the Seller under Clause 4 of this Agreement for the purchase of the Scheduled Land.

For Angus Dundee India Private Limited

  
Director

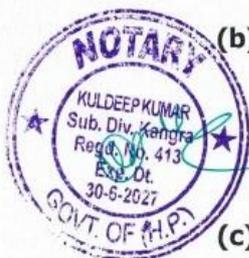
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Kangra (H.P.)

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## 8. SALE DEED:

- (a) The Seller agrees to put the Company in absolute and vacant possession of the Scheduled Land after executing the Sale Deed. The Parties shall register the Sale Deed with the jurisdictional office of the Sub-Registrar, Kangra, District Kangra, Himachal Pradesh.
- (b) The Parties herein covenant to complete the sale transaction of the Scheduled Land and to execute the Sale Deed within thirty (30) days of receipt of all Necessary Permissions. Subject to receipt of Necessary Permissions, the Parties shall execute the absolute Sale Deed by 31.12.2025.
- (c) Upon execution of the Sale Deed, the sale transaction shall be concluded and the clear and marketable title of the Scheduled Land shall be conveyed to the Company. Thereafter, the Scheduled Land shall vest with the Company.
- (d) Upon execution of the Sale Deed, the Seller shall provide and hand over to the Company all the originals title documents pertaining to the Scheduled Land.
- (e) After the execution of the Sale Deed, no right, title, or interest in any nature whatsoever of the Seller shall remain in the Scheduled Land. The Company shall have the absolute discretion to use, transfer, and / or encumber the Scheduled Land without the interference of the Seller.
- (f) After the execution of the Sale Deed, the Company shall have the absolute right to mutate the Scheduled Land (either in its own name or in the name of its nominees) in the records of all concerned government departments. In this regard and if required, the Seller shall be obligated to provide to the Company NOCs explicitly stating that the Seller has no objection to such mutation.



## 9. NO OTHER AGREEMENTS:

The Seller confirms that the Seller has not entered into any agreement to sell the Scheduled Land with any other persons, and

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Kangra (H.P.)

For Angus Dundee India Private Limited

*Sanjay Puri*

Director

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*[Signature]*



the Seller has not otherwise either orally or in writing agreed to sell the Scheduled Land (either whole or in part) to any third parties / third persons. Any violation of this clause shall constitute an 'event of default' under this Agreement.

#### 10. DEALING WITH THE SCHEDULED LAND:



- (a) The Seller warrants that the Seller shall not do any act or execute any deed to create any charge, mortgage, lien, encumbrance over the Scheduled Land in favour of any person, during the subsistence of this Agreement.
- (b) The Seller agrees and warrants that during the subsistence of this Agreement the Seller shall undertake all such acts and deeds that are necessary and requisite to convey the absolute marketable title of the Scheduled Land in favour of the Company.

#### 11. NECESSARY PERMISSIONS:

- (a) Upon receiving the First Instalment, the Seller shall be solely responsible for obtaining the approval of the Loan Settlement Application.
- (b) Upon receiving the Second Instalment, the Seller shall be solely responsible to release J&K Bank's mortgage over the Scheduled Land and to obtain a No Dues Certificate from J&K Bank.
- (c) Upon receiving the Third Instalment, the Seller shall be solely responsible to obtain all permissions / NOCs under Section 118 of the Himachal Pradesh Tenancy and Land Reforms Act, 1972, as required by the Parties to execute the Sale Deed.
- (d) Upon receiving the Fourth Instalment, the Seller shall be solely responsible to obtain the NOC from MOFPI to withdraw from the MOFPI Agreement, as required by the Parties to execute the Sale Deed.
- (e) The Seller shall be responsible to obtain all other statutory permissions or NOCs pertaining to the Scheduled Land, including but not limited to, statutory permissions or NOCs from

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Kangra (H.P.)

For Angus Dundee India Private Limited

*[Signature]*

Director

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*[Signature]*



the electricity department, water department, gas department, gram panchayat, or any other department that exercises any kind of jurisdiction over the Scheduled Land. Any payment, charges, fees, payable to obtain the above statutory permissions or NOCs shall solely be borne by the Seller.

(f) The Company shall: -



(i) obtain environment clearances and licenses from the government departments for the intended use of Scheduled Land, particularly for the purpose of constructing and operating a distillery.

(ii) The Seller undertakes to provide all such assistance and documents as may be required by the Company to obtain the above permissions.

(g) Unless otherwise specified in this Agreement, the Necessary Permissions shall be obtained within a reasonable time period. The Necessary Permissions shall be obtained within Three Hundred and Sixty Five(365) days of the Effective Date of this Agreement.

(h) Approval or rejection of a Necessary Permission, as the case may be, shall be intimated in writing to the other Party, within ten (10) days of such approval or rejection.

## 12. FAILURE TO OBTAIN NECESSARY PERMISSIONS:

(a) The present clause applies to all Necessary Permissions to be obtained by the Seller under Clauses 11 (a) to 11 (e) of this Agreement.

(b) In the event the Seller is unable to obtain the Necessary Permissions within Three Hundred and Sixty Five (365) days of the Effective Date of this Agreement (or within such other time period specified in this Agreement), or if any Necessary Permission is rejected, then the Seller shall refund to the Company all amounts paid by the Company to the Seller under this Agreement along with interest at eight percent (8%) per

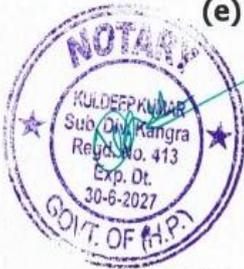
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For Angus Dundee India Private Limited  
Director

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annum computable from the date of payment of the concerned instalment by the Company to the Seller.

- (c) Upon failure of obtaining any of the Necessary Permissions, the Company shall, vide a notice, call upon the Seller to refund to the Company all amounts payable under Clause 12 (b) of this Agreement.
- (d) Within thirty (30) days of the issuance of the above notice, the Seller shall refund to the Company all amounts payable under Clause 12 (b) of this Agreement.
- (e) If the amounts are not refunded by the Seller to the Company within the timeline prescribed in Clause 12 (d) above, then the Seller shall sell the Schedule Land to any third party purchaser. The sale shall be made at a minimum reserve price that shall be equal to or more than the amount of refund (with applicable interest) to be refunded by the Seller to the Company under Clause 12 (b) of this Agreement.
- (f) The proceeds of the sale realised under Clause 12 (e) of this Agreement shall be utilized by the Seller to refund to the Company all amounts (including interest) payable by the Seller to the Company under Clause 12 (b) of this Agreement.
- (g) In the event the Seller is unable to refund the amount payable under Clause 12 (b) within the timeline prescribed under Clause 12 (d) of this Agreement and / or if the Seller is unable to sell the Scheduled Land, then the Seller shall refund to the Company all amounts payable under Clause 12 (b) of this Agreement by selling the Seller's other immovable property as described in **Scheduled III** of this Agreement.
- (h) The Seller shall refund to the Company all amounts under Clause 12 (b) of this Agreement within 6 (six) months of the issuance of the notice under Clause 12 (c) of this Agreement.
- (i) The Seller unequivocally agrees to refund the entire amount to the Company (with interest) within the prescribed timeline, notwithstanding and irrespective of the reason(s) for the failure to obtain Necessary Permissions.



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Kangra (H.P.)

For Angus Dundee India Private Limited

Director

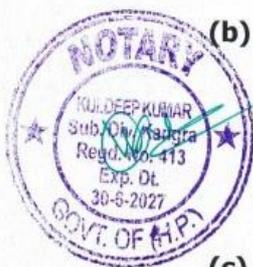
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- (j) The Seller's failure or inaction to perform its obligation set forth in the sub-clauses above shall constitute an 'event of default' under Clause 24 (a) of this Agreement.

**13. FAILURE TO OBTAIN ENVIRONMENT CLEARANCES:**

- (a) The present clause only applies to the Necessary Permissions, being environment clearances and licenses to be obtained by the Company, under Clause 11 (f) of this Agreement.
- (b) In the event the Company is unable to obtain the Necessary Permissions within Three Hundred and Sixty Five (365) days of the Effective Date of this Agreement, or if any Necessary Permission is rejected, then the Seller shall refund to the Company all amounts paid by the Company to the Seller under this Agreement (without any interest).
- (c) Upon failure of obtaining any of the Necessary Permissions, the Company shall, vide a notice, call upon the Seller to refund to the Company all amounts payable under Clause 13 (b) of this Agreement.
- (d) Within thirty (30) days of the issuance of the above notice, the Seller shall refund to the Company all amounts payable under Clause 13 (b) of this Agreement.
- (e) If the amounts are not refunded by the Seller to the Company within the timeline prescribed in Clause 13 (d) above, then the Seller shall sell the Schedule Land to any third party purchaser. The sale shall be made at a minimum reserve price that shall be equal to or more than the amounts to be refunded by the Seller to the Company under Clause 13 (b) of this Agreement.
- (f) The proceeds of the sale realised under Clause 13 (e) of this Agreement shall be utilized by the Seller to refund to the Company all amounts payable by the Seller to the Company under Clause 13 (b) of this Agreement.



For Angus Dundee India Private Limited  
ATTESTED  
NOTARY PUBLIC  
Kangra (H.P.)  
Director

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- (g) In the event the Seller is unable to refund the amount payable under Clause 13 (b) within the timeline prescribed under Clause 13 (d) of this Agreement and / or if the Seller is unable to sell the Scheduled Land, then the Seller shall refund to the Company all amounts payable under Clause 13 (b) of this Agreement by selling the Seller's other immovable property as described in **Scheduled III** of this Agreement.
- (h) The Seller shall refund to the Company all amounts under Clause 13 (b) of this Agreement within 6 (six) months of the issuance of the notice under Clause 13 (c) of this Agreement.
- (i) The Seller unequivocally agrees to refund the entire amount to the Company within the prescribed timeline, notwithstanding and irrespective of the reason(s) for the failure to obtain Necessary Permissions.
- (j) The Parties agree that even if the failure to obtain the Necessary Permissions is attributable to the Company, then also the Seller shall refund to the Company all amounts under Clause 13 (b) of this Agreement.
- (k) The Seller's failure or inaction to perform its obligation set forth in the sub-clauses above shall constitute an 'event of default' under Clause 24 (a) of this Agreement.

#### 14. STATUTORY DUTIES:

It is agreed between the Parties that expenses towards stamp duty and registration, if any, shall be borne solely by the Company.

#### 15. SPECIFIC PERFORMANCE:

It is agreed between the Parties that both the Parties are entitled to enforce specific performance of this Agreement against each other in case of breach of any conditions mentioned in this Agreement.

For Angus Dundee India Private Limited

*Sanjay Punj*

Director

ATTESTED  
*[Signature]*  
NOTARY PUBLIC  
Kangra (H.P.)

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**16. CONFIDENTIALITY:**

Both the Parties agree to maintain confidentiality of the terms of this Agreement and any negotiations related to the sale of the Scheduled Land.

**17. BINDING EFFECT:**

This Agreement shall be binding and inure to the benefit of the Parties and their respective successors and assignees.

**18. DISPUTE RESOLUTION AND GOVERNING LAW:**

- (a) Any dispute arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination, shall be referred to and finally resolved by arbitration under the Arbitration and Conciliation Act, 1996.
- (b) The number of arbitrator shall be one.
- (c) The seat of arbitration shall be at New Delhi. The venue of the arbitration shall be New Delhi.
- (d) The language of the arbitration shall be English. The governing law of the Agreement shall be the substantive law of India.

**19. ENTIRE AGREEMENT:**

This Agreement along with **Appendix I** (Description of Scheduled Land), **Appendix - II** (Board Resolution), **Schedule I** [Details of the Scheduled Land, Building (Built Up), and Machinery], **Schedule II** (Seller's Bank Account), and **Schedule III** (List of Seller's other Immovable Property) constitutes the entire agreement between the Parties and supersedes all prior agreements and understandings whether written or oral relating to the subject matter of this Agreement.

For Angus Dundee India Private Limited  
*Deepu Rani*  
Director

ATTESTED  
*[Signature]*  
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Kangra (H.P.)

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**20. ASSIGNMENT:**

No Party shall be entitled to assign or otherwise deal with this Agreement or any right under this Agreement without the prior written consent of the other Party.

**21. SEVERABILITY:**

In the event that any provision of this Agreement or portion thereof is found to be invalid or unenforceable by a court of competent jurisdiction or arbitral tribunal, then the remaining provisions or portions of this Agreement shall remain in full force or effect. Further, if a provision or portion of this Agreement is deemed invalid or unenforceable due to the scope thereof or for any other reason, then the provision or portion thereof shall be effective to the maximum extent permitted by law.

**22. SIGNATURES:**

This Agreement may be executed in counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument. The Parties may enter into this Agreement by signing any such counterpart.

**23. AMENDMENT:**

No amendment or modification of any provisions of this Agreement shall be effective unless the same is in writing and signed by each of the Parties.

**24. TERMINATION UPON EVENT OF DEFAULT:**

- (a) This Agreement shall be terminated at the instance of either Party in the event the Parties / each Party fail(s) to comply with the obligations set forth in this Agreement, within the timelines prescribed in this Agreement. Such a failure shall constitute an "Event of Default".
- (b) If the Event of Default is on part of the Seller, then as a consequence of termination the Seller shall refund to the

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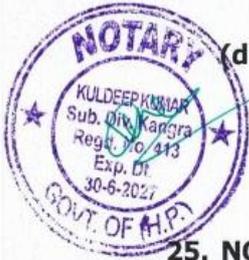
For Angus Dundee India Private Limited  
Director

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Company the amounts payable by the Company to the Seller under this Agreement, along with applicable interest.

(c) If the Event of Default is on part of the Company, then the Company shall pay to the Seller the administrative expenses borne by the Seller in respect of and in relation to this Agreement.



(d) Any termination shall be in writing and by way of a formal notice. The notice shall explain the reasons for termination and shall state the necessary particulars of the Event of Default. This notice shall be issued within thirty (30) days of the occurrence of the Event of Default.

## 25. NOTICES:

Any notice between the Parties shall be in writing and shall be transmitted by electronic email or by a nationally recognized courier service, in the manner as elected by the Party giving such notice to the following addresses:

### In the case of the Seller:

Address: Great Himalayan Resort, Bhagsunag, Mcleodganj, Bhagsunag Road, PO Bhagsunag, Tehsil Dharamshala, District, Kangra, Himachal Pradesh – 176219, India.

Attention: Mr. Madan Lal Kapoor

Email: [ghfoodpark@gmail.com](mailto:ghfoodpark@gmail.com)

Phone No: 92051-29900 ; 98050 - 26447

### In the case of the Company / Purchaser:

Address: 127, DLF Galleria Mall, Mayur Vihar, Extension, New Delhi – 110091, India.

Attention: Mr. Sanjeev Kumar Puri

Email: [spuri@angusdundee.co.uk](mailto:spuri@angusdundee.co.uk)

Phone No: 98100 – 18896

For Angus Dundee India Private Limited

Director

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**IN WITNESS THEREOF**, the Parties have executed, or caused their duly authorized representative to execute this Agreement, as on the Effective Date:

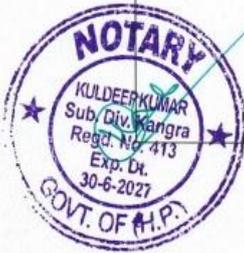
**SIGNED AND DELIVERED** by **MR. MADAN LAL KAPOOR** as the Seller:

**SIGNED AND DELIVERED** by **ANGUS DUNDEE INDIA PVT LTD.** as the Purchaser / Company by its authorized signatory **MR. SANJEEV KUMAR PURI**

Director

**Witnesses: -**

Sr. No.	Name with Full Residential Address and AADHAR No.	Signature
1.	Sanjeew Singh Rana Sto Late Shri Dharm Singh Rana. V. P.O. Ch Langyani Teh Dinala Distt Kangra(H.P) A.No 279039618599 PIN No 176218	
2.	Luna Singh Bisti 151/61-6/P-1, Block-A, Andraprastha Colony, Akhatpura, BURAR, Kangra - 170084 559233496444	



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Kangra (H.P.)  
28/10/2022

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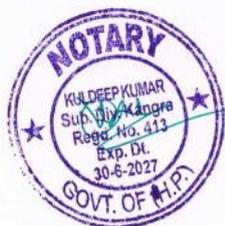


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			02-89-98 02-44-45 00-58-26 00-02-49 00-02-41 00-02-25	02-89-98 02-44-45 00-58-26 00-02-49 00-02-41 00-02-25	SSC/LMK (Khanpura Ward No. 15) Teh. District Kangra (H.P.) ID-501002 Mobile : 973607710 Date:		

Certified that this copy has been generated from the database of Revenue Department at  
 Central Server- HP as accessed by the Lok Mitra Kendra 242676160012 on  
 17-September-2024  
 दिनांक: 17-Sep-2024

To Verify: enter the Copy No above Bar Code at  
<https://himhioomlink.nic.in>  
 For Validity Refer: Notice No:RevC/P/10-1/2009 Dated 14-Feb-2011  
 दिनांक: 17-Sep-2024

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**SCHEDULE II – SELLER’S BANK ACCOUNT**

Sr. No.	Particulars	Details
1.	Bank and Branch	Canara Bank, Kotwali Bazar Dharamshala, Tehsil Dharamshala, District Kangra H.P.
2.	Name of Payee	Mr Madan Lal Kapoor
3.	Account No.	127000825471
4.	IFSC Code	CNRB0002062
5.	Amount	2,00,00,000/- (Rs Two Crore Only)
6.	RTGS No	HSBCN24302125788
7.	Dated	28.10.2024.

*(Handwritten signature)*

NOTARY PUBLIC  
Kangra (H.P.)

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**SCHEDULE III – LIST OF SELLER’S OTHER IMMOVABLE PROPERTY**

50% of the share of Khata No 85, khatoni No. 262 khasra No 1459 to 1468 having total area of 7984.48 sqmtr (50% share 3992.24 sqmtr) situated at Great Himalayan Resort, Mohal Bhagsunag, MCleodganj, Tehsil Dharamshala, District Kangra H.P. in the name of Mr Madan Lal Kapoor, S/o Late Sh Ranjha Ram, as per jamabandi for the year 2011-12.

For Angus Dundee India Private Limited

Director

ATTESTED  
NOTARY PUBLIC  
Kangra (H.P.)  
25/10/17

26 of 26



**SCHEDULE I – DETAILS OF THE SCHEDULED LAND, BUILDING (BUILT UP), AND MACHINERY**

Sr. No.	Particulars	Amount (in Rs.)
1	Land (3.45.29 Hectares)	7,05,00,000
2*	Building (Build up)	27,49,23,087
3	Machinery (as per last audited balance sheet of M/s Great Himalayan Farm Fresh)	45,76,913
	<b>Total</b>	<b>35,00,00,000</b>

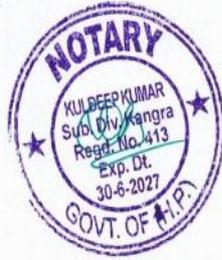
2\* Build Up Area 211888 square feet along with retaining wall and Build Up Road 900 meters

For Angus Dundee India Private Limited

*[Handwritten Signature]*  
Director



ATTESTED  
*[Handwritten Signature]*  
NOTARY PUBLIC  
Kangra (H.P.)  
28/10/2024



Angus Dundee  
INDIA PVT LTD

EXTRACT OF THE RESOLUTION PASSED IN THE MEETING OF THE BOARD OF DIRECTORS OF ANGUS DUNDEE INDIA PVT. LTD HELD AT 10<sup>TH</sup> DAY OF JUNE, 2024 AT THE REGISTERED OFFICE OF THE COMPANY AT 127, DLF GALLERIA MALL, MAYUR VIHAR EXTENSION, NEW DELHI – 110091, INDIA.

“FURTHER RESOLVED THAT the Company is purchasing land parcel comprising of Khata No. 4, Khatauni No. 5 & 6, Khasra Nos. 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, and 92 admeasuring 3.45.29 Hectares (plus 0.44.12 Hectares that has been leased of road), situated at Mohal Parei, Patwar Circle, Salol, Tehsil Kangra, District Kangra, Himachal Pradesh, India (“Land Parcel”) for the purposes of building, commissioning, and operating a distillery.”

“FURTHER RESOLVED THAT the Company may require entering into and executing a Memorandum of Understanding, Agreement to Sell, Sale Deed, or any other such agreement(s) for the purposes of purchasing the Land Parcel, or may need to apply for any permissions / licenses, either jointly or on its own, for the purposes of purchasing the Land Parcels.”

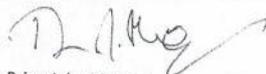
“FURTHER RESOLVED THAT the Company may require entering into and executing various agreements, such as purchase agreements, supply agreements, vendor agreements, distributions agreements, or any other agreements for the purposes of building, commissioning, and operating a distillery on the Land Parcel. Further, the Company may require to apply for and obtain permissions / licenses for the purposes of building, commissioning, and operating a distillery on the Land Parcel.”

“FURTHER RESOLVED THAT Mr. Sanjeev Kumar Puri, Regional Director of the Company (DIN - 01038503), be and is hereby authorized to enter into and execute on behalf of the Company all such agreements or apply for and obtain all such permissions / licenses for purchasing the Land Parcel; and enter into and execute all such agreements or apply for and obtain all such permissions / licenses for the for the purposes of building, commissioning, and operating a distillery on the Land Parcel. Further, Mr. Sanjeev Kumar Puri is further authorized to do all such acts, deeds, or things as may be necessary and proper for the purposes mentioned above, including appointment of attorneys, signing necessary documents, and further delegation of all such powers for performing all such acts, deeds, or things, as may be necessary for the purposes mentioned above.

Dated this 10<sup>th</sup> day of June 2024

Certified True Copy

For Angus Dundee India Pvt. Ltd.

  
Brian John Megson

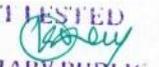
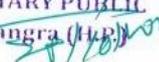
DIN - 03618441

Angus Dundee India Private Limited  
Regd. Office: 127 DLF Galleria District Centre  
Mayur Vihar, Phase-1, Delhi-110091.  
P: +91 11 4241 8896/4301 1406  
F: +91 11 4244 8896

For Angus Dundee India Private Limited

  
Director

CIN: U15511DL2012FC230186  
PAN: AAKCA1819Q

ATTESTED  
  
NOTARY PUBLIC  
Kangra (H.P.)  




Company Master Data

**Company Master Data**

CIN	U15511DL2012FTC230186
Company Name	ANGUS DUNDEE INDIA PRIVATE LIMITED
ROC Code	RoC-Delhi
Registration Number	230186
Company Category	Company limited by Shares
Company SubCategory	Subsidiary of Foreign Company
Class of Company	Private
Authorised Capital(Rs)	20000000
Paid up Capital(Rs)	13013090
Number of Members(Applicable in case of company without Share Capital)	0
Date of Incorporation	18/01/2012
Registered Address	Office No. 127,DLF Galleria District Centre Mayur Vihar Phase 1 New Delhi East Delhi DL 110092 IN
Address other than R/o where all or any books of account and papers are maintained	-
Email Id	spuri@angusdundee.co.uk
Whether Listed or not	Unlisted
ACTIVE compliance	ACTIVE compliant
Suspended at stock exchange	-
Date of last AGM	29/11/2021
Date of Balance Sheet	31/03/2021
Company Status(for efilng)	Active

Assets under charge	Charge Amount	Date of Creation	Date of Modification	Status
Floating charge; Creation of Lien on Fixed Deposit	10000000	28/01/2021	-	OPEN

**Directors/Signatory Details**

DIN/PAN	Name	Begin date	End date	Surrendered DIN
01038503	SANJEEV PURI	18/01/2012	-	
03618441	BRIAN JOHN MEGSON	18/01/2012	-	
03618444	AARON NICHOLAS HILLMAN	18/01/2012	-	
03618447	TANIA HILLMAN	18/01/2012	-	

For Angus Dundee India Private Limited  
*Sanjeev Puri*  
 Director

ATTESTED  
 NOTARY PUBLIC  
 Kangra (H.P.)  
*28/10/2024*

NOTARY PUBLIC  
 KANGRA (H.P.)  
*28/10/2024*

Sr. No. 4352 Date: 28.10.2024  
 Certified that the Contents of this Document have been read over and explained to the deponent/executor who admitted the same to be correct.

<https://www.mca.gov.in/mcafoportal/companyLLPMasterData.do>

1/1





**भारतीय विशिष्ट पहचान प्राधिकरण**  
**भारत सरकार**  
Unique Identification Authority of India  
Government of India



**E-Aadhaar Letter**

नामांकन क्रमांक/Enrolment No.: 1190/20104/00387

**Sanjeev Kumar Puri (संजीव कुमार पुरी)**  
S/O Rajinder Kumar Puri, FLAT NO. 46 POCKET - E,  
NEAR SANJAY PARK, MAYUR VIHAR PHASE - 2,  
Delhi, East Delhi,  
Delhi - 110091

Date: 08/03/2018

**सूचना**

- आधaar पहचान का प्रमाण है, नागरिकता का नहीं।
- पहचान का प्रमाण ऑनलाइन ऑथेंटिकेशन द्वारा प्राप्त करें।
- यह एक इलेक्ट्रॉनिक प्रक्रिया द्वारा बना हुआ पत्र है।

आपका आधaar क्रमांक/ Your Aadhaar No.:

**8136 7446 8303**



**आधaar-आम आदमी का अधिकार**

1947    help@uidai.gov.in    www.uidai.gov.in

Digitally signed by Sanjeev Kumar Puri  
Date: 2018.03.08 09:03:47 IST

- आधaar देश भर में मान्य है।
- आधaar के लिए आपको एक ही बार नामांकन दर्ज करवाने की आवश्यकता है।
- कृपया अपना नवीनतम मोबाइल नंबर तथा ई-मेल पता दर्ज कराएं, इससे आपको विभिन्न सुविधाएं प्राप्त करने में सहायित होगी।

- Aadhaar is valid throughout the country.
- You need to enroll only once for Aadhaar.
- Please update your mobile number and e-mail address. This will help you to avail various services in future.

**भारत सरकार**  
GOVERNMENT OF INDIA



संजीव कुमार पुरी  
Sanjeev Kumar Puri  
जन्म तिथि/ DOB: 10/09/1962  
पुरुष / MALE

8136 7446 8303

**भारतीय विशिष्ट पहचान प्राधिकरण**  
UNIQUE IDENTIFICATION AUTHORITY OF INDIA

**पता:**  
S/O राजिंदर कुमार पुरी,  
फ्लैट नं०. ४६ पॉकेट - ई,  
मजदीक संजय पार्क, मयूर  
विहार फेज - २, दिल्ली, पूर्वी  
दिल्ली,  
दिल्ली - 110091

**Address:**  
S/O Rajinder Kumar Puri, FLAT NO.  
46 POCKET - E, NEAR SANJAY  
PARK, MAYUR VIHAR PHASE - 2,  
Delhi, East Delhi,  
Delhi - 110091

8136 7446 8303

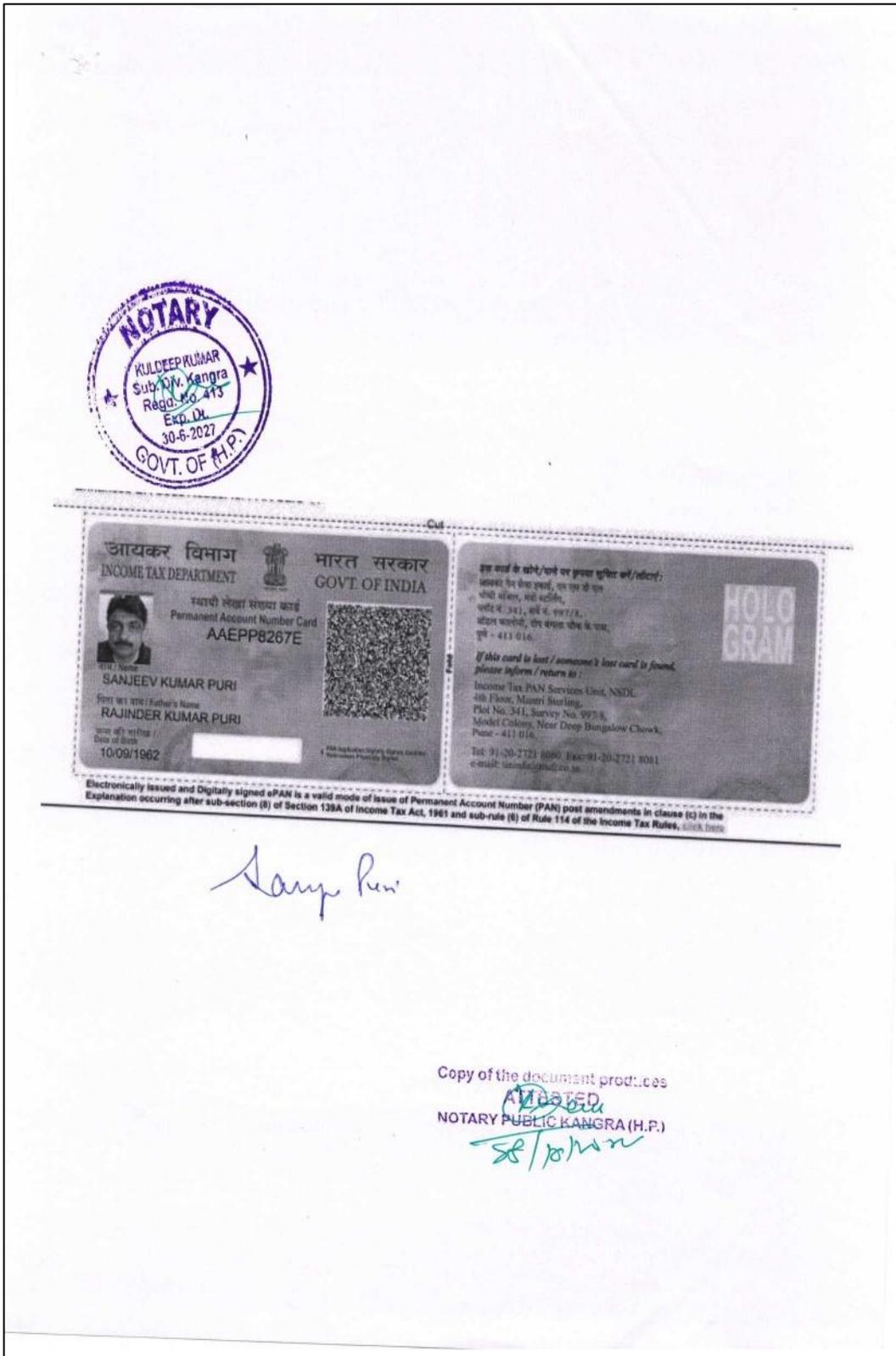
**आधaar-आम आदमी का अधिकार**    **Aadhaar-Aam Admi ka Adhikar**

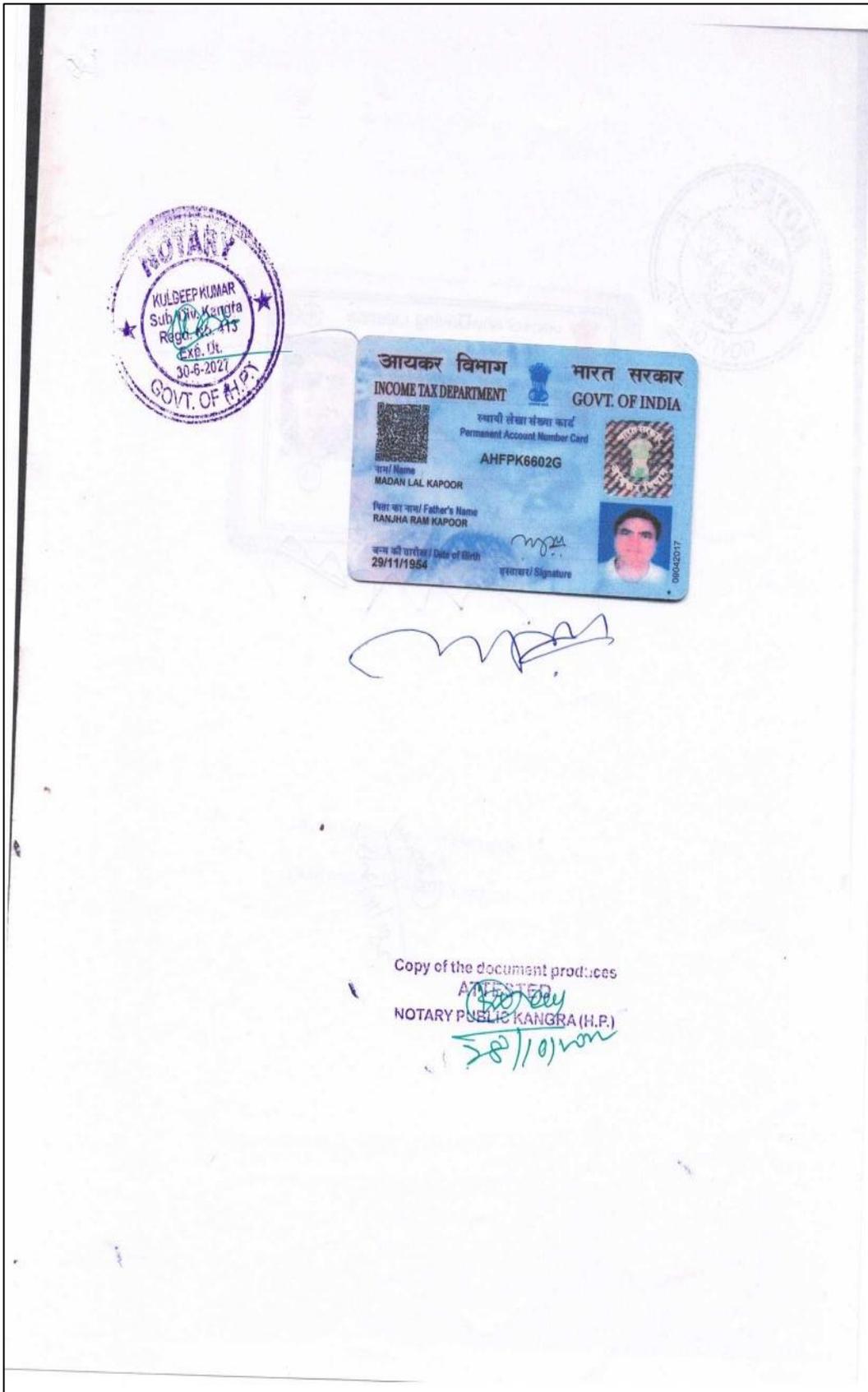
*Sanjeev Puri*

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**NOTARY PUBLIC KANGRA (H.P.)**

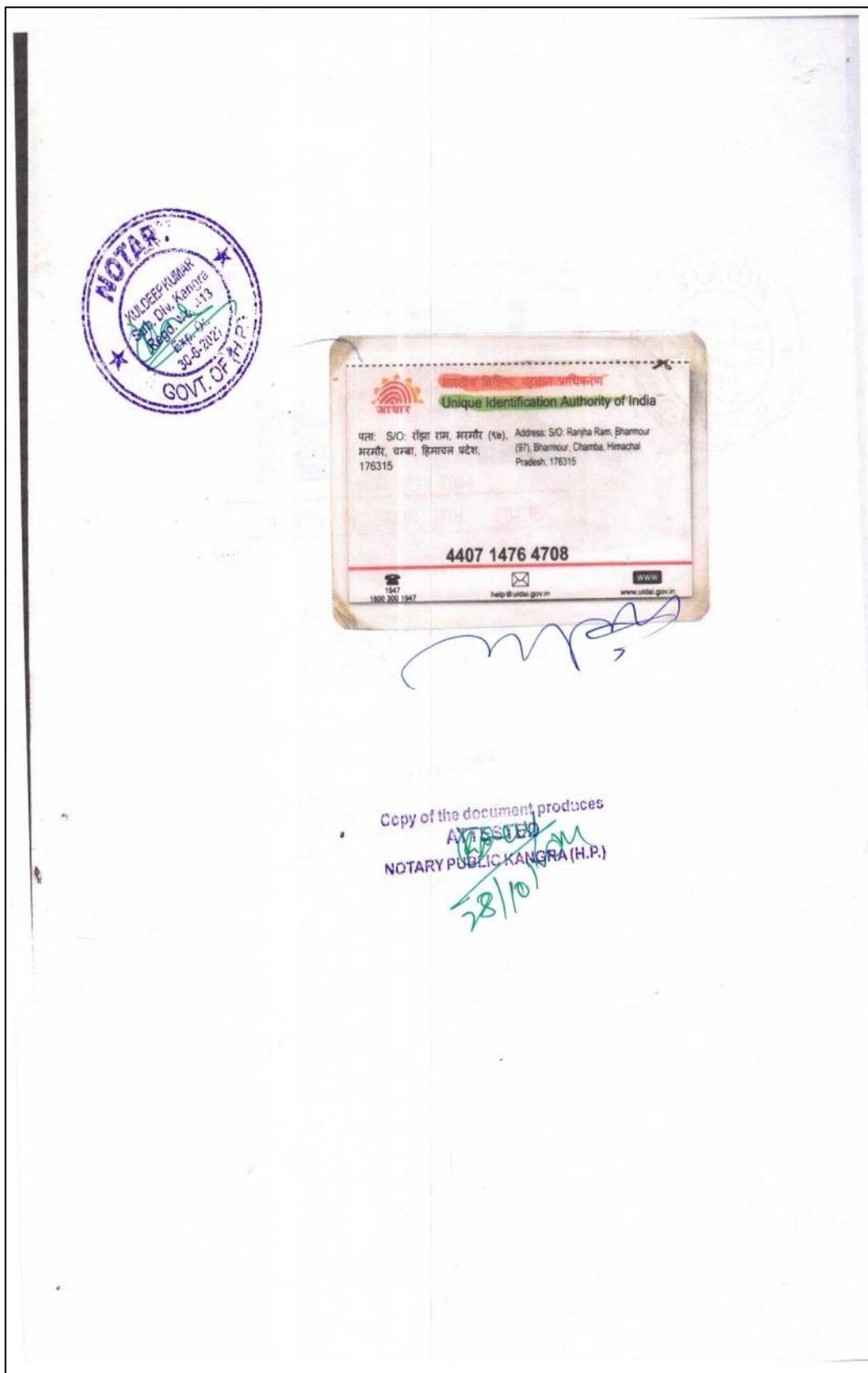
*28/03/2018*













**भारत सरकार**  
Unique Identification Authority of India  
Government of India

नामांकन क्रमांक/Enrolment No.: 1090/10936/00416

To: Sanjeev Singh Rana  
(संजीव सिंह राणा)  
S/O Late Shri Dharam Singh Rana  
V.P.O. Ghaniyara Teh. Dharamshala  
Thelr (378)  
Kangra  
Himachal Pradesh - 176218

Date: 23/03/2011



  
EY 04503276 8 IN Ref. No : 23032011-00221

आपका आधार क्रमांक / Your Aadhaar No. :  
**2790 3961 8599**

**आधार - आम आदमी का अधिकार**

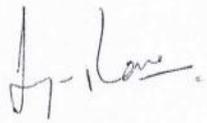
संजीव सिंह राणा  
Sanjeev Singh Rana



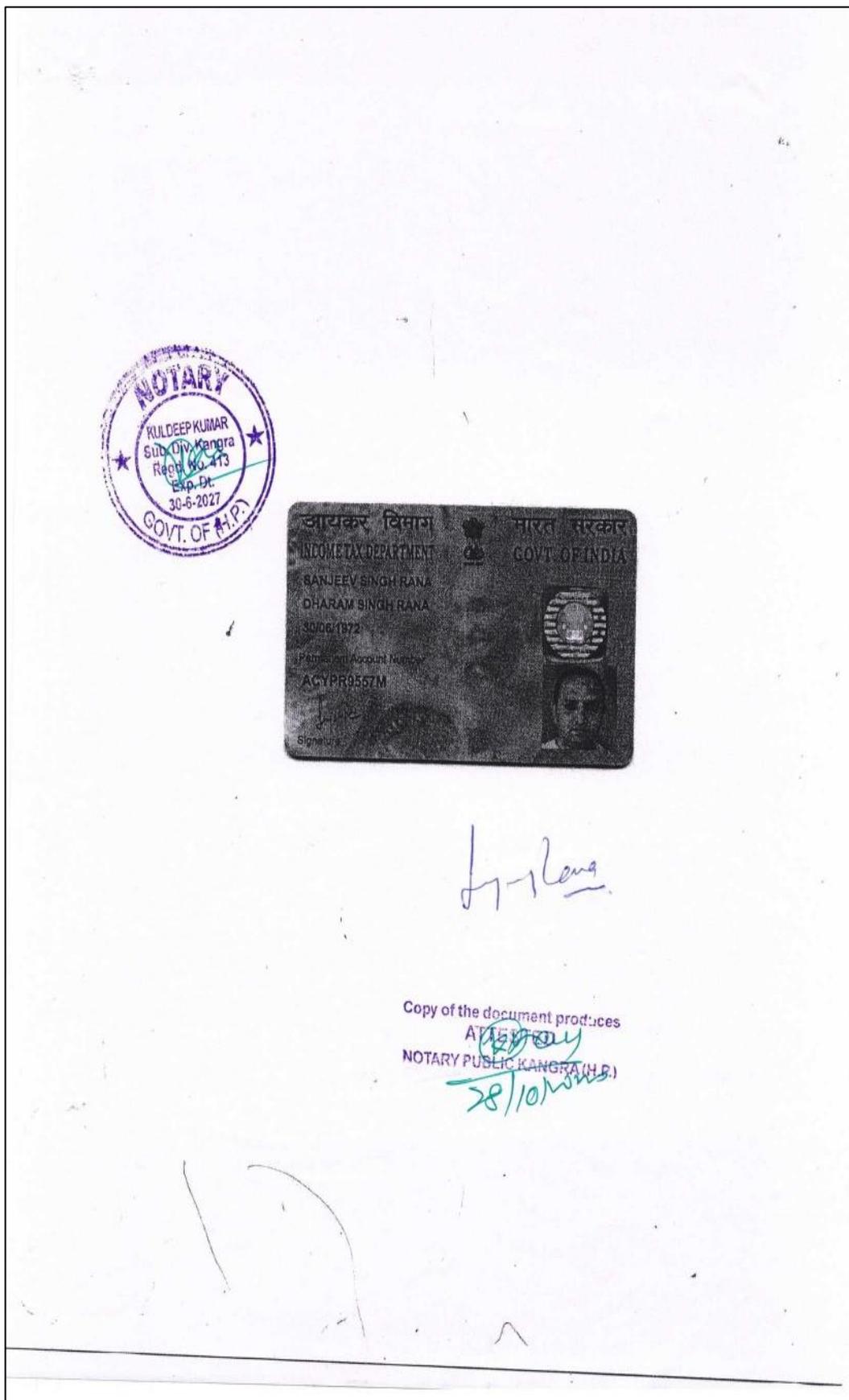
जन्म वर्ष / Year of Birth : 1972  
पुरुष / Male

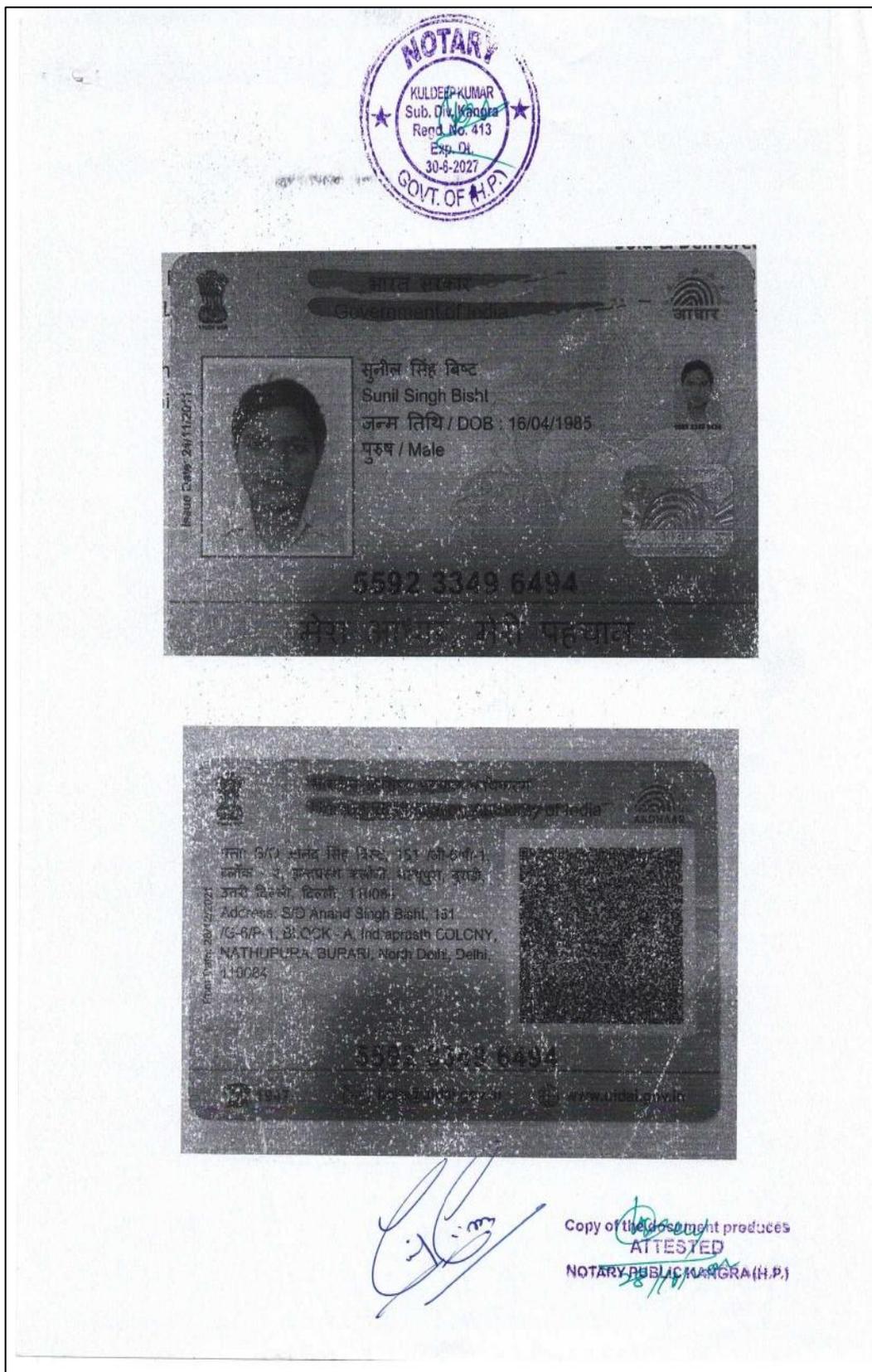
**2790 3961 8599** 

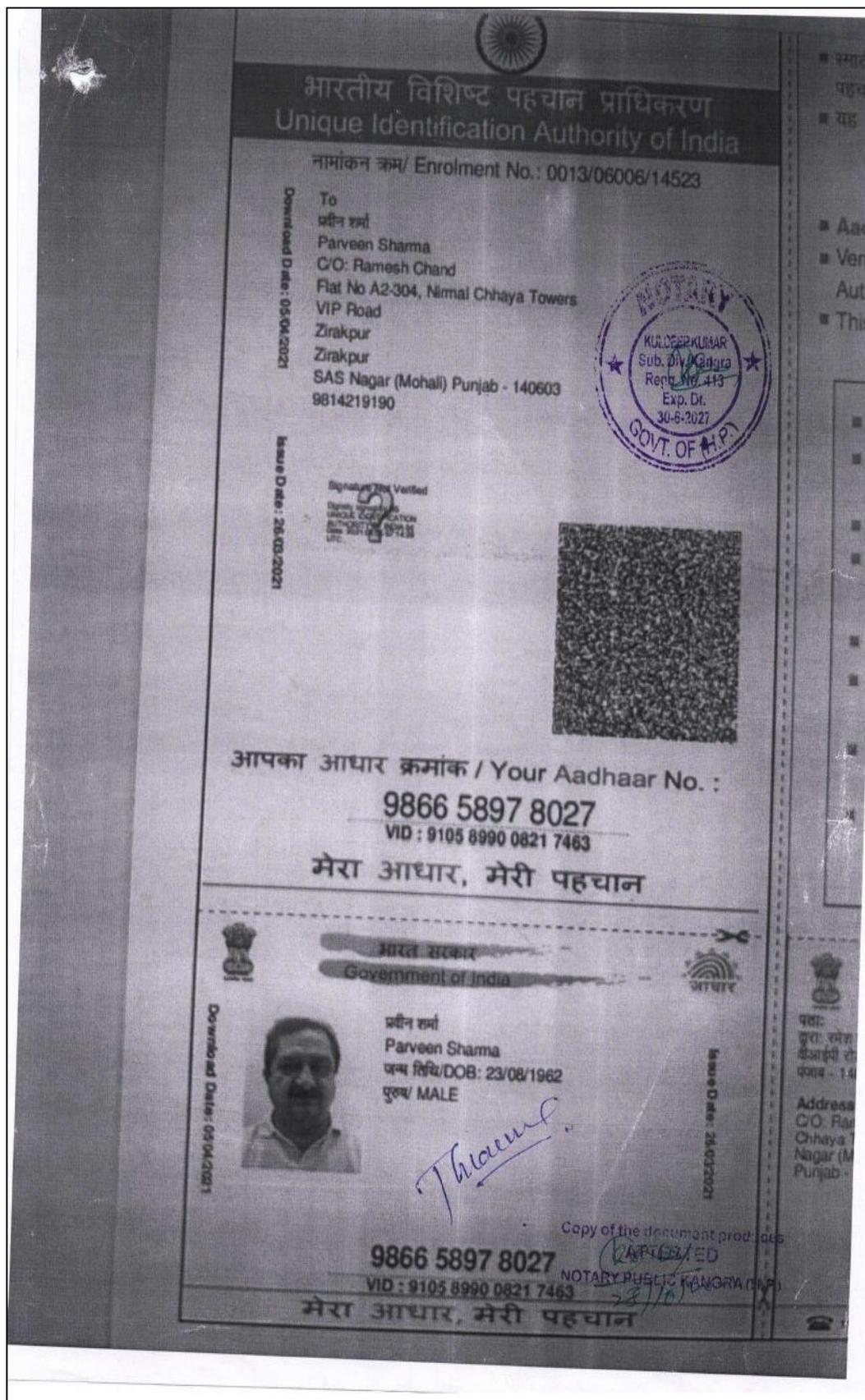
**आधार - आम आदमी का अधिकार**



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ATTACHED  
NOTARY PUBLIC KANGRA (H.P.)  

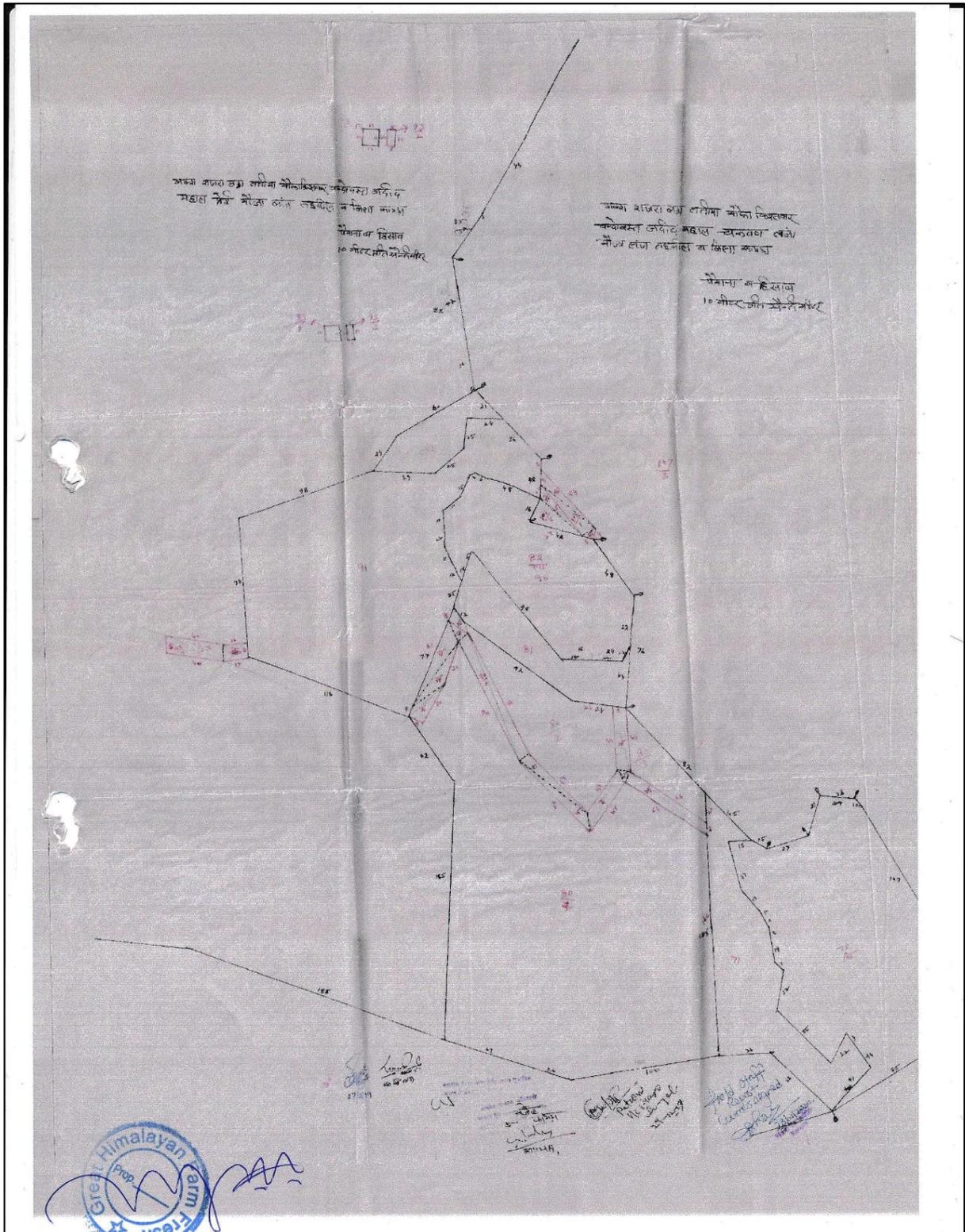






ANNEXURE-II

TATIMA





ANNEXURE III

MOA

THE COMPANIES ACT, 1956

(COMPANY LIMITED BY SHARES)

MEMORANDUM OF ASSOCIATION

OF

Angus Dundee India Private Limited

- I. The name of the Company is **Angus Dundee India Private Limited**.
- II. The Registered Office of the Company will be situated in the National Capital Territory of Delhi.
- III. The objects for which the Company is established are:
  - (A) **THE MAIN OBJECTS TO BE PURSUED BY THE COMPANY ON ITS INCORPORATION RE:-**
    1. To manufacture, brew, distil, blend, compound, prepare, process, render, potable or marketable all sorts of alcohol/ portable alcohol, spirits including but not limited to liquors, wines, Scotch whisky, beers and other related products.
    2. To carry on all or any of the business of merchants, sellers, buyers, distributors, manufacturers, promoters, warehouse, exporters, importers, packers, commission and selling agents, representative and shippers of and dealers in all sorts of alcohol, spirits, aerated and mineral waters and other drinks.



**(B) THE OBJECTS INCIDENTAL OR ANCILLARY TO THE ATTAINMENT OF THE MAIN OBJECTS ARE:-**

1. To purchase, take on lease, acquire, sell or dispose of properties movable or immovable or rights therein for the purposes of the Company.
2. To enter into, make and perform contracts of every kind and description, agreements and arrangements with any person, firm, association, corporation, corporate bodies, municipality, country, State, political body or government.
3. To buy, sell, exchange, alter, improve, prepare for market and otherwise deal in all kinds of plant, machinery, apparatus, tools, utensils, receptacles, substances, materials, articles and things, necessary or convenient for carrying on any of the above business or processes of the Company usually dealt in by persons engaged in the like business or processes.
4. To purchase, take on lease or license or in exchange hire or otherwise any real and/or personal property, and any rights or privileges which the Company may think necessary or convenient for the purpose of its business or which may enhance the value of any other property of the Company and in particular any land (free hold or other tenure) building easement, machinery, plant and stock-in-trade and on any houses or other structures for the works and purposes of the Company and to install machinery thereat.
5. To build, construct, maintain, enlarge, pull down, remove or replace, improve or develop and to work, manage and control any buildings, offices, factories, mills, foundries, refineries, furnaces, godowns, warehouses, shops, roads, ways, railways, tramways, or other means of transport, sidings bridges, reservoirs, dams, water courses, water systems, wharves, electrical works, gas works or works operated by any other kinds of power and to install all kinds of plant, machinery and works thereat.
6. To sell, let, lease, grant licenses, easements, and other rights over and in any other manner dispose of or deal with the whole or any part of the undertaking, property, assets, rights, effects, and businesses of the Company for such consideration as may be thought fit and in particular for rent or rents or stocks, shares or other obligations of any other company.
7. To amalgamate with or enter into partnership or any joint purpose or profit-sharing arrangement with or co-operate in any way with, or assist or subsidise,



13. To enter into any arrangements with any government or authority, imperial, supreme, municipal, local or otherwise or company that may seem conducive to the Company's objects or any of them and to obtain from any such government, authority or company any charters, contracts, decrees, rights, grants, loans, privileges or concessions which the Company may think desirable to obtain, and to carry out, exercise, and comply with the same.
14. To establish, provide, maintain and conduct any research and development activity or otherwise subsidise research laboratories and experimental workshops for scientific and technical research and experiments and to undertake and carry on with all scientific and technical researches, experiments and test of all kinds and to promote studies and research both scientific and technical, investigations and invention by providing, subsidising, endowing or assisting laboratories, workshop, libraries, lectures, meetings and conferences and by providing for the remuneration of scientific or technical professors or teachers and by providing for the award of exhibitions, scholarships, prizes and grants to students or otherwise and generally to encourage, promote and reward studies, researches, investigations, experiments, tests and inventions of any kind that may be considered likely to assist any of the business which the Company is authorised to carry on.
15. To grant donations, gratuities, pensions allowances, benefits, emoluments to any persons (including Director and other Officer) who are or shall have been at any time in the employment or services of the Company or of any company which is a subsidiary of the Company or of the predecessors in business of the Company or of any such subsidiary company or the wives, widows, families or dependants of any such persons, and to establish, subsidise, subscribe to or support institutions, associations, clubs, funds or trusts calculated to be for the benefit of any such persons as aforesaid or otherwise advance the interests and well-being of the Company or of any such other company as aforesaid or of its members, and to make payments for or towards the insurance of any such persons as aforesaid and subscriptions or guarantees of money for charitable or benevolent objects or for any exhibition or for any public, general or useful object, and to establish and contribute to any scheme for the purchase by trustees of shares of the Company to be held for the benefit of the Company's employees.
16. To refer or agree to refer any claim, demand, dispute or any other question by or against the Company in which the Company is interested or concerned and whether between the Company and the member or members or his or their representatives, or between the company and third parties to arbitration in India or



any company, firm or person carrying on, or proposing to carry on, any businesses within the objects of the Company.

8. To acquire and undertake on any terms and subject to any conditions, the whole or any part of the business, property and liabilities of any person or company, carrying on any business which the Company is authorised to carry on, or possessed or property suitable for the purposes of the Company.
9. To establish, promote, concur, or be interested in establishing or promoting any company or companies for the purposes of acquiring all or any of the property, rights and liabilities of the company or for any other purpose whatsoever and to transfer to any such company any property of this Company and to place or guarantee the placing of, underwrite, subscribe for or otherwise acquire all or any part of the shares, debentures or other securities of any such other company and to subsidise or otherwise assist any such other company.
10. To subscribe for, underwrite, purchase or otherwise acquire, and to hold dispose of and deal with the shares, stocks, securities and evidences or indebtedness or the right to participate in profits or other similar documents issued by any government, authority, corporation or body, or by any company or body of persons, and any options or rights in respect thereof and to buy and sell foreign exchange provided that the Company shall in no circumstances be empowered to carry on business as or act as stock and share brokers of any kind.
11. To pay for any rights or property acquired by the Company and to remunerate any person or company whether by cash payment or by allotment of shares, debentures or other securities of the Company credited as paid up in full or in part or otherwise.
12. To acquire, hold, use, sell, assign, lease, grant licenses in respect of mortgage, pledge or otherwise dispose of in India or any part of the world any patents, patent rights, licenses, privileges, inventions, improvements, and processes, copy rights, trade marks, trade names, concessions and formulae of any mixture or technology including any process or product whatsoever and apply for purchase or otherwise acquire and protect and renew in any part of the world any patents, patent rights, brevets invention, trade marks, designs, licenses, concessions and like, conferring any exclusive or non-exclusive or limited right to their use or any secret or other information as to any invention and to use, exercise, develop or grant licences in respect of or otherwise turn to account the property rights or information so acquired to expend moneys in experimenting upon, testing or improving any such patents, inventions and rights.



at any place outside India and to observe and perform and to do all acts, deeds, matters and things to carry out or enforce the awards or to challenge the same.

17. To pay all preliminary expenses of the Company and any company promoted by the Company or in any company in which this company is or may contemplate being interested, including in such preliminary expenses all or any part of the costs and expenses of owners of any business or property acquired of the Company.
18. To borrow or raise moneys or to receive moneys on deposit or loan at interest or otherwise in such manner as the Company may think fit and in particular by the issue of debentures (perpetual or otherwise) and convertible into shares of this or any other company or not and to secure the repayment of any such moneys borrowed, raised or received by mortgage, charge or lien upon all or an of the property, assets, or revenue of the Company (both present and future) including its uncalled capital and to give the lenders or creditors the power of sale and other powers as may seem expedient and to purchase, redeem or pay off any such securities and also by a similar mortgage, charge or lien to secure and guarantee the performance by the Company or other person, firm or company of any obligation undertaken by the Company or any other person, firm, or company as the case may be, but not to carry on banking business within the definition of Banking Regulation Act, 1949.
19. To lend money with or without security and to subsidise, assist and guarantee the payment of money by or the performance of any contract, engagement or obligation by any person or companies, and in support of such guarantee to mortgage or charge all or any part of the undertaking or property of the Company.
20. To give all descriptions of guarantees and indemnities.
21. To draw, make, accept, endorse, discount, execute and issue and negotiate bills of exchange, hundies, bills of lading, promissory notes, warrants, debentures and other negotiable or transferable instruments or securities subject to the provisions of Banking Regulation Act, 1949.
22. To act as agents or brokers and trustees for any person or company and to undertake and perform sub-contracts and to do all or any of the above things in any part of the world and as principals, agents, contractors or trustees or otherwise and by or through agents, sub-contractors or trustees or otherwise and either alone or jointly with others.



- 23 To do all and everything necessary, suitable or proper for the accomplishment of any of the objects or the furtherance of any of the power hereinbefore set forth either alone or in association with other corporate bodies, firms or individuals and to do every other act or acts, thing or things incidental or appurtenant to growing out of or connected with the aforesaid business or power or any part thereof provided the same be not inconsistent with the laws of the Union of India.
- (C) THE OTHER OBJECTS OF THE COMPANY NOT INCLUDED IN (A) OR (B) ABOVE**
1. To carry on the business of manufacturing, refining, selling importing, exporting, treating and preparing all classes and kinds of Alkalis and all classes and kind of alcoholic chemicals, chemical compound both organic, inorganic, heavy, basic and fine chemicals, petrochemicals, plastic chemicals, industrial and other preparation arising from or required in the manufacture of all kind of Alkalis Chemicals and to carry or any operation or process of mixing, granulating different chemicals.
  2. To manufacturing alcoholic acids, Alkalis Corrosive and Anti- Corrosive substance, non- Corrosive substances all kind of chemicals and petrochemicals as element and intermediates, moderators, moderators or in a mixture or compound forms.
- IV. The Liability of the members is Limited.**
- V. The Authorized Share Capital of the Company is Rs. 20,000,000/- (Rupees Two Crore) divided into 2,000,000 (Twenty Lac) equity shares of Rs. 10/- (Rupees Ten) each.**



We, the several persons, whose names and addresses, are subscribed, hereto are desirous of being formed into a Company in pursuance of THIS MEMORANDUM OF ASSOCIATION, and we respectively agree to take the number of shares in the Capital of the Company, set opposite our respective names:-

S. No.	Name, Addresses Description and Occupation Of each subscriber	Number And type of Shares	Signature Of Subscribers	Name, Addresses Description and Signatures of Witnesses
1	Angus Dundee Distilleries Plc. 20-21, CATO STREET, LONDON W14 8JQ (BUSINESS) THROUGH ITS ATTORNEY SANJEEV KUMAR PURI S/O LATE RAJINDER KUMAR PURI R/o: 46, POCKETE, MAYUR VIHAR, PHASE II, DELHI 110071	9998 Nine thousand nine hundred and ninety eight only	<i>Sanjeev Puri</i>	<i>Ashwin K. Varma</i> I witness the signature of the subscriber herein to the Memorandum of Association of Angus Dundee Distilleries Private Limited at New Delhi on 05/01/2012 New Delhi - 110001
2	AARON NICHOLAS HILLMAN S/O MR. TERENCE MICHAEL HILLMAN R/o 9 SPANISH PLACE MANIONS 6 SPANISH PLACE LONDON - W1J 3HZ (BUSINESS)	1 (ONE ONLY)	<i>Aaron Hill</i>	<i>Ashwin K. Varma</i> I witness the signature of the subscriber herein to the Memorandum of Association of Angus Dundee Distilleries Private Limited at New Delhi on 05/01/2012 New Delhi - 110001
3	TANIA HILLMAN D/O MR TERENCE MICHAEL HILLMAN R/o 52, QUEENS GARDEN LONDON - NW8 6EN (BUSINESS)	1 (ONE ONLY)	<i>Tania Hill</i>	<i>Ashwin K. Varma</i> I witness the signature of the subscriber herein to the Memorandum of Association of Angus Dundee Distilleries Private Limited at New Delhi on 05/01/2012 New Delhi - 110001

THE LONDON CHAMBER OF COMMERCE & INDUSTRY  
CERTIFYING STAMP  
- 5 JAN 2012  
Authorised Signatory  
London Chamber of Commerce & Industry  
THIS SIGNATURE IS AUTHENTIC

Authorised Signatory of CCI  
SANDRA DALTON

THE LONDON CHAMBER OF COMMERCE & INDUSTRY  
CERTIFYING STAMP  
- 5 JAN 2012  
Authorised Signatory  
London Chamber of Commerce & Industry  
THIS SIGNATURE IS AUTHENTIC

Authorised Signatory of ICCI  
SANDRA DALTON

Place: London

Dated: Jan 5, 2012

7



**APOSTILLE**  
(Hague Convention of 5 October 1961 - Convention de La Haye du 5 octobre 1961)

**UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND**

1 Country: United Kingdom of Great Britain and Northern Ireland  
Pays: Royaume-Uni de Grande-Bretagne et d'Irlande du Nord  
This public document / Le présent acte public

2 Has been signed by: **Sandra Dalton**  
a été signé par

3 Acting in the capacity of: **Official of the Chamber of Commerce and Industry,**  
agissant en qualité de **London**

4 Bears the seal/stamp of  
est revêtu du sceau/stamp de

5 at London/Londres

6 Certified/Atteste  
le 06 January 2012

7 by Her Majesty's Principal Secretary of State for Foreign and Commonwealth Affairs /  
par le Secrétaire d'Etat Principal de Sa Majesté aux Affaires Etrangères et du Commonwealth

8 Number/sous No: **J103211**

9 Stamp  
sceau

10 Signature: **Jeremy Crook**

  
For the Secretary of State / Pour le Secrétaire d'Etat

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ANNEXURE IV

LETTER OF INTENT

संख्या: ई0 एकस0 एन0-एफ (6)-1/2025  
हिमाचल प्रदेश सरकार  
राज्य कर एवं आबकारी विभाग

प्रेषक  
प्रधान सचिव (रा0 कर एवं आ0)  
हिमाचल प्रदेश सरकार।

प्रेषित  
राज्य कर एवं आबकारी का आयुक्त  
हिमाचल प्रदेश, कसुम्पटी शिमला-171009  
दिनांक: शिमला-171002 24 मार्च, 2025

विषय:- **Proposal for the grant of LOI in favour of M/s Angus Dundee India Pvt. Ltd to set up aMalt Spirit Craft Gin plant along with Bottling plant at Mohal Parei, Village Salol, Kangra, HP**

महोदय,  
उपरोक्त विषय पर मुझे आपके पत्र संख्या: 7-6/2025-ई0 एकस0 एन0 -5093 दिनांक 10 मार्च, 2025 के संदर्भ में यह कहने का निदेश हुआ है कि **M/s Angus Dundee India Pvt. Ltd at Mohal Parei, Village Salol, Kangra, HP** के पक्ष में डिस्टिलरी एवं बॉटलिंग संयंत्र स्थापित करने हेतु आशय पत्र जारी करने सम्बन्धी प्रस्ताव में सरकार द्वारा मामले को राज्य स्तरीय एकल खिड़की निकासी एवं अनुश्रवण प्राधिकरण के अनुमोदनार्थ ले जाने हेतु अपनी स्वीकृति प्रदान कर दी गई है। अतः मामले में तदानुसार कार्यवाही करके इस विभाग को अवगत करवाने की कृपा करें।

भवदीय,  
  
(हरबंस सिंह ब्रसकोन)  
विशेष सचिव (राज्य कर एवं आबकारी)  
हिमाचल प्रदेश सरकार।  
24 मार्च, 2025

संख्या: उपरोक्त दिनांक: शिमला-171002  
प्रतिलिपि :- निदेशक, उद्योग विभाग, हिमाचल प्रदेश, शिमला-1 को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है।

विशेष सचिव (राज्य कर एवं आबकारी)  
हिमाचल प्रदेश सरकार।



ANNEXURE V

AUTHORITY LETTER

Angus Dundee  
INDIA PVT LTD



True Copy of Resolution passed by the Board of Directors of the company in their meeting held on 20<sup>th</sup> February 2025 at the registered office of the company

**RESOLVED** that Mr. Hasan Bakhtawar, Chief Operating Officer of the company is hereby authorized to apply, files and submit various applications, form, declarations, affidavits & legal documents etc. for obtaining approvals/permission/sanctions for Environment & Pollution Clearances from concerned State, Central & Government department/authorities for the Chemical Industrial Unit of M/s **Angus Dundee India Private Limited** proposed in the revenue estate of Mohal Parei Village-Salol, Tehsil & District Kangra, Himachal Pradesh, 176214.

**RESOLVED FURTHER** that Mr. Hasan Bakhtawar is authorized to sign, execute and submit required documents for the purpose mentioned hereinabove.

For Angus Dundee India Private Limited

Sanjeev Kumar Puri

Director



Angus Dundee India Private Limited  
Regd. Office: 127 DLF Galleria District Centre  
Mayur Vihar, Phase-1, Delhi-110091.  
P: +91 11 4241 8896/4301 1406  
F: +91 11 4244 8896

CIN: U15511DL2012FTC230186  
PAN: AAKCA1819Q



ANNEXURE VI

TOR LETTER



File No: HPSEIAA/2025/1320  
Government of India  
Ministry of Environment, Forest and Climate Change  
(Issued by the State Environment Impact Assessment  
Authority(SEIAA), HIMACHAL PRADESH)

\*\*\*



Dated 26/05/2025



To,

ANGUS DUNDEE INDIA PRIVATE LIMITED  
Mohal Parei Village-Salol, Tehsil & District Kangra, Himachal Pradesh, Salol, KANGRA,  
HIMACHAL PRADESH, 176214  
angushp2025@gmail.com

**Subject:** Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding.

**Sir/Madam,**

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Proposed 30 KLD Malt Spirit Distillery and 2 KLD Craft Gin Plant along with Pilot Plant for bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village- Salol, Tehsil & Distt. Kangra, Himachal Pradesh by M/s Angus Dundee India Private Limited submitted to Ministry vide proposal number SIA/HP/IND2/533095/2025 dated 07/04/2025.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25B2504HP5890978N
(ii) File No.	HPSEIAA/2025/1320
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	5(g) Distilleries Proposed 30 KLD Malt Spirit Distillery and 2 KLD Craft Gin Plant along with Pilot Plant for bottling of 1000 Cases per day of IMFL in the revenue estate of Mohal Parei Village- Salol, Tehsil & Distt. Kangra, Himachal Pradesh by M/s Angus Dundee India Private Limited
(vii) Name of Project	ANGUS DUNDEE INDIA PRIVATE LIMITED
(viii) Name of Company/Organization	KANGRA, HIMACHAL PRADESH
(ix) Location of Project (District, State)	SEIAA
(x) Issuing Authority	no
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

SIA/HP/IND2/533095/2025

Page 1 of 10



3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the Ministry for an appraisal by the State Environment Impact Assessment Authority(SEIAA) Appraisal Committee (SEIAA) in the Ministry under the provision of EIA notification 2006 and its subsequent amendments.
4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority(SEIAA) Appraisal Committee of SEIAA in the meeting held on 22/05/2025. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C EIA, EMP)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.
5. The brief about configuration of plant/equipment, products and byproducts and salient features of the project along with environment settings, as submitted by the Project proponent in Form-1 (Part A, B and C)/EIA & EMP Reports/presented during SEIAA are annexed to this EC as Annexure (1).
6. a) Proposal No. SIA/HP/IND2/533095/2025 (**Fresh TOR's**)  
HP SEIAA/2025/1320
- b) Processing Reference Id: HSBCN09733938465 dated 07.04.2025 of Rs. 6,00,000/-
- c) Project type Distilleries Item 5 (g) of the schedule of EIA notification
- d) Project Location Khasra no. 4, Khatauni No. 5, comprising of Khasra no. 81,82,83,84,85,86,87,88,89,90,91,92 and Khatauni no. 6 comprising of Khasra no. 89 falling in Mohal Parei Village Salol, Tehsil & Distt. Kangra, Himachal Pradesh.
- e) Jamabandi Jamabandi for the year 2017-2018
- f) Land Status Private Land.
- g) Status of land The land purchased by Sh. Madan Lal Kapoor, M/s Angus Dundee India Private Limited
- h) Letter of Intent LOI has been obtained from Commissioner of State Taxes & Excise, Himachal Pradesh on dated 24.03.2025
- i) Capacity 30 KLD Malt Spirit Distillery & 2 KLD Craft Gin Plant along with Pilot Plant for bottling of 1000 cases per day of IMFL.
- j) Proposed Area 34,529 square meter.
- k) Fresh water requirement 504 KLP
- l) Power requirement The proposed power demand will be 1.5 MW which will be met through HPSEB. Diesel will be used for DG sets. It will be sourced from local market.  
DG set – 2x750 KVA
- m) Fly ash Boiler ash @ 3.75 TPD which will be generated from boiler & will be sold to brick manufacturers
- n) Cost of project 297 Crores.
- o) EMP Cost Capital Cost: Rs. 2.0 Crores  
Recurring Cost: Rs. 0.80 Crores/annum CER @1.5% to be deposited with DEST
7. The SEIAA, in its meeting held on 22/05/2025, based on information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to stipulation of specific and general conditions as detailed in Annexure (2).
8. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the State Environment Impact Assessment Authority(SEIAA) Appraisal Committee hereby decided to grant Terms of Reference for instant proposal of M/s. Hasan Bakhtawar under the provisions of EIA Notification, 2006 and as amended thereof.
9. The Ministry reserves the right to stipulate additional conditions, if found necessary.
10. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The



Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.

11. This issues with the approval of the Competent Authority.

**Copy To**

1. The Secretary (Environment), Ministry of Environment, Forests & Climate Change (MoEF&CC), GoI, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi - 110003 .
2. The Chairman, Central Pollution Control Board, Him Parivesh Bhawan, CBD-cum-office Complex, East Arjun Nagar, New Delhi-110032.
3. The Chairman, Himachal Pradesh State Pollution Control Board, Shimla-171009.
4. The Director (Environment, Science & Technology) to the GoHP, Shimla-171001.
5. The Adviser (IA), MoEF&CC, GoI, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi - 110003.
6. The Integrated Regional Office, MoEF&CC, CGO Complex, Shivalik Khand, Longwood, Shimla, HP-171001.
7. The Monitoring Cell, MoEF&CC,GoI, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi - 110003
8. Record File.

**Annexure 1**

**Standard Terms of Reference for (Distilleries)**

**1. Executive Summary**

S. No	Terms of Reference
1.1	Executive Summary

**2. Introduction**

S. No	Terms of Reference
2.1	Details of the EIA Consultant including NABET accreditation
2.2	Information about the project proponent

**3. Project Description**

S. No	Terms of Reference
3.1	Cost of project and time of completion.
3.2	Products with capacities for the proposed project.If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
3.3	List of raw materials required and their source along with mode of transportation.
3.4	Other chemicals and materials required with quantities and storage capacities
3.5	Details of Emission, effluents, hazardous waste generation and their management. Requirement of



S. No	Terms of Reference
	water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
3.6	Process description along with major equipments and machineries, process flow sheet (quantitative) from raw material to products to be provided.
3.7	Hazard identification and details of proposed safety systems.
3.8	Expansion/modernization proposals: a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 08th June, 2022 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report. b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

#### 4. Site Details

S. No	Terms of Reference
4.1	Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
4.2	A toposheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)
4.3	Co-ordinates (lat-long) of all four corners of the site. Google map-Earth downloaded of the project site. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.
4.4	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.
4.5	Land use break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area).
4.6	A list of major industries with name and type within study area (10km radius) shall be incorporated.



S. No	Terms of Reference
4.7	Details of Drainage of the project up to 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects).
4.8	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.
4.9	R&R details in respect of land in line with state Government policy.

**5. Forest And Wildlife Related Issues (If Applicable):**

S. No	Terms of Reference
5.1	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)
5.2	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).
5.3	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.
5.4	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon
5.5	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area
5.6	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.

**6. Environmental Status**

S. No	Terms of Reference
6.1	Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.
6.2	AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.
6.3	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the



S. No	Terms of Reference
	NAQPM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.
6.4	Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.
6.5	Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details.
6.6	Ground water monitoring at minimum at 8 locations shall be included.
6.7	Noise levels monitoring at 8 locations within the study area.
6.8	Soil Characteristic as per CPCB guidelines.
6.9	Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.
6.10	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule- I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.
6.11	Socio-economic status of the study area.

#### 7. Impact And Environment Management Plan

S. No	Terms of Reference
7.1	Assessment of ground level concentration of pollutants from the stack emission based on site specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modeling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.
7.2	Water Quality modeling - in case of discharge in water body
7.3	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor cum- rail transport shall be examined.
7.4	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.
7.5	Details of stack emission and action plan for control of emissions to meet standards.



S. No	Terms of Reference
7.6	Measures for fugitive emission control
7.7	Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.
7.8	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.
7.9	Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.
7.10	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

#### 8. Occupational Health

S. No	Terms of Reference
8.1	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.
8.2	Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.
8.3	Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.
8.4	Annual report of health status of workers with special reference to Occupational Health and Safety.

#### 9. Corporate Environment Policy

S. No	Terms of Reference
9.1	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
9.2	Does the Environment Policy prescribe for standard operating process / procedures to bring into



S. No	Terms of Reference
	focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
9.3	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.
9.4	Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.

**10. Details Regarding Infrastructure Facilities Such As Sanitation, Fuel, Restroom Etc. To Be Provided To The Labour Force During Construction As Well As To The Casual Workers Including Truck Drivers During Operation Phase.**

S. No	Terms of Reference
10.1	No Data Found

**11. Enterprise Social Commitment (Esc)**

S. No	Terms of Reference
11.1	Adequate funds (at least 2.5 % of the project cost) shall be ear marked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.
11.2	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details there of and compliance/ATR to the notice(s) and present status of the case.
11.3	A tabular chart with index for point wise compliance of above TOR.

**12. Specific Conditions**

S. No	Terms of Reference
12.1	List of existing distillery units in the study area along with their capacity and sourcing of raw material.
12.2	Number of working days of the distillery unit.
12.3	Details of raw materials such as molasses/grains, their source with availability.
12.4	Details of the use of steam from the boiler.



S. No	Terms of Reference
12.5	Surface and Ground water quality around proposed spent wash storage lagoon, and compost yard.
12.6	Plan to reduce spent wash generation within 6-8 KL/KL of alcohol produced.
12.7	Proposed Effluent treatment system for molasses/grain based distillery (spent wash, spent lees, condensate and utilities) as well as domestic sewage and scheme for achieving zero water conservation.
12.8	Proposed action to restrict fresh water consumption within 10 KL/KL of alcohol production.
12.9	Details about capacity of spent wash holding tank, material used, design consideration. No. of peizometers to be proposed around spent wash holding tank.
12.10	Details of solid waste management including management of boiler ash, yeast, etc. Details of incinerated spent wash ash generation and its disposal.
12.11	Details of bio-composting yard (if applicable).
12.12	Action plan to control odour pollution.
12.13	Arrangements for installation of continuous online monitoring system (24x7 monitoring device)
12.14	If Sugar and distillery will have integrated effluent treatment facilities. Details regarding the same.
12.15	1. The project proponent shall obtain NOC from the State Biodiversity Board. 2. The project proponent shall obtain 118 permissions before submission the case for EC.

**Additional Terms of Reference**

N/A

**Annexure 2**

**Details of Products & By-products**

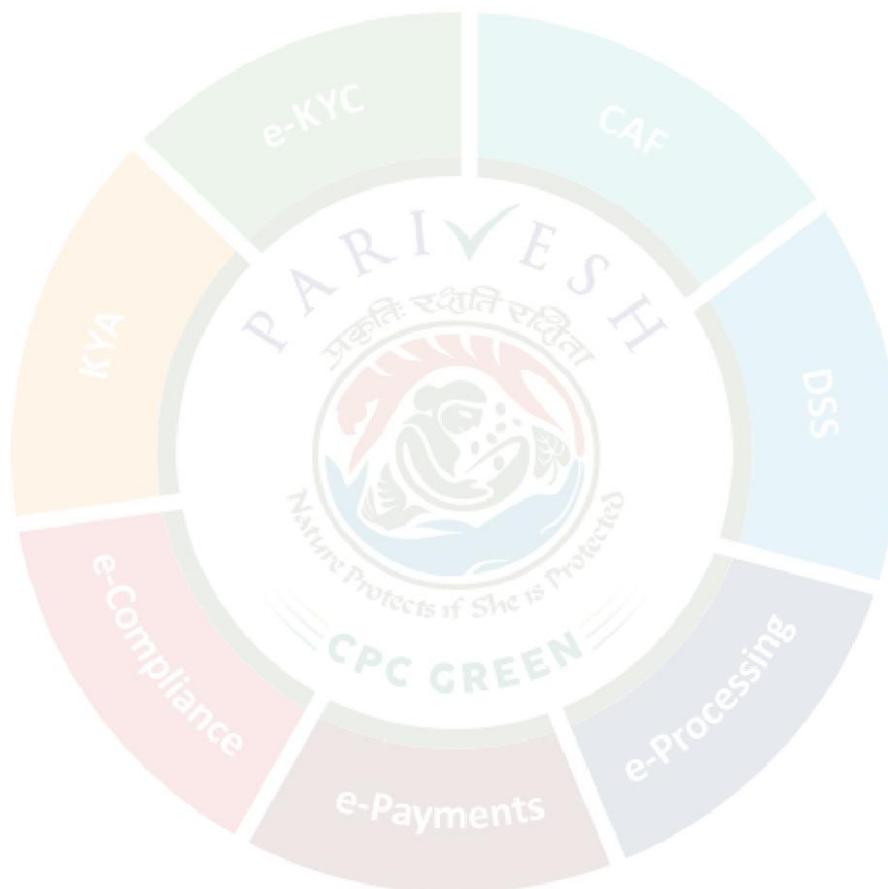
Name of the product /By-product	Product / By-product	Quantity	Unit	Mode of Transport / Transmission	Remarks (eg. CAS number)
Malt spirit	Malt spirit	30	Kilo Litre per Day (KLD)	Road	Main product
IMFL Bottling	IMFL Bottling	1000	Cases/day	Road	
Craft Gin	Craft Gin	2	Kilo Litre per Day (KLD)	Road	
DWGS or spent grains	DWGS or spent grains	65	TPD	Rail	This will be mixed with Spent Wash/Thin Slope in

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Name of the product /By-product	Product / By-product	Quantity	Unit	Mode of Transport / Transmission	Remarks (eg. CAS number)
					MEE to make DDGS



Signature Not Verified

Digitally Signed by: Sh D C Rana  
Member Secretary, SEIAA

Date: 26/05/2025

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ANNEXURE VII

ESSENTIALITY CERTIFICATE



Single Window Clearance System

Directorate of Industries(DOI)  
Govt. of Himachal Pradesh

ESSENTIALITY CERTIFICATE

(Certificate No. EC/45/111325/2025)

This is to certify that land alongwith building measuring 03-45-29 Hectare as detailed below is required by M/S ANGUS DUNDEE INDIA PRIVATE LIMITED, MOHAL PAREI, VPO SALOL, TEHSIL AND DISTRICT KANGRA, HIMACHAL PRADESH 176214 for the purpose of setting up of Industrial Unit for manufacturing of MALT SPRITI FRESH AND MATURE MALT SPIRIT, Gin, INDIAN MADE FOREIGN LIQUIR, CATTLE FEED with proposed total investment of Rs. 29700 Lakh including investment in plant & machinery amounting to Rs.7200 Lakh,

Detail of land as per Jamabandi for the Year 2022-23 is as under :-

Sr.No.	Khata No.	Khatauni No.	Khasra No.	Area in Hectare
1	5	6	81	00-38-47
2	5	6	82	00-02-97
3	5	6	83	00-02-25
4	5	6	84	00-47-94
5	5	6	85	00-02-25
6	5	6	86	00-01-71
7	5	6	87	00-01-10
8	5	6	88	00-00-68
9	5	6	90	00-24-56
10	5	6	91	02-01-48
11	5	6	92	00-19-79
12	5	7	89	00-02-09
Total				03-45-29

Terms & Conditions:-

1. This land alongwith building is recommended for transfer/lease after ascertaining the eligibility of transferee as per the criteria laid down by the department.
2. This land alongwith building is recommended for transfer / lease in favour of the enterprise as the same is essentially required for the aforesaid purpose. The aforesaid activities cannot be run in a lesser area.
3. This land alongwith building is recommended for transfer after obtaining all NOCs from all relevant departments/authorities and after ensuring adherence to any guidelines, under Rule 38-A of the Himachal Pradesh Tenancy and Land Reforms Rules,
4. This EC can be withdrawn/cancelled/amended at any time by the department, if any factual error/misrepresentation of facts /omission comes to the notice of the department.
5. The unit has to apply for permission under section 118 with Revenue Department through concerned Deputy Commissioner



### Single Window Clearance System

Directorate of Industries(DOI)  
Govt. of Himachal Pradesh



[Digitally Signed by Dr. Yunus on 03 May 2025 ]  
Director (Approving Authority), Department of Industries  
Govt. of Himachal Pradesh





## ANNEXURE VIII

### Methodology of sampling and monitoring of Ambient Air

#### 3.3.1 Climate

The project area is located in the foot hills of Shivalik Range and experiences a pleasant Climate throughout the year. The average altitude of the region is from 350 meter to 700 meter above sea level. The region generally experiences three seasons. The winter season spans from October to February and the summer from March to June. By July the rainy season starts in the hilly region and ends in September. During winter the days and nights are very cold.

- Summer – March to June
- Monsoon – July to August
- Winter Season – October to February

In order to study the meteorology of the project area, site specific one season meteorological data was collected. Annual Weather Averages & Windrose diagram is provided at Fig 3.1 and Fig 3.2 respectively.

#### 3.3.2 Temperature

June and July are the hottest months with daily average temperature going up to 30°C and minimum average daily temperature as 24°C. Hot scorching dust laden winds blow during the summer season and on individual days the temperature sometimes goes a little above 40°C. With the on-set of monsoons in July there is appreciable drop in temperature but due to increased moisture in the air the weather becomes uncomfortable. After monsoon in September the night temperature drops appreciably. December and January are the coldest months when the maximum average daily temperature is around 22°C and minimum about 6°C.

#### 3.3.3 Rainfall

The rainfall in the zone is caused by the Southwest monsoon. It starts in the month of July and extends up-to the end of September. During this period the monsoon rain-fall contributes about 70 to 80% of the total annual rainfall. The average annual rain fall is in the range of 1010mm. The annual numbers of rainy days on an average are about 62 in a year, out of which about 30 falls in the monsoon period of July to September.

#### Micro-Meteorology at Site



Meteorological station was set-up at site to record surface meteorological parameter during the study period. Wind rose diagram for the study period is given at Figure 3.2. Summary of the micro-meteorology at site is given in Table.

### Micro-meteorology

Month	Temperature(°C)		Relative Humidity (%)
	Max.	Min.	Average
March, 2025	34°C	10°C	21°C
April, 2025	38°C	14°C	27°C
May, 2025	38°C	20°C	28°C
June, 2025	39°C	18°C	28°C

(Source: <https://www.timeanddate.com/weather/@1256073/historic?month=10&year=2024>)

**Table 3.5 Wind Rose Data for January-December, 2024**

YYYY	MM	DD	HH	W_DR	W_SPEED
2024	1	1	12	180	0.81
2024	1	2	12	135	0.81
2024	1	3	12	315	0.81
2024	1	4	12	22.5	0.81
2024	1	5	12	22.5	0.81
2024	1	6	12	270	0.81
2024	1	7	12	225	0.81
2024	1	8	12	135	0.81
2024	1	9	12	90	0.81
2024	1	10	12	135	0.81
2024	1	11	12	90	0.81
2024	1	12	12	0	0.81
2024	1	13	12	225	0.81
2024	1	14	12	225	0.81
2024	1	15	12	135	0.81
2024	1	16	12	180	0.81
2024	1	17	12	225	0.81
2024	1	18	12	0	0.81
2024	1	19	12	135	0.81
2024	1	20	12	135	0.81
2024	1	21	12	180	0.81
2024	1	22	12	135	0.81
2024	1	23	12	180	0.81
2024	1	24	12	135	0.81



2024	1	25	12	180	0.81
2024	1	26	12	45	0.81
2024	1	27	12	270	0.81
2024	1	28	12	90	0.81
2024	1	29	12	225	0.81
2024	1	30	12	270	0.81
2024	1	31	12	0	0.81
2024	2	1	12	180	0.81
2024	2	2	12	270	0.81
2024	2	3	12	225	0.81
2024	2	4	12	135	0.81
2024	2	5	12	0	0.81
2024	2	6	12	225	0.81
2024	2	7	12	315	0.81
2024	2	8	12	180	0.81
2024	2	9	12	135	0.81
2024	2	10	12	0	0.81
2024	2	11	12	180	0.81
2024	2	12	12	45	0.81
2024	2	13	12	135	0.81
2024	2	14	12	270	0.81
2024	2	15	12	180	0.81
2024	2	16	12	270	0.81
2024	2	17	12	90	0.81
2024	2	18	12	135	0.81
2024	2	19	12	45	0.81
2024	2	20	12	315	0.81
2024	2	21	12	225	0.81
2024	2	22	12	315	0.81
2024	2	23	12	90	0.81
2024	2	24	12	270	0.81
2024	2	25	12	315	0.81
2024	2	26	12	225	0.81
2024	2	27	12	225	0.81
2024	2	28	12	315	0.81
2024	2	29	12	270	0.81
2024	3	1	12	270	0.81
2024	3	2	12	45	0.81
2024	3	3	12	90	0.81
2024	3	4	12	180	0.81
2024	3	5	12	315	0.81
2024	3	6	12	90	0.81
2024	3	7	12	225	0.81
2024	3	8	12	315	0.81



2024	3	9	12	45	0.81
2024	3	10	12	225	0.81
2024	3	11	12	225	0.81
2024	3	12	12	270	0.81
2024	3	13	12	225	0.81
2024	3	14	12	315	0.81
2024	3	15	12	270	0.81
2024	3	16	12	270	0.81
2024	3	17	12	135	0.81
2024	3	18	12	270	0.81
2024	3	19	12	135	0.81
2024	3	20	12	315	0.81
2024	3	21	12	225	0.81
2024	3	22	12	45	0.81
2024	3	23	12	315	0.81
2024	3	24	12	315	0.81
2024	3	25	12	225	0.81
2024	3	26	12	135	0.81
2024	3	27	12	225	0.81
2024	3	28	12	270	0.81
2024	3	29	12	225	0.81
2024	3	30	12	135	0.81
2024	3	31	12	270	0.81
2024	4	1	12	270	0.81
2024	4	2	12	270	0.81
2024	4	3	12	315	0.81
2024	4	4	12	225	0.81
2024	4	5	12	270	0.81
2024	4	6	12	225	0.81
2024	4	7	12	315	0.81
2024	4	8	12	315	0.81
2024	4	9	12	225	0.81
2024	4	10	12	270	0.81
2024	4	11	12	270	0.81
2024	4	12	12	225	0.81
2024	4	13	12	135	0.81
2024	4	14	12	135	0.81
2024	4	15	12	315	0.81
2024	4	16	12	0	0.81
2024	4	17	12	0	0.81
2024	4	18	12	0	0.81
2024	4	19	12	0	0.81
2024	4	20	12	315	0.81
2024	4	21	12	315	0.81



2024	4	22	12	0	0.81
2024	4	23	12	270	0.81
2024	4	24	12	225	0.81
2024	4	25	12	315	0.81
2024	4	26	12	315	0.81
2024	4	27	12	0	0.81
2024	4	28	12	315	0.81
2024	4	29	12	315	0.81
2024	4	30	12	270	0.81
2024	5	1	12	270	0.81
2024	5	2	12	225	0.81
2024	5	3	12	225	0.81
2024	5	4	12	270	0.81
2024	5	5	12	225	0.81
2024	5	6	12	225	0.81
2024	5	7	12	225	0.81
2024	5	8	12	225	0.81
2024	5	9	12	225	0.81
2024	5	10	12	45	0.81
2024	5	11	12	225	0.81
2024	5	12	12	225	0.81
2024	5	13	12	225	0.81
2024	5	14	12	225	0.81
2024	5	15	12	270	0.81
2024	5	16	12	315	0.81
2024	5	17	12	315	0.81
2024	5	18	12	225	0.81
2024	5	19	12	225	0.81
2024	5	20	12	270	0.81
2024	5	21	12	135	0.81
2024	5	22	12	270	0.81
2024	5	23	12	225	0.81
2024	5	24	12	225	0.81
2024	5	25	12	225	0.81
2024	5	26	12	225	0.81
2024	5	27	12	225	0.81
2024	5	28	12	270	0.81
2024	5	29	12	225	0.81
2024	5	30	12	135	0.81
2024	5	31	12	225	0.81
2024	6	1	12	315	0.81
2024	6	2	12	315	0.81
2024	6	3	12	225	0.81
2024	6	4	12	135	0.81



2024	6	5	12	225	0.81
2024	6	6	12	270	0.81
2024	6	7	12	225	0.81
2024	6	8	12	270	0.81
2024	6	9	12	225	0.81
2024	6	10	12	270	0.81
2024	6	11	12	270	0.81
2024	6	12	12	270	0.81
2024	6	13	12	225	0.81
2024	6	14	12	315	0.81
2024	6	15	12	225	0.81
2024	6	16	12	270	0.81
2024	6	17	12	270	0.81
2024	6	18	12	225	0.81
2024	6	19	12	225	0.81
2024	6	20	12	45	0.81
2024	6	21	12	315	0.81
2024	6	22	12	180	0.81
2024	6	23	12	315	0.81
2024	6	24	12	135	0.81
2024	6	25	12	0	0.81
2024	6	26	12	0	0.81
2024	6	27	12	225	0.81
2024	6	28	12	315	0.81
2024	6	29	12	315	0.81
2024	6	30	12	225	0.81
2024	7	1	12	45	0.81
2024	7	2	12	0	0.81
2024	7	3	12	180	0.81
2024	7	4	12	270	0.81
2024	7	5	12	315	0.81
2024	7	6	12	45	0.81
2024	7	7	12	135	0.81
2024	7	8	12	45	0.81
2024	7	9	12	270	0.81
2024	7	10	12	315	0.81
2024	7	11	12	225	0.81
2024	7	12	12	0	0.81
2024	7	13	12	315	0.81
2024	7	14	12	180	0.81
2024	7	15	12	270	0.81
2024	7	16	12	135	0.81
2024	7	17	12	0	0.81
2024	7	18	12	180	0.81



2024	7	19	12	225	0.81
2024	7	20	12	90	0.81
2024	7	21	12	270	0.81
2024	7	22	12	45	0.81
2024	7	23	12	225	0.81
2024	7	24	12	225	0.81
2024	7	25	12	225	0.81
2024	7	26	12	180	0.81
2024	7	27	12	0	0.81
2024	7	28	12	225	0.81
2024	7	29	12	315	0.81
2024	7	30	12	45	0.81
2024	7	31	12	225	0.81
2024	8	1	12	225	0.81
2024	8	2	12	135	0.81
2024	8	3	12	225	0.81
2024	8	4	12	0	0.81
2024	8	5	12	225	0.81
2024	8	6	12	135	0.81
2024	8	7	12	45	0.81
2024	8	8	12	225	0.81
2024	8	9	12	225	0.81
2024	8	10	12	135	0.81
2024	8	11	12	135	0.81
2024	8	12	12	315	0.81
2024	8	13	12	0	0.81
2024	8	14	12	315	0.81
2024	8	15	12	315	0.81
2024	8	16	12	0	0.81
2024	8	17	12	225	0.81
2024	8	18	12	0	0.81
2024	8	19	12	135	0.81
2024	8	20	12	135	0.81
2024	8	21	12	135	0.81
2024	8	22	12	0	0.81
2024	8	23	12	135	0.81
2024	8	24	12	0	0.81
2024	8	25	12	0	0.81
2024	8	26	12	270	0.81
2024	8	27	12	90	0.81
2024	8	28	12	0	0.81
2024	8	29	12	0	0.81
2024	8	30	12	0	0.81
2024	8	31	12	315	0.81



2024	9	1	12	135	0.81
2024	9	2	12	45	0.81
2024	9	3	12	45	0.81
2024	9	4	12	0	0.81
2024	9	5	12	180	0.81
2024	9	6	12	225	0.81
2024	9	7	12	225	0.81
2024	9	8	12	0	0.81
2024	9	9	12	180	0.81
2024	9	10	12	315	0.81
2024	9	11	12	270	0.81
2024	9	12	12	0	0.81
2024	9	13	12	135	0.81
2024	9	14	12	225	0.81
2024	9	15	12	315	0.81
2024	9	16	12	135	0.81
2024	9	17	12	315	0.81
2024	9	18	12	225	0.81
2024	9	19	12	270	0.81
2024	9	20	12	315	0.81
2024	9	21	12	45	0.81
2024	9	22	12	180	0.81
2024	9	23	12	135	0.81
2024	9	24	12	135	0.81
2024	9	25	12	90	0.81
2024	9	26	12	0	0.81
2024	9	27	12	270	0.81
2024	9	28	12	135	0.81
2024	9	29	12	0	0.81
2024	9	30	12	225	0.81
2024	10	1	12	225	0.81
2024	10	2	12	270	0.81
2024	10	3	12	135	0.81
2024	10	4	12	225	0.81
2024	10	5	12	225	0.81
2024	10	6	12	0	0.81
2024	10	7	12	135	0.81
2024	10	8	12	135	0.81
2024	10	9	12	135	0.81
2024	10	10	12	225	0.81
2024	10	11	12	270	0.81
2024	10	12	12	225	0.81
2024	10	13	12	135	0.81
2024	10	14	12	225	0.81



2024	10	15	12	225	0.81
2024	10	16	12	135	0.81
2024	10	17	12	135	0.81
2024	10	18	12	180	0.81
2024	10	19	12	270	0.81
2024	10	20	12	225	0.81
2024	10	21	12	135	0.81
2024	10	22	12	315	0.81
2024	10	23	12	135	0.81
2024	10	24	12	225	0.81
2024	10	25	12	135	0.81
2024	10	26	12	315	0.81
2024	10	27	12	180	0.81
2024	10	28	12	225	0.81
2024	10	29	12	135	0.81
2024	10	30	12	180	0.81
2024	10	31	12	180	0.81
2024	11	1	12	180	0.81
2024	11	2	12	180	0.81
2024	11	3	12	135	0.81
2024	11	4	12	180	0.81
2024	11	5	12	135	0.81
2024	11	6	12	135	0.81
2024	11	7	12	225	0.81
2024	11	8	12	135	0.81
2024	11	9	12	225	0.81
2024	11	10	12	0	0.81
2024	11	11	12	225	0.81
2024	11	12	12	315	0.81
2024	11	13	12	135	0.81
2024	11	14	12	315	0.81
2024	11	15	12	135	0.81
2024	11	16	12	315	0.81
2024	11	17	12	270	0.81
2024	11	18	12	225	0.81
2024	11	19	12	225	0.81
2024	11	20	12	135	0.81
2024	11	21	12	180	0.81
2024	11	22	12	225	0.81
2024	11	23	12	180	0.81
2024	11	24	12	45	0.81
2024	11	25	12	225	0.81
2024	11	26	12	0	0.81
2024	11	27	12	0	0.81



2024	11	28	12	0	0.81
2024	11	29	12	135	0.81
2024	11	30	12	315	0.81
2024	12	1	12	135	0.81
2024	12	2	12	315	0.81
2024	12	3	12	315	0.81
2024	12	4	12	270	0.81
2024	12	5	12	225	0.81
2024	12	6	12	135	0.81
2024	12	7	12	135	0.81
2024	12	8	12	135	0.81
2024	12	9	12	225	0.81
2024	12	10	12	225	0.81
2024	12	11	12	180	0.81
2024	12	12	12	135	0.81
2024	12	13	12	315	0.81
2024	12	14	12	180	0.81
2024	12	15	12	135	0.81
2024	12	16	12	270	0.81
2024	12	17	12	135	0.81
2024	12	18	12	225	0.81
2024	12	19	12	225	0.81
2024	12	20	12	225	0.81
2024	12	21	12	315	0.81
2024	12	22	12	135	0.81
2024	12	23	12	315	0.81
2024	12	24	12	315	0.81
2024	12	25	12	180	0.81
2024	12	26	12	0	0.81
2024	12	27	12	45	0.81
2024	12	28	12	270	0.81
2024	12	29	12	315	0.81
2024	12	30	12	135	0.81
2024	12	31	12	135	0.81



**Table 3.5 Wind Rose Data for 15<sup>th</sup> March to 15<sup>th</sup> June, 2025**

YYYY	MM	DD	HH	W_DR	W_SPEED
2025	3	15	12	135	1.62
2025	3	16	12	270	1.35
2025	3	17	12	315	1.08
2025	3	18	12	0	1.35
2025	3	19	12	270	1.62
2025	3	20	12	315	1.62
2025	3	21	12	225	1.08
2025	3	22	12	135	1.08
2025	3	23	12	270	1.62
2025	3	24	12	225	1.62
2025	3	25	12	270	1.08
2025	3	26	12	315	1.08
2025	3	27	12	270	1.08
2025	3	28	12	270	1.62
2025	3	29	12	315	1.08
2025	3	30	12	225	1.08
2025	3	31	12	292.5	1.62
2025	4	1	12	225	1.08
2025	4	2	12	315	1.62
2025	4	3	12	225	1.35
2025	4	4	12	225	1.62
2025	4	5	12	225	1.35
2025	4	6	12	180	0.54
2025	4	7	12	135	1.35
2025	4	8	12	45	0.81
2025	4	9	12	225	1.62
2025	4	10	12	225	1.08
2025	4	11	12	90	0.81
2025	4	12	12	315	1.08
2025	4	13	12	225	0.54
2025	4	14	12	135	1.08
2025	4	15	12	180	0.54
2025	4	16	12	270	0.27
2025	4	17	12	270	0.54
2025	4	18	12	135	1.35
2025	4	19	12	135	1.08
2025	4	20	12	135	1.62
2025	4	21	12	0	0
2025	4	22	12	270	1.08
2025	4	23	12	225	1.62
2025	4	24	12	315	0.54
2025	4	25	12	225	1.08



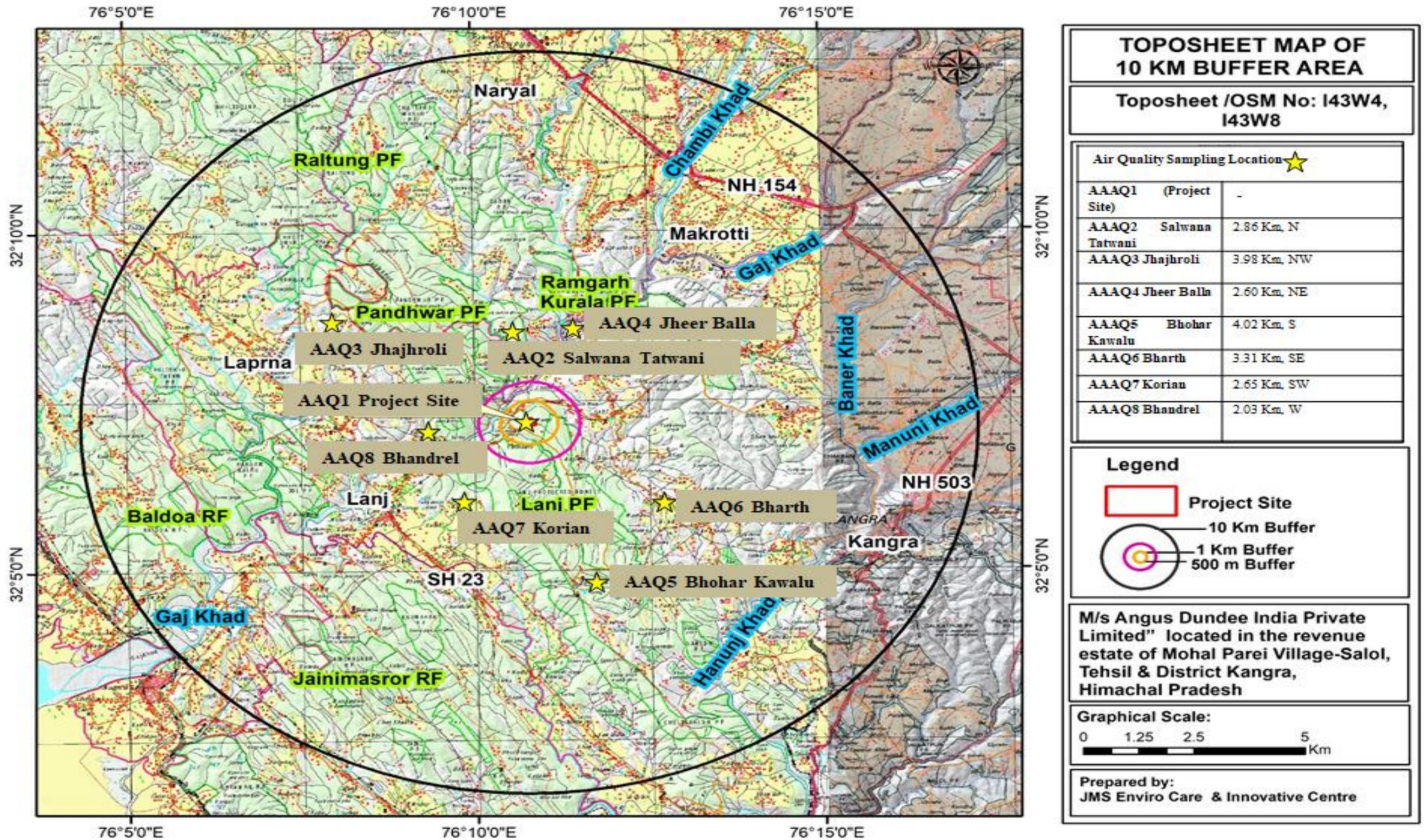
2025	4	26	12	270	1.62
2025	4	27	12	90	1.08
2025	4	28	12	157.5	1.89
2025	4	29	12	270	0.27
2025	4	30	12	135	0.81
2025	5	1	12	202.5	1.62
2025	5	2	12	0	0
2025	5	3	12	180	0.52
2025	5	4	12	225	1.62
2025	5	5	12	135	1.62
2025	5	6	12	225	1.35
2025	5	7	12	270	0.54
2025	5	8	12	135	1.62
2025	5	9	12	202.5	0.81
2025	5	10	12	270	0.81
2025	5	11	12	0	0.54
2025	5	12	12	225	1.08
2025	5	13	12	135	0.54
2025	5	14	12	315	1.08
2025	5	15	12	315	1.62
2025	5	16	12	270	2.16
2025	5	17	12	225	1.35
2025	5	18	12	135	1.08
2025	5	19	12	45	1.08
2025	5	20	12	180	1.08
2025	5	21	12	270	0.27
2025	5	22	12	135	1.08
2025	5	23	12	135	2.16
2025	5	24	12	45	1.62
2025	5	25	12	315	0.27
2025	5	26	12	225	1.08
2025	5	27	12	225	1.35
2025	5	28	12	135	1.62
2025	5	29	12	45	1.08
2025	5	30	12	22.5	1.08
2025	5	31	12	45	0.27
2025	6	1	12	270	1.08
2025	6	2	12	45	1.35
2025	6	3	12	45	1.35
2025	6	4	12	45	0.27
2025	6	5	12	270	0.81
2025	6	6	12	315	0.27
2025	6	7	12	315	1.08
2025	6	8	12	180	0.54



2025	6	9	12	225	0.81
2025	6	10	12	315	0.54
2025	6	11	12	45	1.08
2025	6	12	12	135	0.54
2025	6	13	12	0	0
2025	6	14	12	135	1.62
2025	6	15	12	45	0.54



Fig. 3.6 Monitoring locations of Ambient Air





Ambient Air Quality Abstract

Locations	PM <sub>10</sub> µg/m <sup>3</sup>			PM <sub>2.5</sub> µg/m <sup>3</sup>			SO <sub>2</sub> µg/m <sup>3</sup>			NO <sub>x</sub> µg/m <sup>3</sup>			CO mg/m <sup>3</sup>			O <sub>3</sub> µg/m <sup>3</sup>			NH <sub>3</sub> µg/m <sup>3</sup>	Benzene µg/m <sup>3</sup>	BaP µg/m <sup>3</sup>	Pb µg/m <sup>3</sup>	Ni ng/m <sup>3</sup>	As ng/m <sup>3</sup>	
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
AAQ1- Project Site	64.1	71.5	67.8	30	33.8	31.9	5.0	6.0	5.5	10.0	12.0	11.0	0.50	0.54	0.52	20.10	24.20	22.15	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ2- Salwana Tatwani	62	71.4	66.7	30	31.7	30.9	5.0	5.6	5.3	10.0	11.1	10.6	0.50	0.53	0.52	20.10	22.20	21.15	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ3- Jhajhroli	62.1	70.5	66.3	30	32.9	31.5	5.0	5.5	5.3	10.0	11.2	10.6	0.50	0.51	0.51	20.30	24.30	22.50	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ4- Jheer Balla	61.5	64.5	63.0	31.3	33.8	32.6	5.0	5.5	5.3	10.0	10.9	10.5	0.50	0.55	0.53	20.20	26.60	23.40	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ5- Bohar Kawalu	62	66.7	64.4	32.1	35.8	34.0	5.0	5.9	5.5	10.0	12.4	11.2	0.50	0.56	0.53	20.20	23.20	21.70	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ6- Bharth	60.4	64.8	62.6	30	33.3	31.7	5.0	5.4	5.2	10.0	11.6	10.8	0.50	0.53	0.52	20.10	22.60	21.35	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ7- Korian	62.0	66.7	64.4	31.3	33.8	32.6	5.0	5.5	5.3	10.0	10.9	10.5	0.50	0.54	0.52	20.10	21.60	20.85	BDL	BDL	BDL	BDL	BDL	BDL	BDL
AAQ8- Bhamdrel	62.2	65.4	63.8	30.0	32.1	31.1	5.0	5.3	5.2	10.0	10.4	10.2	0.50	0.53	0.52	20.10	22.60	21.35	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<b>P98</b>	<b>70.4</b>			<b>35.2</b>			<b>5.9</b>			<b>12.2</b>			<b>0.55</b>			<b>25.95</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>CPCB Standards</b>	<b>100</b>			<b>60</b>			<b>80</b>			<b>80</b>			<b>4</b>			<b>100</b>			<b>400</b>	<b>05</b>	<b>01</b>	<b>1.0</b>	<b>20</b>	<b>06</b>	



## ANNEXURE IX

### Water Sampling frequency and Technique

Samples for chemical analysis are collected in polyethylene carboys. Samples collected for heavy metal analysis were acidified (1ml HNO<sub>3</sub>/100 ml). Samples for microbiological analysis were collected in sterilized glass bottles. Parameters analyzed at the site are pH, temperature, odour, turbidity and dissolved oxygen using portable water analysis kits. The methodology for sample collection and preservation techniques was followed as per the Standard Operating Procedures (SOP) mentioned below:

**Table 3.7: Standard Operating Procedure (SOP) for Water Sampling**

Parameters	Sample collection	Sample size	Storage/Preservation
pH	Grab Sampling Plastic/glass container	50 ml	Onsite analysis
Electrical conductivity	Grab Sampling Plastic/glass container	50 ml	Onsite analysis
Total Suspended Solids	Grab Sampling Plastic/glass container	100 ml	Refrigeration can be stored for 7 days
Total Dissolved Solids	Grab Sampling Plastic/glass container	100 ml	Refrigeration can be stored for 7 days
BOD	Grab Sampling Plastic/glass container	500 ml	Refrigeration, 48 hrs.
COD	Grab Sampling Plastic/glass container	100 ml	Add H <sub>2</sub> SO <sub>4</sub> to pH>2, refrigeration; 7 days
Hardness	Grab Sampling Plastic/glass container	100 ml	Add HNO <sub>3</sub> to pH<2, refrigeration; 6 months
Chlorides	Grab Sampling Plastic/glass container	50 ml	Not required; 28 days
Sulphates	Grab Sampling Plastic/glass container	100 ml	Refrigeration, 28 days
Nitrates	Plastic containers	100 ml	Refrigeration, 48 hrs
Fluorides	Plastic containers only	100 ml	Not required; 28 days
Alkalinity	Plastic/glass containers	100 ml	Refrigeration, 14 days
Ammonia	Plastic/glass containers	100 ml	Add H <sub>2</sub> SO <sub>4</sub> to pH>2, refrigeration; 28 days
Hexavalent Chromium, Cr <sup>+6</sup>	Plastic/glass containers Rinse with 1+1 HNO <sub>3</sub>	100 ml	Grab Sample; refrigeration; 24 hours
Trace Metals (Hg, Cd, Cu, Fe, Zn, Pb)	Plastic/glass containers Rinse with 1+1 HNO <sub>3</sub>	100 ml	Add HNO <sub>3</sub> to pH<2, refrigeration; 6 months

*(Source: Standard methods for the Examination of Water*



and wastewater, Published by APHA. AWWA. w.e.f 21<sup>st</sup> Edition, 2005)

**Table – 3.8 Designated Best Uses of Water**

Designated Best Use	Class	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	1. Total Coliforms Organism MPN/100ml shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20°C, 2 mg/l or less
Outdoor bathing (Organized)	B	1. Total Coliforms Organism MPN/100ml shall be 500 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20°C, 3 mg/l or less
Drinking after and water source conventional treatment disinfection	C	1. Total Coliforms Organism MPN/100ml shall be 5000 or less 2. pH between 6 and 9 3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20°C, 3 mg/l or less
Propagation of Wild life and Fisheries	D	1. pH between 6.5 and 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 4. Biochemical Oxygen Demand 5 days 20°C, 2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	1. pH between 6.0 and 8.5 2. Electrical Conductivity at 25°C micro mhos/cm, maximum 2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2 mg/l
	Below-E	Not meeting any of the A, B, C, D & E criteria

*Source: CPCB*

CPCB has identified water quality requirements in terms of a few chemical characteristics, known as primary water quality criteria. Further, Bureau of Indian Standards has also



recommended water quality parameter for different uses in the standard IS 2296:1992 provided in Table 3.8.

**Table – 3.9 Water Quality Standards in India (Source IS 2296:1992)**

Characteristics	Designated best use				
	A	B	C	D	E
Dissolved Oxygen (DO)mg/l, min	6	5	4	4	-
Biochemical Oxygen demand (BOD)mg/l, max	2	3	3	-	-
Total coliform organisms MPN/100ml, max	50	500	5,000	-	-
pH value	6.5-8.5	6.5-8.5	6.0-9.0	6.5-8.5	6.0-8.5
Colour, Hazen units, max.	10	300	300	-	-
Odour	Un-objectionable			-	-
Taste	Tasteless	-	-	-	-
Total dissolved solids, mg/l, max.	500	-	1,500	-	2,100
Total hardness (as CaCO <sub>3</sub> ), mg/l, max.	200	-	-	-	-
Calcium hardness (as CaCO <sub>3</sub> ), mg/l, max.	200	-	-	-	-
Magnesium hardness (as CaCO <sub>3</sub> ), mg/l, max.	200	-	-	-	-
Copper (as Cu), mg/l, max.	1.5	-	1.5	-	-
Iron (as Fe), mg/l, max.	0.3	-	0.5	-	-
Manganese (as Mn), mg/l, max.	0.5	-	-	-	-
Chlorides (as Cu), mg/l, max.	250	-	600	-	600
Sulphates (as SO <sub>4</sub> ), mg/l, max.	400	-	400	-	1,000
Nitrates (as NO <sub>3</sub> ), mg/l, max.	20	-	50	-	-
Fluorides (as F), mg/l, max.	1.5	1.5	1.5	-	-
Phenolic compounds (as C <sub>2</sub> H <sub>5</sub> OH), mg/l, max.	0.002	0.005	0.005	-	-
Mercury (as Hg), mg/l, max.	0.001	-	-	-	-
Cadmium (as Cd), mg/l, max.	0.01	-	0.01	-	-
Selenium (as Se), mg/l, max.	0.01	-	0.05	-	-
Arsenic (as As), mg/l, max.	0.05	0.2	0.2	-	-
Cyanide (as Pb), mg/l, max.	0.05	0.05	0.05	-	-
Lead (as Pb), mg/l, max.	0.1	-	0.1	-	-
Zinc (as Zn), mg/l, max.	15	-	15	-	-
Chromium (as Cr <sup>6+</sup> ), mg/l, max.	0.05	-	0.05	-	-
Anionic detergents (as MBAS), mg/l, max.	0.2	1	1	-	-
Barium (as Ba), mg/l, max.	1	-	-	-	-
Free Ammonia (as N), mg/l, max	-	-	-	1.2	-
Electrical conductivity, micromhos/cm, max	-	-	-	-	2,250
Sodium absorption ratio, max	-	-	-	-	26
Boron, mg/l, max	-	-	-	-	2



## ANNEXURE X

### SOIL ENVIRONMENT

Physical characteristics of soil influence its use and behavior towards plants growth. The plant support, root penetration, drainage, aeration, retention of moisture & plant nutrients is linked with the physical condition of soils. Normally following physical parameters are important for determining the quality of soil:

- (i) Texture
- (ii) Porosity
- (iii) Bulk density

#### i. Texture

On the basis of texture the study area may be classified as loamy sand, sandy loam and silty loam.

#### ii. Porosity

Volume of soil mass that is not occupied by soil particles and usually occupied by air & water are known as pore space. The plant roots grow & exist in the pore spaces. Porosity, therefore, refers to that percentage of soil volume which is occupied by pore spaces.

#### iii. Bulk Density

The bulk density weight of a unit of volume of soil inclusive of pore spaces is called bulk density. Generally, the soil with low bulk density has favorable physical conditions.

### Methodology for Soil Sampling:

The method and procedure for obtaining soil samples vary according to the purpose of sampling. Analysis of soil samples may be needed for engineering and agricultural purposes. In this publication, soil sampling for agricultural purpose is described which is done for soil fertility evaluation and fertilizer recommendations for crops. The results of even very carefully conducted soil analysis are as good as the soil sample itself. Thus, the efficiency of soil testing service depends upon the care and skill with which soil samples are collected. Non-representative samples constitute the largest single source of error in a soil fertility programme. It is to be noted that the most important phase of soil analysis is accomplished not in a laboratory but in the field where soils are sampled.

Soils vary from place to place. In view of this, efforts should be made to take the samples in such a way that it is fully representative of the field. Only one to ten gram of soil is used for each chemical determination and represents as accurately as possible the entire surface 0-22 cm of soil, weighing



about 2 million kg/ha.

### **Tools and Accessories**

Depending upon the purpose and precision required, following tools may be needed for taking soil samples.

- Soil auger- it may be a tube auger, post hole or screw type auger or even a spade for taking samples.
- A clean bucket or a tray or a clean cloth for mixing the soil and sub sampling.
- Cloth bags of specific size.
- Copying pencil for markings and tags for tying cloth bags.
- Soil sample information sheet.

### **Selection of a sampling unit**

A visual survey of the field should precede the actual sampling. Note the variation in slope, color, texture, management and cropping pattern by traversing the field. Demarcate the field into uniform portions, each of which must be sampled separately. If all these conditions are similar, one field can be treated as a single sampling unit. Such unit should not exceed 1 to 2 hectares, and it must be an area to which a farmer is willing to give separate attention. The unit of sampling is a compromise between the expenditure, labour and time on one hand and precision on the other. In view of limited soil testing facilities, it has been suggested to adopt an alternate approach where a sample may be collected from an area of 20-50 ha to be called as composite area soil sample and analyses the same for making a common recommendation for the whole area.

### **Procedure**

- Prepare a map of the area to be covered in a survey showing different sampling unit boundaries.
- A plan of the number of samples and manner of composite sampling is entered on the map, different fields being designated by letters A, B, C etc.
- Each area 64 is traverse separately. A slice of the plough-layer is cut at intervals of 15 to 20 steps or according to the area to be covered.
- Generally, 10 to 20 spots must be taken for one composite sample depending on the size of the field. Scrap away surface liter; obtain a uniformly thick slice of soil from the surface to the plough depth from each place.
- A V-shaped cut is made with a spade to remove 1 to 2 cm slice of soil. The sample may be collected on the blade of the spade and put in a clean bucket. In this way collect samples from all the spots marked for one sampling unit.



- In case of hard soil, samples are taken with the help of augur from the plough depth and collected in the bucket. Pour the soil from the bucket on a piece of clean paper or cloth and mix thoroughly. Spread the soil evenly and divide it into 4 quarters.
- Reject two opposite quarters and mix the rest of the soil again. Repeat the process till left with about half kg of the soil, collect it and put in a clean cloth bag. Each bag should be properly marked to identify the sample.
- The bag used for sampling must always be clean and free from any contamination. If the same bag is to be used for second time, turn it inside out and remove the soil particles.
- Write the details of the sample in the information sheet. Put a copy of this information sheet in the bag. Tie the mouth of the bag carefully.

### **Precautions**

- Do not sample unusual area like unevenly fertilized, marshy, old path, old channel, old bunds, area near the tree, site of previous compost piles and other unrepresentative sites.
- For a soft and moist soil, the tube auger or spade is considered satisfactory. For harder soil, a screw auger may be more convenient.
- Where crops have been planted in rows, collect samples from the middle of the rows so as to avoid the area where fertilizer has been band placed.
- Avoid any type of contamination at all stages. Soil samples should never be kept in the store along with fertilizer materials and detergents.
- Contamination is likely when the soil samples are spread out to dry in the vicinity of stored fertilizers or on floor where fertilizers were stored previously.
- Before putting soil samples in bags, they should be examined for cleanliness as well as for strength.
- Information sheet should be clearly written with copying pencil.

### **Sampling of salt affected soils**

- Salt affected soils may be sampled in two ways. Surface samples should be taken in the same way as for soil fertility analysis. These samples are used to determine gypsum requirement of the soil. For reclamation purpose, it is necessary to know the characteristics of lower soil depth also. Such soils are, therefore, sampled depth wise up to one meter. The samples may be removed from one to two spots per 0.4 hectare if the soil is uniformly salt affected. If patches are conspicuous then all big patches should be sampled separately. Soil is sampled depth wise separately (about ½ kg from each depth) for 0-15 cm, 15-30 cm, 30-60 cm and 60-100 cm soil



depths.

- If a stony 65 layer is encountered during sampling, such a layer should be sampled separately and its depth noted. This is very important and must not be ignored. Soil samples can be removed by a spade or if the auger is used then care should be taken to note the depth of 'concretion' (stones) or other impermeable layer (hard pan).
- If the soil shows evidence of profile development or distinct stratification, samples should be taken horizon wise. If a pit is dug and horizons are absent then mark the vertical side of the pit at 15, 30, 60 and 100 cm depth from the surface and collect about ½ kg. soil from every layer, cutting uniform slices of soil separately. In addition to the above sampling, one surface soil sample should be taken as in the case of normal soil sampling for fertilizer recommendation. Pack the samples and label the bags in the same way as is done for normal soil sampling, giving additional information about the depth of the sample. The sheet accompanying the sample must include the information on nature of soil, hardness and permeability of soil, salinity cause and source, if known, relief, seasonal rainfall, irrigation and frequency of water logging, water table, soil management history, crop species and conditions of plant cover and depth of the hard pan or concretion.
- As the salt concentration may vary greatly with vertical or horizontal distance and with moisture and time, account must be kept about time of irrigation, amount of irrigation or rain received prior to sampling.

### **Dispatch of Soil Samples to the Laboratory**

Before sending soil samples to the testing laboratory by a farmer, it should be ensured that proper identification marks are present on the sample bags as well as labels placed in the bags. It is essential that it should be written by copying pencil and not with ink because the ink will smudge and become illegible. The best way is to get the soil sampling bags from soil testing laboratory with most of the information printed or stenciled on them with indelible ink. Compare the number and details on the bag with the dispatch list. The serial numbers of different places should be distinguished by putting the identification mark specific for each centre. This may be in alphabets, say one for district and another for block/county and third for the village. Pack the samples properly. Wooden boxes are most suitable for long transport. Sample bags may be packed only in clean bags never used for fertilizer or

detergent packing. Farmers may bring soil samples directly to the laboratory. Most of the samples are, however, sent to the laboratories through the field extension staff. An organized assembly-



processing dispatch system is required to ensure prompt delivery of samples to the laboratory.

## **Preparation of soil samples for analysis**

### **a) Handling in the laboratory**

As soon as the samples are received at the soil testing laboratory, they should be checked with the accompanying information list. If the soil testing laboratory staffs have collected the samples themselves, then adequate field notes might have been kept. All unidentifiable samples should be discarded. Information regarding samples 66 should be entered in a register and each sample be given a laboratory number, in addition to sample number, which helps to distinguish if more than one source of samples is involved.

### **a) Drying of samples**

Samples received in the laboratory may be moist. These should be dried in wooden or enamelled trays. Care should be taken to maintain the identity of each sample at all stages of preparation. During drying, the trays can be numbered or a plastic tag could be attached. The soils are allowed to dry in the air. Alternatively, the trays may be placed in racks in a hot air cabinet whose temperature should not exceed 350 C and relative humidity should be between 30 and 60%. Oven drying a soil can cause profound change in the sample. This step is not recommended as a preparatory procedure in spite of its convenience. Drying has negligible effect on total N content but the nitrate content in the soil changes with time and temperature. Microbial population is affected due to drying at high temperature. With excessive drying, soil potassium may be released or fixed depending upon the original level of exchangeable potassium. Exchangeable potassium will be increased if its original level was less than 1 meq/100 g soil ( 1 cmol/kg ) and *vice-versa*, but the effect depends upon the nature of clay minerals in the soil. In general, excessive drying, such as oven drying of the soil, affects the availability of most of the nutrients present in the sample and should be avoided. Only air drying is recommended. Nitrate, nitrite and ammonium determinations must be carried out on samples brought straight from the field. These samples should not be dried. However, the results are expressed on oven dry basis by separately estimating moisture content in the samples.

### **a) Post drying care**

After drying, the samples are taken to the preparation room which is separate from the main laboratory. Air dried samples are ground with a wooden pestle and mortar so that the soil aggregate are crushed but the soil particles do not break down. Samples of heavy clay soils may have to be ground with an end runner grinding mill fitted with a pestle of hard wood and rubber lining to the



mortar. Pebbles, concretions and stones should not be broken during grinding.

After grinding, the soil is screened through a 2 mm sieve. The practice of passing only a portion of the ground sample through the sieve and discarding the remainder is erroneous. This introduces positive bias in the sample as the rejected part may include soil elements with differential fertility. The entire sample should, therefore, be passed through the sieve except for concretions and pebbles of more than 2 mm. The coarse portion on the sieve should be returned to the mortar for further grinding. Repeat sieving and grinding till all aggregate particles are fine enough to pass the sieve and only pebbles, organic residues and concretions remain out.

If the soil is to be analyzed for trace elements, containers made of copper, zinc and brass must be avoided during grinding and handling. Sieves of different sizes can be obtained in stainless steel. Aluminium or plastic sieves are useful alternative for general purposes. After the sample is passed through the sieve, it must be again mixed thoroughly. The soil samples should be stored in cardboard boxes in wooden drawers. These boxes should be numbered and arranged in rows in the wooden drawers, which are in turn fitted in a cabinet in the soil sample room.



## ANNEXURE XI

### Air Pollution Impact Prediction through Modeling

- ***Aermod Cloud***

AERMOD is an air dispersion-modeling package, which seamlessly incorporates the popular USEPA Models, ISCST3, ISC-PRIME and AERMOD into one interface without any modifications to the models. These models are used extensively to assess pollution concentration and deposition from a wide variety of sources.

- ***Aermod Model***

The AMS/EPA REGULATORY MODEL (AERMOD) was specially designed to support the Environmental Regulatory Modeling Programs. AERMOD is a regulatory steady – state modeling system with three separate components;

- AERMOD (AERMIC Dispersion Model);
- AERMAP (AERMOD Terrain Preprocessor); and
- AERMET (AERMOD) Meteorological Preprocessor.

The AERMOD model includes a wide range of options for modeling air quality impacts of pollution sources, making it popular choice among the modeling community for a variety of applications. AERMOD requires two types of meteorological data files, a file containing surface scalar parameters and a file containing vertical profiles. These two files are provided by AERMET meteorological preprocessor program.

- PRIME building downwash algorithms based on the ISC – PRIME model have been added to the AERMOD model;
- Use of arrays for data storage;
- Incorporation of EVENT processing for analyzing short-term source culpability;
- Explicit treatment of multiple – year meteorological data files and the annual average; and Options to specify emissions that vary by season, hour-of-day and day-of-week.

Deposition algorithms have been implemented in the AERMOD model – results can be output for concentration, total deposition flux, dry deposition flux, and / or wet deposition flux. The model contains algorithms for modeling the effects of settling and removal of large articulates and for modeling the effects of precipitation scavenging for gases or particulates.

- ***Aermet***

In order to conduct a refined air dispersion modeling project using the AERMOD short term air quality dispersion model, it is necessary to process the meteorological data representative of the study area being modeled. The collected meteorological data is not always in the format supported by the model; therefore,



the meteorological data needs to be pre-processed using AERMET program.

The AERMET program is a meteorological preprocessor, which prepares hourly surface data and upper air data for use in the AERMOD air quality dispersion model. AERMET is designed to allow future enhancements to process other types of data and to compute boundary layer parameters with different algorithms. AERMET processes meteorological data in three stages and from this process two files are generated for use with the AERMOD model. A surface file of hourly boundary layer parameters estimates a profile file of multiple-level observations of wind speed, wind direction, temperature and standard deviation of the fluctuating wind components.

- **Application of AERMOD**

The AERMOD model with the following assumptions has been used to predict the cumulative GLC due to emissions from the proposed activity:

- The stack tip down wash is not considered.
- Plume rise is estimated by Brigg's formula but the final rise is limited to that of mixing layer.
- Buoyancy induced dispersion is used to describe the increase in plume dispersion.
- Calm processing route is used by default.
- Complex terrain is used in computation.
- It is assumed that the pollutants don't undergo any physico-chemical transformation and there is no pollutant removal by dry deposition.
- Wash out due to rain is not considered.
- Receptors on that terrain with no flag pole have been considered.

### **Atmospheric Stability**

The stability class has been estimated using the hourly monitored wind velocity along with the other computed data.

### **Mixing Heights**

Due to non-availability of site-specific mixing heights "Hourly Mixing Heights & Dissimilative Capacity of Atmosphere in India" published by Environment Monitoring & Research Centre, IMD, New Delhi has been referred for hourly mixing heights.

### **Meteorological Data**

The hourly meteorological data recorded at site is converted to the mean hourly meteorological data as specified by CPCB and the same has been used in the model. Hourly mixing heights are taken from the "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India" published by India meteorological department, 2008, New Delhi. The meteorological data recorded during study



period continuously on wind speed, wind direction, temperature etc., have been processed to extract the data required for simulation by AERMOD using AERMET.



ANNEXURE XII

NABET CERTIFICATE



भारतीय गुणवत्ता परिषद्  
**QUALITY COUNCIL OF INDIA**  
Creating an Ecosystem for Quality



**NABET**

**National Accreditation Board for Education and Training**

**Certificate of Accreditation**

**JMS Enviro Care and Innovative Centre, Solan**

Building No./Flat No.: SCO6, Road/Street: 2nd Floor Motia Plaza, Saraj Majra Lavan, Baddi, Solan, Himachal Pradesh-173205

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors.

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast/underground mining	1	1 (a) (i)	B
2.	Mining of minerals-opencast mining only			A
3.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
4.	Cement plants	9	3 (b)	B
5.	Synthetic organic chemicals industry	21	5 (f)	A
6.	Distilleries	22	5 (g)	A
7.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	B
8.	Highways,	34	7 (f)	A
9.	Building and construction projects	38	8 (a)	B
10.	Townships and Area development projects	39	8 (b)	B

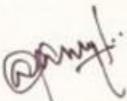
**Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IAAC minutes dated July 12, 2024, and Supplementary Assessment minutes dated September 20, 2024 posted on QCI-NABET website.**

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3373 dated October 1, 2024. The accreditation needs to be renewed before the expiry date by JMS Enviro Care and Innovative Centre, Solan following due process of assessment.

Issue Date  
October 1, 2024

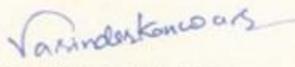


Valid up to  
June 20, 2027



Mr. Ajay Kumar Jha  
Sr. Director, NABET

Certificate No.  
NABET/EIA/24-27/IA 0142



Prof (Dr) Varinder S Kanwar  
CEO-NABET

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.



ANNEXURE XIII

NABL CERTIFICATE



National Accreditation Board for  
Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

**CHANDIGARH POLLUTION TESTING LABORATORY**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing &  
Calibration Laboratories"**

for its facilities at

PLOT NO. E-126, PHASE-VII, INDUSTRIAL AREA, MOHALI, PUNJAB, INDIA

in the field of

**TESTING**

Certificate Number: TC-6728

Issue Date: 09/11/2024

Valid Until: 08/11/2028

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.  
(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Name of Legal Entity: Chandigarh Pollution Testing Laboratory

Signed for and on behalf of NABL



N. Venkateswaran  
Chief Executive Officer

संख्या: 7-6/2025-ई.एक्स.एन.- 27608  
राज्य कर एवं आबकारी विभाग  
हिमाचल प्रदेश।

प्रेषक:

आयुक्त राज्य कर एवं आबकारी,  
हिमाचल प्रदेश, शिमला 9।

प्रेषित:

प्रधान सचिव (राज्य कर एवं आबकारी),  
हिमाचल प्रदेश सरकार, शिमला-2।

दिनांक शिमला-9

07/11/2025

विषय:-

Proposal for the grant of LoI in favour of M/s Angus Dundee India Pvt. Ltd. to set up a Malt Spirit, Craft Gin Plant along with Bottling plant at Mohal Parei, Village Salol, Tehsil & District Kangra (H.P.)

महोदय,

उपरोक्त विषय पर आपके कार्यालय पत्र संख्या ई0एक्स0एन0-एफ(6)-1/2025 दिनांक 24 मार्च, 2025 के सन्दर्भ में सूचित किया जाता है कि मैसर्ज M/s Angus Dundee India Pvt. Ltd. के पक्ष में जिला कांगड़ा के Mohal Parei, Village Salol, Tehsil & District Kangra में डिस्टिलरी एवं बॉटलिंग संयंत्र स्थापित करने प्रस्ताव राज्य स्तरीय सिंगल विंडो क्लीयरेंस एवं मॉनिटरिंग अथॉरिटी के समक्ष प्रस्तुत करने बारे निदेशक, उद्योग, हिमाचल प्रदेश को इस कार्यालय के पत्र संख्या 7-6/2025-ई0एक्स0एन0-7643 दिनांक 29.03.2025 द्वारा लिखा गया था।

इस सन्दर्भ में सूचित किया जाता है कि राज्य स्तरीय सिंगल विंडो क्लीयरेंस एवं मॉनिटरिंग अथॉरिटी द्वारा दिनांक 13.10.2025 को हुई बैठक में उक्त प्रार्थी के पक्ष में डिस्टिलरी तथा बॉटलिंग प्लांट (Malt Spirit, Mature Malt Spirit, Gin, IMFL के उत्पादन हेतु) स्थापित करने बारे सैद्धान्तिक अनुमति प्रदान कर दी है।

उक्त फर्म एक प्राइवेट लिमिटेड फर्म है तथा प्रार्थी द्वारा उक्त प्लांट को स्थापित करने हेतु 297 करोड़ का निवेश किया जाना है तथा 100 लोगों को रोजगार प्रदान किया जायेगा जोकि सरकार द्वारा डिस्टिलरी प्लांट को स्थापित करने बारे मानकों के अनुरूप है। प्रार्थी द्वारा प्रस्तुत अन्य सभी दस्तावेज इस कार्यालय के पत्र संख्या 7-6/2025-ई0एक्स0एन0-1882 दिनांक 28.01.2025 के तहत आपके कार्यालय को प्रेषित किये जा चुके हैं। मामले में यह भी सूचित किया जाता है कि राज्य में वर्तमान में कुल 20 बॉटलिंग/डिस्टिलरी/बूरी प्लांट संचालित है।

अतः उपरोक्त के सन्दर्भ में सिफारिश की जाती है कि मैसर्ज M/s Angus Dundee India Pvt. Ltd. के पक्ष में जिला कांगड़ा के Mohal Parei, Village Salol, Tehsil & District Kangra के पक्ष में Malt Spirit, Mature Malt Spirit, Gin, IMFL के उत्पादन हेतु डिस्टिलरी तथा बॉटलिंग प्लांट स्थापित करने हेतु आशय पत्र जारी करने की कृपा करें। मामला उचित कार्यवाही हेतु आपके कार्यालय को प्रेषित किया जाता है।

इसके अतिरिक्त यह भी सूचित किया जाता है कि यदि उक्त संयंत्र को स्थापित करने की अनुमति दी जाती है तो संयंत्र स्थापित होने के उपरान्त उसमें आबकारी कार्यों के प्रबंधन के लिये सहायक राज्य कर एवं आबकारी अधिकारी (ASTE0) की नियुक्ति की जानी आवश्यक है। अतः

सिफारिश की जाती है कि यदि प्रार्थी के पक्ष में संयंत्र स्थापित किये जाने की अनुमति प्रदान की जाती है तो उक्त संयंत्र हेतु राज्य कर एवं आबकारी अधिकारी (ASTE0) के दो पदों को सृजित करने की अनुमति भी प्रदान की जाये।

संलग्न: उपरोक्त

भवदीय,



(डॉ० यूनुस) आइ०ए०एस०  
आयुक्त राज्य कर एवं आबकारी  
हिमाचल प्रदेश।



# Single Window Clearance System

Directorate of Industries(DOI)  
Govt. of Himachal Pradesh

## IN-PRINCIPLE APPROVAL

No: HP-CAF/108127

Date of Issue:04 Nov 2025

M/s **ANGUS DUNDEE INDIA PRIVATE LIMITED** has filled Common Application Form No. **108127** received Dt. Tuesday 21 Jan 2025 expressing its intention to setup the Manufacturing enterprise as per following details:-

Nature of Organization		Type of Enterprise		Project Status	
Private Limited		Large (> 50 Crore)		New	
Proposed Location			MOHAL PAREI, VPO SALOL, TEHSIL & DISTRICT KANGRA, HIMACHAL PRADESH		
Proposed Product & Capacity Per Annum					
Items					
Product Name	Excise Code	Quantity	Unit		
MALT SPRITI FRESH AND MATURE MALT SPIRIT	22083019 AND 22083099	9600000.00	Liters		
Gin	22085091	640000.00	Liters		
INDIAN MADE FOREIGN LIQUIR	22083012 AND 22085011	2880000.00	Liters		
CATTLE FEED	23099020	20800.00	Tonnes		
Detail of Investment (Rs. in lacs)					
Land	Building	Plant & Machinery	Other Fixed Assets	Total	
705.00	7195.00	7200.00	14600.00	29700.00	
Detail of Employment					
Skilled	Un-Skilled	IT/ITeS Professional	Total		
30	45	2	77		
Requirement of Basic Infrastructure					
Land	Power Connection Load(kW)	Power Contract Demand(kVA)	Water (KL/Day)		
34529 Square Meter (Pvt.)	1200	1333.33	900		

The proposal was approved in-Principle by the State Single Window Clearance & Monitoring Authority in its 31st Meeting held on 13.10.2025 subject to the following conditions:

1. The unit will obtain all project specific approvals/clearances from the concerned regulatory authorities of Central & State Govt. as applicable prior to implementation of the project or before starting commercial production as applicable, failing which unit will be held liable for any consequences without giving opportunities of being heard. Any violation on the part of the unit will attract action under relevant rules/laws.
2. The unit will employ at all level at least 80% (or as prescribed from time to time) of total manpower, whether on regular/Contractual/Sub-contractual/daily basis/ or any other mode from amongst bonafide Himachali. The management/employer is also advised/directed to upload all the employment vacancies on EEMIS portal of the Labour & Employment Department. The unit will also get their plan approved by Chief inspector of Factories as per the provision of Factories Act & applicable rules thereof.
3. The HPPCB has no objection subject to following conditions: 1. The unit shall not carry out any activity at site till Consent to Establish is issued under Air Act, 1981 and Water Act, 1974. 2. Unit shall obtain environmental clearance from the competent authority, if applicable. 3. Unit will have to provide the necessary pollution control devices. 4. Unit shall comply with the State Fuel Policy. 5. Unit shall comply the rules and provision laid down in Solid Waste Management Rules, 2016, C & D Waste Rules (Muck Management) and Plastic Waste Rules, 2016.
4. The JSV concurred that if proposed from new borewell then the proponent should apply online for "Grant of Permit" through [www.emerginghimachal.hp.gov.in](http://www.emerginghimachal.hp.gov.in) or [jsv.hp.nic.in](http://jsv.hp.nic.in) portal of Himachal Pradesh Ground Water Authority.
5. The HPSEBL concurred that the power for a load of 1200 kW with 1333.33 kVA Contract Demand can be made



# Single Window Clearance System

Directorate of Industries(DOI)  
Govt. of Himachal Pradesh

available at 11 kV supply voltage from 33/11 kV Substation Lunj after augmentation of 1.6 MVA power transformer to 5 MVA at 33/11 kV Substation Lunj, Re-conductoring of spans, augmentation of 16/20 MVA Power transformer at 132/33 kV Substation Dehra. The applicant should fulfil the codal formalities for issuance of PAC and sanction/release of load as per HP Electricity Supply Code,2009 and HPSEBL Sales Manual Instructions as amended from time to time. The recovery of expenditure for supply of electricity shall be as per HPERC(Recovery of Expenditure for supply of Electricity) Regulations,2012 as amended from time to time.

6. The Firm has to obtain NoC from Fire Department prior to implementation of Project.
7. The Site /location for setting up of the project should conform to the sitting criteria and other environmental considerations as prescribed by the concerned State/ Centre Govt. Departments/ Organizations. You are therefore advised to keep in mind all these requirements for setting up of the project.
8. In order to reduce requirement of fresh water you are also advised to recycle used/ waste water.
9. 1% Cess on the actual cost of construction shall be deposited by the industrial unit under the Building and Other Construction Workers Welfare Cess Act 1996.
10. The unit will update monthly progress Report regarding implementation of project or any problems/hurdles being faced online on Single Window Portal.
11. The unit will obtain NoC from the HP State Bio-Diversity Board under the aegis of the Science & Technology Department for the usage of Bio Resources as Raw material for manufacturing of finished goods prior to the commencement of commercial production.
12. The firm has to obtain permission under Section-118 of HPT&LRA 1972 from competent authority prior to implementaion of project.
13. The firm will obtain letter of Intent from Department of State Excise &Taxation before starting implementation of the project.

***This approval is valid for two years from today. If no effective steps are taken to establish the project within this time period, it will be presumed that you are not interested in establishing the project and the approval will lapse automatically without any further notice. We assure you of our full co-operation and wish you and your enterprise all the success.***



सत्यमेव जयते  
हिमाचल प्रदेश सरकार

[Digitally Signed by Dr. Yunus on 04 Nov 2025 ]  
Director (Approving Authority), Department of Industries  
Govt. of Himachal Pradesh