

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

DRAFT ENVIRONMENT IMPACT ASSESSMENT REPORT

For

**"Proposed Expansion of Existing
waste to Energy Plant up to 45
MW" At
Adjacent DTC Tehkhand Depot,
Maa Anandmai Marg, Tehkhand,
New Delhi-110020 by
M/s Tehkhand Waste to Electricity
Project Limited**



Production Capacity:

Power Generation - 45 MW and
By-Product- Biogas upto 20,000
Nm³/day or Bio-CNG/CBG upto 8 TPD)

Plant Area - 6.07 Ha (60703 Sqm)

Cost of Project: Rs. 900.00 Crores

Item no. & Category - 1(d), Cat.- A

Baseline season - March 2024 - May
2024

UID No.- PE263419-G-05

Laboratory Assigned:

M/s Virat Global Lab(A division of
Aseries Enviroteck India Private
Ltd.) ,Certificate Number: TC-14455
Valid upto-08/09/2026) (An
ISO/IEC 17025:2017 certified lab)

Site Address

**Adjacent DTC Tehkhand Depot,
Maa Anandmai Marg
District- Tehkhand
State- New Delhi**

Project Proponent

**M/s Tehkhand Waste to Electricity
Project Limited**

Name of Contact Person -Shri Sandip
Dutt

Email

Address-Sandip.Dutt@jindalecopolis.com

Registered Address- Adjacent to DTC
Tehkhand Depot, Maa Anandmai Marg,
Tehkhand, New Delhi-110020

Environmental Consultant

**Perfact Enviro Solutions Pvt. Ltd.
(PESPL)**

NABET Registered List of Accredited Consultant
Organisations/ NABET/ EIA/ 2225/ RA0284
(Rev.01), Valid upto 26.11.2025

Registered Address: - A14, Shubham Enclave
(Outer Ring Road), Paschim Vihar, New Delhi
110063

Email- info@perfactgroup.in

Website- www.perfactgroup.com

Phone- +91-11-4928 13

Cover Letter

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Date: 20-09-2025

To Whom it May Concern

We authorize M/s Perfact Enviro Solutions Pvt. Ltd. add. A 14, Shubham Enclave (Outer Ring Road), Paschim Vihar, New Delhi 110063, one of the approved consultant of Ministry of Environment, Forest & Climate Change, Govt, of India listed on MoEF&CC website for getting Environmental Clearance for project "Proposed Expansion of Existing Waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.



(Authorized Signatory)

For M/s Tehkhand Waste to Electricity Project Limited

Plagiarism/ QMS Certificate

Title of EIA Report:	“Proposed Expansion of Existing waste to Energy Plant from 25 MW up to 45 MW at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.”
Name of Accredited Organization:	M/s Perfact Enviro Solutions Pvt. Ltd.
Unique Identification Number:	PE263419-G-04
Name of EIA Coordinator (EC):	Dr. Suresh Chandra Jain
Name of the Software:	Duplichecker
Date of Check:	15.09.2025
Time of Check:	12:00pm

I hereby certify that this EIA Report has been evaluated using online/In-house software Duplichecker. The report produced has been analysed by the system and based on it, I certify that the EIA report produced in accordance with good scientific practice.

**SURESH
CHANDRA JAIN**

Sign of EIA Coordinator

Name: Dr. Suresh Chandra Jain

Digitally signed by SURESH CHANDRA JAIN
DN: cn=SURESH CHANDRA JAIN, o=Perfact Enviro Solutions Pvt. Ltd., email=suresh.chandra.jain@perfactgroup.com, serialNumber=1, c=IN
Reason: I am the author of this document
Date: 2025.09.15 17:02:13 +05'30'
Foat PDF: Reader Version: 2024.4.0

Date and Sign of Head of Accredited Organisation:

Mrs. Rachna Bhargava

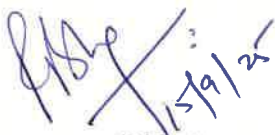
Name of the EIA consultant organisation: M/s Perfact Enviro Solutions Pvt. Ltd.

NABET certificate no. NABET/EIA/2225/RA 0284 (Rev 1) valid up to 26.11.2025)

Undertaking by Head of EIA Consultant

I, Rachna Bhargava, Director & CEO of M/s Perfact Enviro Solutions Pvt. Ltd., A 14, Shubham Enclave (Outer Ring Road), Paschim Vihar, New Delhi 110063, authorise **Dr. Suresh Chandra Jain** (EIA Coordinator- 1(d)) for the preparation and conducting the Environment Impact Assessment for project **“Proposed Expansion of Existing waste to Energy Plant from 25 MW up to 45 MW at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.”**

Name of EIA Coordinator	Dr. Suresh Chandra Jain
	1 (d)- Thermal Plant, Category A
Signature	SURESH CHANDRA JAIN Digitally signed by SURESH CHANDRA JAIN DN: C=IN, O=Personal, T=6999, Phone=30617768898565f60587c8f0d4d3a9130aa1355a4369a6dc2f4c2e1afb50, PostalCode=834005, S=Jharkhand, SERIALNUMBER=5c0d0e4fa3012d77aba8597f95114c7656025233706e829e72756e951c470509, CN=SURESH CHANDRA JAIN Reason: I am the author of this document Location: Date: 2025.09.15 16:56:49+05'30' Foxit PDF Reader Version: 2024.4.0



Rachna Bhargava, Director & CEO

M/s Perfact Enviro Solutions Pvt. Ltd.

A 14, Shubham Enclave (Outer Ring Road),

Paschim Vihar, New Delhi 110063

Undertaking By of EIA Coordinator

I, Dr. Suresh Chandra Jain, EIA Coordinator from Environmental consultant M/s Perfact Enviro Solutions Pvt. Ltd. A14, Shubham Enclave (Outer Ring Road), Paschim Vihar, New Delhi 110063 for project **“Proposed Expansion of Existing waste to Energy Plant from 25 MW up to 45 MW at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.”** hereby undertake that the report is prepared in accordance with a robust quality management system adopted by EIA consulting organisation for the EIA process and the prescribed TOR have been complied with and that the data submitted is factually correct.

Name of EIA Coordinator	Dr. Suresh Chandra Jain
	1 (d)- Thermal Plant, Category A
Signature	SURESH CHANDRA JAIN
Office Address	Perfact Enviro Solutions Pvt. Ltd. A 14, Shubham Enclave (Outer Ring Road), Paschim Vihar, New Delhi 110063

EIA Coordinator

M/s Perfact Enviro Solutions Pvt. Ltd.

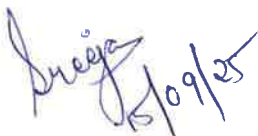
A 14, Shubham Enclave (Outer Ring Road),
Paschim Vihar, New Delhi 110063

Declaration by EIA Coordinator(s) & Experts Contributing to the EIA “Proposed Expansion of Existing waste to Energy Plant from 25 MW up to 45 MW at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited”.

I hereby declare that I was involved in the following EIA Report submitted to Delhi Pollution Control Board, as EIA Coordinator. I further certify that the data given in this report is true and correct to the best of my knowledge.

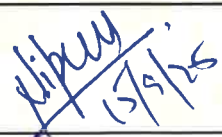
Name of EIA Coordinator	Dr. Suresh Chandra Jain
	1 (d)- Thermal Plant, Category A
Signature	SURESH CHANDRA JAIN
Task & Period of Involvement	I had visited the site along with the FAEs to understand the project site and the study area. Coordinated with the experts and prepared the impact assessment methodology. Identification and Prediction of the impact assessment, Formulation of the Environment Management Plan, Technical Review. Period of Involvement: September 2025
Office Address	Perfact Enviro Solutions Pvt. Ltd. A 14, Shubham Enclave (Outer Ring Road), Paschim Vihar, New Delhi 110063

Assistant to EIA Coordinator

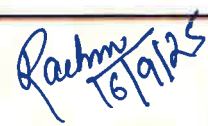
Name of Assistant to EIA Coordinator	Ms. Sreeja Sreekanth
Signature	

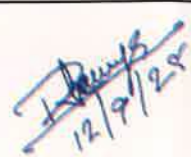
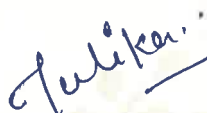
Task & Period of Involvement	I had understood the project. Coordinated with the experts and prepared the Environment Impact Assessment Report along with the EIA coordinator. Identification and Prediction of the impact assessment, Formulation of the Environment Management Plan. Period of Involvement: July 2025 - September 2025
Office Address	Perfact Enviro Solutions Pvt. Ltd. A 14, Shubham Enclave (Outer Ring Road), Paschim Vihar, New Delhi 110063

List of FAEs Involved (Cat A)

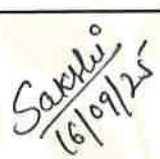
S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
1.	EIA Coordinator	Dr. Suresh Chandra Jain	I had visited the site with the FAEs to assess the project site and the study area. Coordinated With the experts and prepared the impact assessment methodology. Identification and Prediction of the impact assessment, Formulation of the Environment Management Plan, Technical Review. Period of Involvement: July 2025 - September 2025	SURESH CHANDRA JAIN Digitally signed by SURESH CHANDRA JAIN DN: C=IN, O=Personal, T=6999, Phone=3061777e6698565f60567c8f0dfd8d3a9130aa1355a4369a6dc214c2e1afb50, PostalCode=834005, S=Jharkhand, SERIALNUMBER=5c0d0e4fa3012d77aba8597f95114c7856025233706e829e72756e951c470509, CN=SURESH CHANDRA JAIN Reason: I am the author of this document Location: Date: 2025.09.15 16:55:45+05'30' Foxit PDF Reader Version: 2024.4.0
2	AP (Air pollution monitoring, prevention, and control)	Dr. Nipun Bhargava	I had visited the site to assess the site conditions in the surrounding area. After assessing the Air pollution sources. Made Sampling plan & conducted monitoring; based on the results and the site specific details along with Project Specific Details obtained, I have prepared the Impact Mitigation measures Period of Involvement: July 2025 - September 2025	 15/9/25
3	AQ (Meteorology,	Dr. Nipun Bhargava	I had visited the site for the assessment of the sources and the emissions. After studying, I calculated the model input	 15/9/25

S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
	air quality modeling, and prediction)		data related to the proposed emissions and micrometeorology interpretation of modeling results and development of EMP. Period of Involvement: July 2025 - September 2025	
4	WP (Water pollution monitoring, prevention, and control)	Dr. Nipun Bhargava	I had visited the site to assess the water sources and its water quality in the study area. After studying the Water pollution sources have prepared Sampling plan & collected samples ; based on the results from the lab and the site specific details along with Project Specific Details obtained, I have prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025	 15/9/25
5	RH (Risk Assessment and hazard management)	Dr. Nipun Bhargava	I had visited the site to assess the site conditions in the surrounding area and identified hazards. After assessing the risk and hazard, I prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025	 15/9/25
6	SE (Socio-Economics)	Mrs. Rachna Bhargava	I had visited the site to collect the baseline status of socio-economic conditions and studied Villages in study area using Topographical maps and extracted Secondary data from Census of India. Then was involved in preparing a socio economic study report using the primary survey and secondary data which includes impact and mitigation measures.	 15/9/25

S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
			Period of Involvement: July 2025 - September 2025	
7	NV (Noise and Vibration)	Mr. Praveen Bhargava	I had visited the site to assess the site conditions in the surrounding area. After assessing the Noise pollution sources have prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025	
8	SHW (Solid and hazardous waste management)	Mr. Praveen Bhargava	I had visited the site to assess the Solid waste sources and status in the study area. After studying the sources have prepared the Impact report and suggested Mitigation measures and development of EMP. Period of Involvement: July 2025 - September 2025	
9	HG (Hydrology, groundwater water and water conservation)	Mr. Santosh Pant	The physical observation of the study area including Ground water sources and its water quality was made. After studying the Water pollution sources, the Impact report was prepared and Mitigation measures were suggested Period of Involvement: July 2025 - September 2025	
10	Geo (Geology)	Mrs. Saloni Sharma	I had visited the site to assess the geology of the study area. After studying I have prepared the Impact report and suggested mitigation measures Period of Involvement: July 2025 - September 2025	
11	SC (Soil conservation)	Mrs. Rachna Dogra	I had visited the site to assess the site conditions in the surrounding area. After assessing the type of soil and need of Soil	

S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
			Conservation, Prepared the Impact Mitigation measures accordingly. Period of Involvement: July 2025 - September 2025	
12	LU (Land use)	Mr. Rajneesh Maurya	I was involved in preparing a Land Use map using Satellite Imagery, Google maps after primary survey. Period of Involvement: July 2025 - September 2025	 12/9/25
13	EB (Ecology and biodiversity)	Mrs. Tulika Rawat	I had visited the site to assess the various forest areas, Ecological and Biodiversity sources in the study area. After studying the various floral and faunal species, assisted FAE in preparing the Impact report and suggested Mitigation measures Period of Involvement: July 2025 - September 2025	

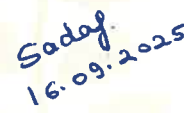
List of FAA Involved

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
1.	SHW (Solid and hazardous waste management)	Ms. Navneet Kaur	I had studied the project to assess the Solid waste sources and status in the study area. After studying the sources have prepared the Impact report and suggested Mitigation measures and development of EMP. Period of Involvement: July 2025 - September 2025	 16/09/25
2.	WP (Water pollution monitoring, prevention and)	Ms. Sakshi Tripathi	I had visited the site to assess the water sources and its water quality in the study area. After studying the Water pollution sources, I have	 16/09/25

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
	control)		prepared a Sampling plan & collected samples ; based on the results from the lab and the site-specific details, along with Project Specific Details obtained, I have prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025	
3.	AP (Air pollution monitoring, prevention, and control)	Ms. Tanya Thakur	I had visited the site to assess the site conditions in the surrounding area. After assessing the Air pollution sources. Made Sampling plan & conducted monitoring; based on the results and the site specific details along with Project Specific Details obtained , I have prepared the Impact Mitigation measures Period of Involvement: July 2025 - September 2025	Tanya Thakur
4.	AQ (Meteorology, air quality modeling, and prediction)	Ms. Tanya Thakur	I had visited the site for the assessment of the sources and the emissions. After studying, I calculated the model input data related to the proposed emissions and micrometeorology interpretation of modeling results and development of EMP. Period of Involvement: July 2025 - September 2025	Tanya Thakur
5.	SE (Socio-Economics)	Mr. Pramod Kumar	I had visited the site to collect the baseline status of socio-economic conditions and studied Villages in study area using Topographical maps and extracted Secondary data	Pramod Kumar 15/09/2025

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
			from Census of India. Then was involved in preparing a socio economic study report using the primary survey and secondary data which includes impact and mitigation measures. Period of Involvement: July 2025 - September 2025	

List of TM Involved

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
1.	LU (Land Use)	Mr. Deepak Kumar	I was involved in preparing a Land Use map using Satellite Imagery, Google maps and Toposheet after primary survey. Period of Involvement: July 2025 - September 2025	 12/09/2025
2.	HG (Hydrology, ground water and water conservation)	Mr. Deepak Kumar	I have visited the site and assessed the hydrology of the area. After studying the hydrology and pollution sources the impact and mitigation have been identified. Period of Involvement: July 2025 - September 2025	 12/09/2025
3.	AP (Air pollution monitoring, prevention, and control)	Mrs. Sadaf Akhtar	I had visited the site to assess the site conditions in the surrounding area. After assessing the Air pollution sources. Made Sampling plan & conducted monitoring; based on the results and the site specific details along with Project Specific Details obtained, I have prepared the Impact Mitigation measures Period of Involvement: July 2025 - September 2025	 16.09.2025

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)	Signature & Date
4.	WP (Water pollution monitoring, prevention and control)	Mrs. Sadaf Akhtar	I had visited the site to assess the water sources and its water quality in the study area. After studying the various WP sources, assisted FAE in preparing the impact report and suggested mitigation measures. Period of Involvement: July 2025 - September 2025	<i>Sadaf</i> 16.09.2025
5.	SHW (Solid and hazardous waste management)	Ms. Sreekanth Sreeja	I had studied the project to assess the Solid waste sources and status in the study area. After studying the sources have prepared the Impact report and suggested Mitigation measures and development of EMP. Period of Involvement: July 2025 - September 2025	<i>Sreeja</i> 16/09/25

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg,
New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

SECTION A - TOR LETTER



File No: J-13012/03/2017-IA.I(T)
Government of India
Ministry of Environment, Forest and Climate Change
IA Division



Dated 16/09/2025



To,

Mr. Sandip Dutt
M/s. Tehkhand Waste to Electricity Project Limited
Adjacent DTC Tehkhand Depot, Maa Anandmai Marg, Tehkhand, New Delhi - 110020.
E-mail: info.twepl@jindalecopolis.com

Subject: **Expansion of Existing 25 MW Waste to Energy (WTE) Plant to 45 MW by M/s Tehkhand Waste to Electricity Project Limited located at adjacent DTC Tehkhand, Depot, Maa Anandmai Marg, District Southeast, New Delhi - Prescribing of Terms of Reference under para 7(ii) a of EIA Notification, 2006 – regarding**

Sir/Madam,

This is in reference to your online proposal number IA/DL/THE/544398/2025 dated 21/07/2025 along with submission of additional information dated 26.08.2025 seeking for grant of Terms of Reference under the provisions of the EIA Notification 2006 and as amended for the project mentioned above.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25A0603DL5903895N
(ii) File No.	J-13012/03/2017-IA.I(T)
(iii) Clearance Type	TOR
(iv) Category	A
(v) Project/Activity Included Schedule No.	1(d) Thermal Power Plants
(vi) Sector	Thermal Projects “Proposed Expansion of Existing Waste to Energy Plant up to 45 MW”, at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited
(vii) Name of Project	
(viii) Name of Company/Organization	M/s. Tehkhand Waste to Electricity Project Limited
(ix) Location of Project (District, State)	South East, DELHI
(x) Issuing Authority	MoEF&CC
(xi) Applicability of General Conditions	yes

3. M/s. Tehkhand Waste to Electricity Waste Project Limited (TWEWPL) has made an application online vide proposal no. IA/DL/THE/544398/2025 dated 21/07/2025 along with the application in prescribed format (CAF, Form – I Part A & B), copy of pre-feasibility report and proposed ToRs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above.

4. The proposed project activity is listed at item no. 1(d) Under Category “A” of the schedule of the EIA Notification, 2006 and also attracts general conditions due to proximity to protected area - Okhla Bird Sanctuary ESZ at 4.76 Km NE and Okhla Bird Sanctuary at 4.83 km NE, Asola Wildlife Sanctuary ESZ at 0.72 km SW & Asola Wildlife Sanctuary at 1.65 km SW & inter-state boundaries-Delhi-Haryana State boundary at 1.30 Km SE, and Okhla Industrial Area [Critically polluted area having CEPI score of 92.65] is located at 0.61 km North. Hence, the proposal is considered at Central Level.

5. The instant proposal was considered in 28th EAC meeting held on 12-13th August, 2025. The MoM for the same may be seen using the web link: parivesh.nic.in.

Details submitted by Project proponent

6. The existing 25 MW WTE plant was accorded environmental clearance vide letter no. J-13012/03/2017-IA.I(T) dated 26.07.2018 from MoEF&CC. Public hearing for the project was held on 21/05/2018. Subsequently, EC amendment was accorded on 15.01.2019. Consent to Establish (CTE) was obtained from Delhi Pollution Control Committee (DPCC), vide File No. DPCC/WMC-II/Tehkhand-WTE/2018/3090 dated 31.01.2020 and subsequently renewed up to 25.02.2023. Consent to Operate (CTO) has been taken from Delhi Pollution Control Committee (DPCC), vide File No. DPCC/WMC-II/Tehkhand-WTE/2018/620-626, dated 07.10.2022 and subsequently renewed up to 06.10.2029.

7. Implementation status of the EC dated 26/07/2018

S. No.	Configuration	Capacity (MW)	As per the EC dated	Implementation Status as on July 2025	Production as per CTO
1	Product- Power Generation through MSW waste processing 2000 TPD	25	26/07/2018 & 15.01.2019 (Amendment in EC)	The project has been implemented in compliance with the EC conditions and is currently in operation after obtaining all necessary clearances and No Objection Certificates (NOCs) from concerned departments.	25MW

8. The unit configuration and capacity of existing and proposed project is given as below:

Name of the facility	Unit	Existing	Proposed Expansion*	Total after Expansion Capacity	
Product (Waste to Energy Power)	MW	25	20	45	
Biogas production (by-product)	Nm ³ /day or TPD	Nil	Biogas = up to 20,000 Nm ³ /day /CBG = up to 8 TPD	Biogas = up to 20,000 Nm ³ /day /CBG = up to 8 TPD	
Boiler for WTE	TPH	2 x 65	≤100	≤230	

Note*: As per the final EIA report submitted at the time of grant of EC during 26/07/2018 (Proposal No: IA/DL/THE/71979/2017), provision was indicated for future expansion in Figure 2.8 (Site Layout Plan) at Page No. 59 by depicting the third boiler in a grey outline. Instant expansion was envisaged at the time of applying of existing EC itself.

Process description

WTE plant

The technology proposed to be employed for this WTE project is RDF combustion based reciprocating forward feed grate technology. The power plant constitutes Material Recovery Facility (Pre-sorting), RDF fuel Pit, Incinerators, Boilers, and Steam Turbine Generators with power generation capacity of 20 MW.

Bio-gas plant

- Leachate Treatment Plant utilizes chemical and biological treatment methods to treat approximately 360 KL of leachate per day. The plant features three anaerobic digesters operating in both series and parallel modes.
- Anaerobic (without oxygen) biological process that breaks down organic materials and release biogas.
- The Digestion takes about 20 days in the mesophilic temperature (30°C-35°C) and producing approx. 8000 to 20,000 Nm3 of biogas per day.
- Anaerobic digestion has four major steps: Hydrolysis, Acidogenesis, Acetogenesis & Methanogenesis to decompose the organic matter and produce biogas.
- Digested Sludge from the bottom can be used as manure.

CBG production

- Raw biogas will be filtered and cleaned to remove impurities like hydrogen sulphide, moisture, and particulate matter.
- Carbon dioxide and hydrogen sulphide gas will be removed from the biogas using scrubbing and absorption methods.
- The biogas is then enriched to increase the CH4 concentration, typically to 90-95%.
- The scrubbed biogas will be compressed to high pressure (typically 200- 250 bar) and filled into CBG cylinders or will be supplied to gas grid through pipeline.
- The final CBG / Bio-CNG product will meet specified standards for fuel quality, safety, and environmental regulations.

9. Environmental site settings

S.No.	Particulars	Details				Remarks
1	Total Land	6.0703 ha [The complete area is Government land obtained on lease from MCD]				Land use: The existing Land use of the project site is Industrial. There will be no change in the land use pattern of the site. As per Gazette Notification dated 12.01.2018, the land is already notified for utility purposes by the Delhi Development Authority. The land was transferred from DDA to MCD and then was handed over to M/s Tehkhanda Waste to Electricity Project Limited through a lease deed agreement dated 25.09.2018.
2	Land use break up	Particulars	Existing (Ha)	Expansion (Ha)	Area upon expansion (Ha)	No additional land is required. The proposed expansion will be implemented exclusively on the existing available land, without any reduction
		Covered area	2.2190	0.4664 (increased)	2.6854	
		Road area & drainage	1.0116	0 (will remain same)	1.0116	

S.No.	Particulars	Details				Remarks																																																																								
		Green Area (33%)	2.0142	0 (will remain same)	2.0142	to the greenbelt area.																																																																								
		Open Area	0.8255	0.4664 (reduced by)	0.3591																																																																									
		Total Area	6.0703		6.0703																																																																									
3	Land acquisition details as per MoEF&CC O.M. dated 7/10/2014 & 20/2/2025	The land was transferred from DDA to MCD and then was handed over to M/s Tehkhand Waste to Electricity Project Limited through a lease deed agreement dated 25.09.2018.				Registration No. 5.302 dated 25.09.2018 and agreement is upto 25 years																																																																								
4.	Existence of habitation & involvement of R&R, if any.	Project site: Not applicable Study Area: <table><thead><tr><th>Name of Habitat</th><th>Distance (Km)</th><th>Direction</th></tr></thead><tbody><tr><td>Railway Colony</td><td>0.41</td><td>SE</td></tr><tr><td>Prem Nagar</td><td>0.48</td><td>SSW</td></tr><tr><td>Pul Pehladpur</td><td>1.10</td><td>NNW</td></tr><tr><td>Tuglaqabad Village</td><td>1.37</td><td>NW</td></tr><tr><td>Tehkhand</td><td>1.39</td><td>NNE</td></tr><tr><td>Tuglaqabad Extension</td><td>2.54</td><td>NW</td></tr><tr><td>Sarita Vihar</td><td>2.58</td><td>NE</td></tr><tr><td>Tajpur Pahari</td><td>2.72</td><td>ESE</td></tr><tr><td>Talimabad</td><td>2.76</td><td>WNW</td></tr><tr><td>Govindpuri</td><td>3.24</td><td>NNW</td></tr><tr><td>Madanpur Khadar</td><td>3.53</td><td>NE</td></tr><tr><td>Gupta Colony</td><td>3.79</td><td>SW</td></tr><tr><td>Jasola Vihar</td><td>4.19</td><td>NNE</td></tr><tr><td>Kalkaji</td><td>4.20</td><td>NNW</td></tr><tr><td>Mithapur</td><td>4.28</td><td>ESE</td></tr><tr><td>Sarai Khawaja Village</td><td>4.31</td><td>SE</td></tr><tr><td>Devli</td><td>4.34</td><td>SW</td></tr><tr><td>Sangam Vihar</td><td>4.38</td><td>W</td></tr><tr><td>Jaitpur</td><td>4.45</td><td>W</td></tr><tr><td>Dakshinpuri</td><td>4.46</td><td>WNW</td></tr><tr><td>Dr. Ambedkar Nagar</td><td>4.56</td><td>NW</td></tr><tr><td>Khanpur</td><td>4.64</td><td>W</td></tr><tr><td>GK II</td><td>4.67</td><td>NW</td></tr></tbody></table> The nearest habitation is Tughlakabad Railway Colony 0.41 km, East. However there is no R & R involved in the said project. Hence Not applicable.				Name of Habitat	Distance (Km)	Direction	Railway Colony	0.41	SE	Prem Nagar	0.48	SSW	Pul Pehladpur	1.10	NNW	Tuglaqabad Village	1.37	NW	Tehkhand	1.39	NNE	Tuglaqabad Extension	2.54	NW	Sarita Vihar	2.58	NE	Tajpur Pahari	2.72	ESE	Talimabad	2.76	WNW	Govindpuri	3.24	NNW	Madanpur Khadar	3.53	NE	Gupta Colony	3.79	SW	Jasola Vihar	4.19	NNE	Kalkaji	4.20	NNW	Mithapur	4.28	ESE	Sarai Khawaja Village	4.31	SE	Devli	4.34	SW	Sangam Vihar	4.38	W	Jaitpur	4.45	W	Dakshinpuri	4.46	WNW	Dr. Ambedkar Nagar	4.56	NW	Khanpur	4.64	W	GK II	4.67	NW	Status of R&R. Not applicable
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5.	Existence of school and hospital if any.	A. School <table><thead><tr><th>School</th><th>Distance</th><th>Direction</th></tr></thead><tbody><tr><td>MCD Primary School (BOYS)</td><td>0.49 Km</td><td>SE</td></tr><tr><td>Apollo Public School</td><td>0.76 Km</td><td>SW</td></tr><tr><td>Government Girls Senior Secondary School</td><td>0.79 Km</td><td>ESE</td></tr><tr><td>Sky High Modern School</td><td>0.95 Km</td><td>WNW</td></tr></tbody></table>				School	Distance	Direction	MCD Primary School (BOYS)	0.49 Km	SE	Apollo Public School	0.76 Km	SW	Government Girls Senior Secondary School	0.79 Km	ESE	Sky High Modern School	0.95 Km	WNW																																																										
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S.No.	Particulars	Details			Remarks
		MCD Primary School, Railway Colony	1.07 Km	ESE	
		New Sangam Public School	1.19 Km	W	
		Nav Jai bharti Public School	1.39 Km	SE	
		Manav Rachna International School	1.43 Km	SSE	
		Eros Garden,			
		New Motherland Public School	1.56 Km	ESE	
		Govt. Boys Sr. Sec. School No 1	1.67 Km	E	
		Bal Upwan Public School	1.86 Km	SE	
		Ramchander Memorial Public School	1.92 Km	SE	
		St. Columbus School	2.19 Km	SE	
		Saraswati Vidya Niketan Public School	2.39 Km	SE	
		Little wings play school	2.41 Km	SE	
		Ashiyan Public School Faridabad, New Delhi, Haryana 121009	2.46 Km	SSE	
		Kinderzone School	3.23 Km	SSE	
		B. Hospital			
		Hospital	Distance	Direction	
		OKHLA PH-I ESI Hospital	0.50 Km	NNE	
		MAX Lab	0.92 Km	SE	
		Tuglakabad Railway Health Unit N R Hospital	1.02 Km	ESE	
		Western Central Railway Hospitals	1.02 Km	ESE	
		Jeewan Jyoti Hospital	1.21 Km	NNE	
		Jain Charitable Hospital	1.24 Km	SE	
		Sarvopari Hospital	1.56 Km	SE	
		Supreme Hospital	1.98 Km	SE	
		BTPS Hospital	2.03 Km	East	
		ECHS Polyclinic Hospital	2.44 Km	WNW	
		Health City Clinic Landmark	2.70 Km	ESE	
		Majeedia Unani Hospital	2.77 Km	WNW	
		Hakeem Abdul Hameed Centenary Hospital	2.78 Km	WNW	
		Unity Hospital	3.11 Km	SE	
		Batra Hospital & Medical Research Centre	3.35 Km	WNW	
		Universal Hospital DND	3.41 Km	SE	
		6.	Latitude and Longitude of all corners of the project site.	Plant site	
		Point	Latitude	Longitude	
		A	28°30'35.37"N	77°16'50.82"E	
		B	28°30'32.41"N	77°16'56.59"E	
		C	28°30'22.99"N	77°16'51.15"E	
		D	28°30'25.49"N	77°16'44.93"E	
7	Elevation of the project site	258 meters above mean sea level			
8	Involvement of Forest land if any	Status of stage I Forest Clearance: Not applicable Area of the forest land involved: Nil			Not applicable
9	Water body (Rivers, Lakes, Pond, Nala,	Project site: There are no water body within the project site Study area -The following are within 5km radius from the project site			

S.No.	Particulars	Details			Remarks						
	Natural Drainage, Canal etc.) exists within the project site as well as study area	Water body	Distance	Direction							
		Pond Near Prem Nagar	0.51 Km	West							
		Pond Near Chugi No 2	0.57 Km	SSW							
		Hari Singh Pond	0.60 Km	W							
		Pond Near Tughlakabad District Park	1.00 Km	W							
		Pond Near Tughlakabad Fort Pond	1.03 Km	WSW							
		Pond Near Tughlakabad	1.10 Km	NNW							
		Pond Near Laal Kuwa	1.15 Km	SE							
		Pond Near Gali No1	1.39 Km	SSW							
		Drain near Okhala Phase 2	1.60 Km	N							
		Suraj Kund	2.46 Km	S							
		Pond near Kakkurpur	2.77 Km	SE							
		Agra Canal	2.86 Km	NE							
		Gurgaon Canal Feeder	3.00 Km	E							
		Gurukul Lake	3.34 Km	SSE							
		Drain near Khanpur	4.07 Km	WNW							
		Sehatpur Drain	4.23 Km	SE							
		Drain near Abdulfazal Enclave	4.28 Km	N							
		Pond near Mithapur Extension	4.53 Km	ESE							
		Drain near Jasaula Vihar	4.87 Km	N							
		Yamuna River	4.98 Km	NE							
10	Archaeologic al sites monuments/ historical temples etc.	The following Archaeological Sites are in the radius of 2 km from the project site:									
		Name	Distance	Direction							
		Nai-ka-kot in Tughlaqabad	0.44 km	SW							
		Walls, gate and bastions of Adilabad (Mohammadabad) and causeway leading there to from Tughlakabad	1.18 km	SW							
		Tomb of Ghiyasuddin Tughlakabad	1.76 km	West							
11	Existence of ESZ/ ESA/ national park/ wildlife sanctuary/ biosphere reserve/ tiger reserve/ elephant reserve etc. if any within the study area	Study area Name & Distance of the ESZ/ESA: a) Asola Wildlife Sanctuary ESZ is located at 0.72 km SW & Asola Wildlife Sanctuary is located at 1.65 km SW. b) Okhla Bird Sanctuary ESZ is located at 4.76 Km NE and Okhla Bird Sanctuary is located at 4.83 km NE Status of Notification: a) Gazette Notification for ESZ & WLS of Asola Wildlife Sanctuary published in 2017 b) Gazette Notification for ESZ & WLS of Okhla Bird Sanctuary published in 2015 Authenticated map of ESZ projecting distance of ESZ from project site has been submitted. Status of NBWL approval: Not applicable List of Reserved and Protected Forests: <table><tr><th>Forest Type</th><th>Name</th><th>Distance & Direction</th></tr><tr><td>Reserved Forest</td><td>Jahanpanah City Forest</td><td>2.78 km in WNW</td></tr></table>			Forest Type	Name	Distance & Direction	Reserved Forest	Jahanpanah City Forest	2.78 km in WNW	
Forest Type	Name	Distance & Direction									
Reserved Forest	Jahanpanah City Forest	2.78 km in WNW									
12	Facility envisaged in CRZ area	Name of the facility in CRZ area: Nil Recommendations of CZMA:- Not applicable Status of CRZ clearance: Not applicable									

S.No.	Particulars	Details	Remarks
	(Only for coastal power plant)		
13	Involvement of Critically Polluted Area/Severely Polluted area as per 2018 CEPI score	Involvement of CPA/SPA-No (a) Critically Polluted- Not Applicable (b) Proximity to CPA - Okhla Industrial Area is located at 0.61 Km North [Critically polluted area having CEPI score of 92.65]	Proponent will submit action plan to comply with the additional environmental safeguard as per MoEF&CC O.M. dated 31/10/2019.

10. The details of the municipal solid waste requirement for the existing project and proposed expansion project along with its source and mode of transportation, is given as below:

Details	Fuel Requirement (MTPA)	Source	Distance from site (Kms)	Mode of transportation	Linkage Document
Existing WtE	Municipal Solid Waste- 7,30,000	MCD	5-10 Km	Trucks and dumpers	Concession agreement between MCD and TWEPL
Proposed WtE	Municipal Solid Waste- 3,65,000	MCD	5-10 Km	Trucks and dumpers	

11. **Water requirement:** The Existing Water requirement is 490 m3/day, water requirement is obtained by treated water from Okhla STP and permission for the same has been obtained from Delhi Jal Board vide letter no. F-1/DJB/EE(SDW)V/2017/1346 dated 13.10.2017. The water requirement for the proposed project is estimated as 632 m3/day, out of which 7 m3/day, of fresh water requirement will be obtained from the DJB pipeline supply and the remaining requirement of 625 m3 /day will be met from the treated water from Okhla STP and inhouse treated water. The water will be transported to the plant site through pipelines.

12. **Power requirement:** The existing power requirement of 3.5 MW is obtained from Inhouse (WtE Plant). The power requirement for the proposed project is estimated as 2.8 MW, which will be obtained from the Inhouse (WtE Plant).

13. **Solid and hazardous waste management:** The details of solid and hazardous waste generation along with its mode of treatment/disposal is furnished as below:

Type of Waste	Source	Existing	Expansion	Total	Disposal Method
Recyclable (Ferrous & Non ferrous)	Process	2.5 MT/day (Avg. actual)	1.5 MT/day	4 MT/day	Will be sold to registered recyclers
Manure (from composting)	Process	-	2 MT/day	2 MT/day	Used as compost/soil conditioner
Bottom Ash	Process	230 MT/day (Avg. actual)	80 MT/day	310 MT/day	Ash Generated is utilized in road subgrade construction and embankment. Any unutilized material will be sent to SLF* located adjacent to the project site.
Fly Ash	Process	27 MT/day	20 MT/day	47 MT/day	Supplied to ash brick manufacturers and any unutilized material will be sent to SLF* located adjacent to the project site.
Inert	Process	300 MT/day (Avg. actual)	144 MT/day	444 MT/day	Used for road construction and any material will be sent to SLF* located adjacent to the project site.
Used Oil	Machineries	4 MT/year	3 MT/year	7 MT/day	Will be sold to registered recyclers
Domestic Solid	Staff	25	7	32	Will be incinerated in- house boilers

Type of Waste	Source	Existing	Expansion	Total	Disposal Method
Waste		kg/day	kg/day	kg/day	

Note: Ash + inert may vary 15 to 26% of the total MSW received.

*** Note** – There is a SLF located adjacent to WTE site which is owned by Municipal Corporation of Delhi for which EC was accorded by the Ministry on 29/10/2018. This SLF is an interdependent projects or activities for the proposed WTE expansion as MSW from SLF will be sent to WTE for treatment and waste (ash & inert) from WTE will be sent to SLF for disposal.

14. Project cost: The total cost of the proposed expansion project is estimated Rs. 435 crores. For the existing project, the Environmental Management Plan (EMP) incurred a capital expenditure of Rs. 42.72 crores, and the annual recurring cost of approximately Rs. 5.65 Crores is dedicated towards the environmental protection measures. For the proposed expansion, the estimated capital cost for environmental safeguards is Rs. 1.97 crores, while the annual recurring cost is estimated Rs. 0.34 crores. The employment generation from the proposed project / expansion is 45 nos during the operation phase and 262 workers during the construction phase.

15. Ash management for the last three years

Type of Waste	Quantity generated (MT)	Quantity utilized (MT)	% of utilization	Balance quantity (MTP)	No. of storage silos with capacity
Bottom Ash	230 MT/day	230 MT/day	100%	0	Nil
Fly Ash	27 MT/day	27 MT/day	100%	0	2x250 m ³

i. Fly ash Details for last three years = 9983.5 TPA (Avg. FY 23-24 & 24-25)

S. No.	Activity (as applicable)	Quantity	Percentage	Remarks (Prior approval of SPCB details to be mentioned)
1	Fly ash based products (bricks or blocks or tiles or fibres cement sheets or pipes or boards or panels)	27 MT/day	100%	Supplied to ash brick manufacturers and any unrecyclable material will be sent to SLF.
	Total	27 MT/day	100%	As per guidelines

ii. Bottom ash generation for the last three years = 83947.5 TPA (Avg. FY 23-24 & 24-25)

S. No.	Activity (as applicable)	Quantity	Percentage	Remarks (Prior approval of SPCB details to be mentioned)
1	Construction of roads, road and fly over embarkment	230 MT/day	100%	As per guidelines
	Total	230 MT/day	100%	As per guidelines

iii. Legacy ash details- Not applicable

iv. Ash Pond details:- Not Applicable

v. Proposed ash utilization plan for expansion project

Details	Existing generation (MTPA)	Proposed generation (MTPA)	Total	Utilization (MTPA)	% of utilization	Balance quantity (MTPA)	No of storage Silos with capacity
Bottom Ash	230 MT/day	80 MT/day	310 MT/day	310 MT/day	100%	Nil	Nil
Fly Ash	27	20	47	47	100%	Nil	2x250 m ³

	MT/day	MT/day	MT/day	MT/day			
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Ash pond details: If an existing ash pond is to be utilized details may be mentioned. If not, new ash pond details may be provided as below: There is no ash pond in the project. Hence not applicable.

16. Greenbelt development: The project's greenbelt, which covers 2.01 hectares and constitutes 33% of the total 6.07 hectare of land area, has been established in accordance with CPCB guidelines. It features a three-tiered periphery with a width of 20-30 meters. The greenbelt includes a total of 6,219 native and local species of saplings and trees. Furthermore, an additional green cover of 0.5 acres (300 No's) has been developed outside the project boundary to create a green curtain.

17. Summary of violation under EIA, 2006/court case/show cause/direction if any, related to the project under consideration – Nil.

18. Proposed Terms of Reference (Baseline data collection period: March 2024 to May 2024-Summer season.

Attributes	Parameters	Sampling		Remarks
		No. of stations	Frequency	
A. Air	-	12	-	
a. Meteorological parameters	Temperature, Wind speed, Wind direction, humidity, rainfall, dry bulb temperature, wet bulb temperature, solar radiation	1	Daily	
b. AAQ parameters	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	12	-	
B. Noise	Leq Day time & Leq Night time	12	-	
C. Water	-	12 (@6 ground water & @6 Surface water)	-	
Surface water/Ground water quality parameters	Monitoring for parameters as per drinking water standard IS – 10500 Ground water quality parameters: Colour, Odour, Turbidity, Temperature, Conductivity, pH Value, Total Dissolved Solids, Chloride (as Cl), Fluoride (as F), Total Hardness, Alkalinity, Boron, Calcium, Aluminum, Phosphorus, Magnesium (as Mg), Phosphate, Iron, Sulphate (as SO ₄), Nitrate as NO ₂ , Chromium, Arsenic, Nickel, Manganese, Sodium (as Na), Copper, Potassium (as K), Cadmium, Lead, Total coliform, faecal coliform Surface water quality parameters: Total Carbon, Colour, Odour, Taste, Turbidity, Temperature, Conductivity, pH Value, Total Dissolved Solids, Chloride (as Cl), Fluoride (as F), Total Hardness, Total suspended solids, Calcium (as Ca), Aluminum, Total Phosphorus, Magnesium (as Mg), Iron, Sulphate (as SO ₄), Nitrate NO ₃ , Chromium, Arsenic as As, Alkalinity CaCO ₃ , Nickel, Sodium (as Na), Copper, Potassium (as K), Cadmium, Copper, Lead, Lithium, Zinc, BOD, COD, DO, Ammoniacal Nitrogen, Total coliform, Faecal Coliform	12 (@6 ground water & @6 Surface water)	-	
D. Land				
a. Soil quality	Qualitative and Quantitative Parameters to check	10	-	
b. Land use	soil fertility, Soil Quality Parameters: pH Value, Colour, Moisture content, Organic Matter, Electrical			

Attributes	Parameters	Sampling		Remarks
		No. of stations	Frequency	
	Conductivity, Available Nitrogen, Available Calcium, Available Magnesium, Potassium, Nitrate, Phosphorous Available, Available Chloride, Cation Exchange Capacity, Sulphur, Sodium, Phosphorous (Ortho), Bicarbonate Alkalinity, Texture (with Percentages of Sand, Silt and Clay), Bulk Density, Porosity.			
E. Biological a. Aquatic b. Terrestrial	The Primary survey of the site was conducted to check the flora and fauna of the core and the buffer area.			

19. **Justification for considering proposal under para 7(ii) Aof EIA, 2006 (exemption for PH):** Proponent has requested for the waiver off public consultation as per the provisions contained under para 7(ii) a of EIA Notification, 2006 based on the following grounds:

- Proposed expansion of WTE was already envisaged under the proposal submitted for existing EC dated 26/07/2018. As per the final EIA report submitted at the time of grant of EC during 26/07/2018 (Proposal No: IA/DL/THE/71979/2017), provision was indicated for future expansion in Figure 2.8 (Site Layout Plan) at Page No. 59 by depicting the third boiler in a grey outline. Hence, instant expansion was envisaged at the time of applying of existing EC itself.
- Proposed expansion of WTE from 25 to 45 MW will be confined to the existing land of 6.0703 Ha only.
- 6.0703 Ha is already undergone public hearing process as per the provisions contained under EIA Notification, 2006 at the time of grant of EC during 26/07/2018.
- No reduction in green belt area of 2.01 Ha due to the proposed expansion of WTE.
- Proposed expansion will facilitate disposal of additional 1000 tons per day of Municipal Solid Waste.
- State Govt. of Delhi has initiated the neutralization of the waste dump site and the existing project is playing a key role in reducing the waste dumped into landfills by using Municipal Solid waste to generate power.
- Central Pollution Control Board (CPCB) has introduced a new "blue category" to classify industries providing Essential Environmental Services (EES) like waste management and pollution control. This category recognizes activities such as waste-to-energy plants, sewage treatment plants, and landfill maintenance, which are crucial for managing pollution from both domestic and industrial sources.
- Summary of pollution load for existing project vis-à-vis proposed expansion

Emission Load				
S. No.	Pollutant	Existing Load (Kg/hr)	After Expansion Load (Kg/hr)	% Change
1	PM	11.21	14.70	31.2
2	NOx	130.73	171.55	31.2
3	SO2	37.35	49.02	31.2
4	CO	37.35	49.02	31.2
5	Vehicular Emission (kg/day)	0.092	0.009	-90

Water pollution load (Kg/day)				
Parameters	Existing	After Expansion	% Change	Remarks
TSS	1.344	1.98	47.5	Increase
TDS	371.28	547.64	47.5	Increase
COD	4.8	7.08	47.5	Increase
BOD(3 days)	0.984	1.45	47.5	Increase

Waste Generation					
Type of Waste	Unit	Permitted as per EC	Total After Expansion	% Change	Remarks
Recyclable	MT/day	2	5	150.0	Increase
Manure (from composting)	MT/day	0	2	0.0	Increase
Bottom Ash	MT/day	230	310	34.8	Increase
Fly Ash	MT/day	27	47	74.1	Increase
Inert	MT/day	300	444	48.0	Increase
Domestic Solid Waste	Kg/day	25	32	28.0	Increase
Hazardous waste					
Type of Waste	Unit	Permitted as per EC	Total After Expansion	% Change	Remarks
Used Oil	MT/year	4	7	75.0	Increase

- Additional mitigation measures to be adopted

A. Treatment of the Flue Gas from the Boilers:

Existing Control Measures: There are 2 x 65 TPH (each) capacity of boilers installed at the existing plant, the flue gas from Boilers directed into the turbo-reactor via a venturi nozzle, creating a fluidized bed. The flue gas comes into turbulent contact with hydrated lime and activated carbon, which absorb SO₂, HCl and other acidic compounds, heavy metals, and dioxins & furans.

The remaining dust particles are carried with the flue gas into the baghouse filter through a central duct to chambers. The flue gas passes through filter bags, trapping solids on the outside of the bags, forming a filtration-aiding layer (filter cake). This process ensures the removal of particulate matter.

SNCR technology is installed for the control of NO_x emission.

Proposed: The proposed Boiler of up to 100 TPH will be installed as the 3rd boiler with the Best available technology and State-of-the-art technology pollution control devices. The proposed bag filters will be designed with 130% capacity, providing additional margin for efficient emission control.

B. Measures to be adopted during Construction Phase:

- Regular water sprinkling to mitigate fugitive emissions at the project site.
- Use of Anti-Smog Gun/Fog Cannon for nebulized water spray to control fine dust.
- Transportation of construction material in covered vehicles and proper packing conditions to avoid pollution due to transportation.
- Storing of construction material in covered condition at project site.
- Proper route management of the traffic for smooth ingress and egress of traffic.
- Monitoring of Ambient Air Quality at periodical intervals.
- Continuous Ambient Air Quality Monitoring Station (CAAQMS) already installed.
- Thick Plantation around the plant periphery has been done.
- Strict checking of PUC certificate compliance for all vehicles entering project/plant site
- Plantation of indoor fragrant plants & extensive green belt.

C. Measures for emissions from MSW Storage Pit:

Existing Measures

- The MSW storage pit is maintained under negative pressure. Outside air is allowed to enter the waste storage shed; however, malodorous emissions are not allowed to exit into the atmosphere.
- Odorous emissions containing gases such as methane, mercaptan, hydrogen sulphide, etc., are directed to the boiler furnace, where they are burnt.
- Tolerant tree species have been planted to act as natural sinks for pollutants and odour.
- Use of fragrant agents in the odour control system through air-solution spraying methods.

These measures will remain applicable for the proposed expansion, as the MSW storage pit will remain the same.

D. Proposed Measures- Leachate Treatment Plant:

Leachate plant emissions will be channelized to the biogas plant, where the CH₄ will be recovered from the biogas. Carbon dioxide (CO₂) and hydrogen sulphide (H₂S) will be removed from the biogas using amine-based scrubbing and absorption methods, these gases directed to the Flue Gas Cleaning System for the treatment and thereafter discharge through chimney.

20. Written submissions: Proponent made the following written submission during the meeting:

S. No.	Query	Reply																
1	PP shall submit the Revised PPT after removing ranges and +- %.	Revised PPT after removal of ranges & % figures from capacity has been submitted.																
2	PP shall submit the existing and proposed additional air pollution control measures and odour control measures.	The details of existing and proposed additional air pollution control measures as mentioned above has been submitted.																
3	PP shall submit a Comparison of 2018 EIA baseline and current baseline data for both air and water.	A detailed Comparison of 2018 EIA baseline (December 2017- February 2018) and current baseline data (March-May 2024) for both air and water has been submitted.																
4	PP shall submit Compliance to Earlier Public Hearing held on 21.05.2018.	Earlier Public Hearing was conducted on 21.05.2018 by Delhi Pollution Control Committee (DPCC) under the supervision of Additional District Magistrate at project site near existing Tehkhand Landfill site/ Bus depot, Maa Anandmai Marg, Okhla, New Delhi. Please find below the brief of Public hearing minutes: ■ Attended by 230 persons ■ 08 persons expressed their views/queries/suggestions/questions during the public hearing while 57 written suggestion/views slips were received. However, all the queries were responded by the Project proponent ■ Overall, the public was happy and welcomed the project for the management of solid waste in the area. ■ Further, it was suggested for adequate control measures to minimize the pollution. Summary of the commitment are given below:																
		<table><tr><th>S. No.</th><th>Activity</th><th>Amount Spent</th><th>Remarks</th></tr><tr><td>1</td><td>Noise Pollution</td><td>Approx. 0. 35 lakhs annually</td><td>Regular monitoring is being done by approved NABL / MoEFCC laboratory</td></tr><tr><td>2</td><td>Air Pollution</td><td>Rs. 2514 lakhs (Capital Cost) Rs. 424.04 lakhs (recurring for the FY 2023-24 & FY 2024-25)</td><td>2 nos. Flue Gas Cleaning System (Bag Filter), Anti Smog Gun, Water Sprinklers etc.</td></tr><tr><td>3</td><td>Employment for rag pickers</td><td>Rs. 18.95 lakhs (for the FY 2023-24 & FY 2024-25)</td><td>Employment to the rag pickers (7 No's) have been provided in the TWEPL.</td></tr></table>	S. No.	Activity	Amount Spent	Remarks	1	Noise Pollution	Approx. 0. 35 lakhs annually	Regular monitoring is being done by approved NABL / MoEFCC laboratory	2	Air Pollution	Rs. 2514 lakhs (Capital Cost) Rs. 424.04 lakhs (recurring for the FY 2023-24 & FY 2024-25)	2 nos. Flue Gas Cleaning System (Bag Filter), Anti Smog Gun, Water Sprinklers etc.	3	Employment for rag pickers	Rs. 18.95 lakhs (for the FY 2023-24 & FY 2024-25)	Employment to the rag pickers (7 No's) have been provided in the TWEPL.
		S. No.	Activity	Amount Spent	Remarks													
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		2	Air Pollution	Rs. 2514 lakhs (Capital Cost) Rs. 424.04 lakhs (recurring for the FY 2023-24 & FY 2024-25)	2 nos. Flue Gas Cleaning System (Bag Filter), Anti Smog Gun, Water Sprinklers etc.													
3	Employment for rag pickers	Rs. 18.95 lakhs (for the FY 2023-24 & FY 2024-25)	Employment to the rag pickers (7 No's) have been provided in the TWEPL.															
The Public Hearing minutes has been submitted.																		
5	PP shall submit undertaking of Expansion provision mentioned in earlier EIA.	Undertaking of expansion provisions mentioned in earlier EIA has been submitted.																
6	PP shall submit an undertaking	An undertaking is attached herewith confirming that there is no addition to																

S. No.	Query	Reply
	that there is no addition in the existing MSW storage pit for the proposed expansion.	the existing MSW storage area for proposed expansion. The existing area and volume of the MSW storage pit has been submitted.
7	PP to suggest Nearby park to be adopted in consultation with MCD for green area development.	Plantation will be undertaken in nearby areas as per the parks/locations allocated by the Municipal Corporation of Delhi (MCD), with a target of planting 5,000 indigenous saplings over a period of three years, in coordination with MCD. Additionally, within the project site, Miyawaki plantation will be implemented in designated areas as per space availability. The undertaking for the same has been submitted.
8	PP shall Improve FGCS and also a modelling study shall be conducted for various stack height and receptors nearby.	The proposed Flue Gas Cleaning System (FGCS) will be designed with 130% capacity, providing an additional margin for efficient emission control. The best available fabric filter materials will be used for the filter bags. A comprehensive modelling study will be conducted for various stack heights for nearby receptors, and the optimised height will be selected to achieve better pollutant dispersal for the proposed expansion.
9	PP shall utilize the third party monitoring reports in addition to the existing baseline data conducted between March to May 2024 for preparation of EIA report.	The third party monitoring reports will be used apart from the already conducted baseline study from March to May 2024.

Observations and deliberation of the EAC

21. The Committee observed and noted the following:

- i. Instant proposal is for expansion of existing 25 MW Waste to Energy (WTE) Plant up to 45 MW by M/s Tehkhand Waste to Electricity Project Limited located at adjacent DTC Tehkhand, Depot, Maa Anandmai Marg, District Southeast, New Delhi.
- ii. The existing project was accorded EC on 26/07/2018 and the same has been implemented.
- iii. Proposed expansion is envisaged within the existing land of 6.0703 Ha and no additional land is required for the proposed expansion.
- iv. The EAC also took into consideration the drone survey of the project site and KML file on the Google Earth presented by the project proponent along with DSS of the project site on PARIVESH portal.
- v. There is a SLF located adjacent to WTE site which is owned by Municipal Corporation of Delhi for which EC was accorded by the Ministry on 29/10/2018. This SLF is an interdependent projects or activities for the proposed WTE expansion as MSW from SLF will be sent to WTE for treatment and waste (ash & inert) from WTE will be sent to SLF for disposal.
- vi. There is no involvement of forest land in the proposed project.
- vii. There are three Archaeological Sites within the radius of 2 km from the project site namely Nai-ka-kot in Tughlaqabad; Walls, gate and bastions of Adilabad (Mohammadabad) and causeway leading there to from Tughlakabad and Tomb of Ghiyasuddin Tughlakabad.
- viii. Asola Wildlife Sanctuary ESZ is located at 0.72 km SW & Asola Wildlife Sanctuary is located at 1.65 km SW from the project site. Okhla Bird Sanctuary ESZ is located at 4.76 Km NE and Okhla Bird Sanctuary is located at 4.83 km NE from the project site.

ix. The project site is located at distance of 0.61 km from the Okhla Industrial Area which is a Critically Polluted Area (CPA) having CEPI score of 92.65. Proponent is required to submit action plan for additional environmental safeguards as per MoEF&CC O.M. dated 31/10/2019.

x. MSW requirement for the proposed expansion is 1000 TPD and the same would be supplied MCD through trucks and dumpers.

xi. The existing power requirement of 3.5 MW is obtained from Inhouse (WtE Plant). The power requirement for the proposed project is estimated as 2.8 MW, which will be obtained from the Inhouse (WtE Plant).

xii. The water requirement for the proposed project is estimated as 632 m³/day, out of which 7 m³/day, of fresh water requirement will be obtained from the DJB pipeline supply and the remaining requirement of 625 m³ /day will be met from the treated water from Okhla STP and inhouse treated water. The water will be transported to the plant site through pipelines.

xiii. The cost of the project expansion project is Rs. 435 crores. Environmental Management Plan (EMP) for the existing project incurred a capital cost of Rs. 42.72 crores. The annual recurring cost towards the environmental protection measures is Rs. 5.65 Crores. The employment generation from the proposed project / expansion is 45 nos during the operation phase and 262 workers during the construction phase.

xiv. EAC deliberated on the request of project proponent regarding exemption sought from conduct of public consultation for the proposed expansion project on the following grounds:

- Proposed expansion of WTE was already envisaged under the proposal submitted for existing EC dated 26/07/2018.
- Proposed expansion of WTE from 25 to 45 MW will be confined to the existing land of 6.0703 Ha only.
- 6.0703 Ha is already undergone public hearing process as per the provisions contained under EIA Notification, 2006 at the time of grant of EC during 26/07/2018.
- No reduction in green belt area of 2.01 Ha due to the proposed expansion of WTE.
- Proposed expansion will facilitate disposal of additional 1000 tons per day of Municipal Solid Waste.
- State Govt. of Delhi has initiated the neutralization of the waste dump site and the existing project is playing a key role in reducing the waste dumped into landfills by using Municipal Solid waste to generate power.
- Central Pollution Control Board (CPCB) has introduced a new "blue category" to classify industries providing Essential Environmental Services (EES) like waste management and pollution control. This category recognizes activities such as waste-to-energy plants, sewage treatment plants, and landfill maintenance, which are crucial for managing pollution from both domestic and industrial sources.
- Increase in pollution load due to the proposed WTE expansion will be minimized by adopting additional environmental safeguards.

In this regard, the member secretary apprised the EC as per the provisions contained under para 7(ii) a of EIA Notification 2006, all applications seeking prior environmental clearance for expansion with increase in the production capacity beyond the capacity for which prior environmental clearance has been granted under this notification shall be made in Form I and they shall be considered by the concerned Expert Appraisal Committee or State Level Expert Appraisal Committee within sixty days, who will decide on the due diligence necessary including preparation of Environment Impact Assessment and public consultations and the application shall be appraised accordingly for grant of environmental clearance.

After deliberating on the above, EAC opined that proposed expansion of WTE project may be exempted from the conduct of fresh public hearing in terms of the provisions contained under para 7(ii)a of EIA, 2006. However, public consultation by obtaining responses in writing from concerned persons having a plausible stake in the environmental aspects of the project or activity shall be carried out as per the procedure prescribed under EIA, 2006.

xv. EAC opined that there should be a site visit by the Sub-committee of EAC to see the various environmental issues pertaining to the instant project before consideration of EC proposal.

xvi. The EAC also deliberated on the written submissions of the project proponent and found it satisfactory.

Recommendations of the Committee:

22. Based on the discussion held and the documents submitted the EAC (coal) **recommended** the proposal for the grant of Terms of Reference (TOR) to Proposed "*Expansion of Existing 25 MW Waste to Energy (WTE) Plant to 45 MW by M/s Tehkhand Waste to Electricity Project Limited located at adjacent DTC Tehkhand, Depot, Maa Anandmai Marg, District Southeast, New Delhi*", under EIA Notification, 2006 (as amended) with the specific TOR conditions in addition to the generic TOR (**Annexure-1**).

23. In accordance with the provisions contained in the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and based on the recommendations of the EAC, the Ministry hereby accords Terms of Reference (ToR) to M/s Tehkhand Waste to Electricity Project Limited for "*Expansion of Existing 25 MW Waste to Energy (WTE) Plant to 45 MW, located at adjacent DTC Tehkhand, Depot, Maa Anandmai Marg, District Southeast, New Delhi*", with the specific ToRs in addition to generic/standard ToR as per **Annexure-1**.

24. The EIA/EMP report should contain the information in accordance with provisions & stipulations as given in the specific and standard ToR.

25. You are required to submit the final EIA/EMP prepared as per TORs to the Ministry within 4 years as per this Ministry's Notification vide S.O. 751(E) dated 17th February, 2020 for considering the proposal for environmental clearance.

26. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India/National Accreditation Board of Education and Training (QCI/NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization(s)/laboratories including their status of approvals etc.

27. The Ministry reserves the right to stipulate additional ToR, if found necessary.

28. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006 and as amended. 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.

29. This issues with the approval of the Competent Authority.

Yours faithfully,

(Sundar Ramanathan)
Scientist 'F'
Tel: 011- 20819378
Email- r.sundar@nic.in

Copy To

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi 110001.
2. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066.
3. Deputy Director General of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office, Regional Office (CZ), Kendriya Bhawan, 5th Floor, Sector-H, Aliganj, Lucknow - 226020.
4. The Chairman, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
5. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi – 32.
6. The Chairman, Delhi Pollution Control Board, 6th floor, B wing, Delhi Secretariat, I P Estate, Delhi-110 002.
7. The Member Secretary, Delhi Pollution Control Board, 6th floor, C wing, Delhi Secretariat, I P Estate, Delhi-110 002.
9. The District Collector, Southeast Delhi, Delhi.

Specific Terms of Reference for (Thermal Power Plants)

1. [A] Environmental Management And Biodiversity Conservation

S. No	Terms of Reference
1.1	Project proponent shall submit an action plan to comply with the additional environmental safeguards as per MoEF&CC O.M. dated 31/10/2019 shall be submitted as the project site is located at a distance of 0.61 km from the Okhla Industrial Area which is a Critically Polluted Area (CPA).
1.2	PP shall obtain No Objection Certificate from Archeological Survey of India for its impact on Nainika-kot in Tughlaqabad; Walls, gate and bastions of Adilabad (Mohammadabad) and Tomb of Ghiyasuddin Tughlakabad.
1.3	Project proponent shall submit the authenticated map of Chief Wildlife Warden indicating the distance between the boundary of the project site and Asola Wildlife Sanctuary ESZ, located at 0.72 km SW Asola Wildlife Sanctuary, located at 1.65 km SW, Okhla Bird Sanctuary ESZ located at a distance of 4.76 km NE and Okhla Bird Sanctuary located at 4.83 km NE.
1.4	Cumulative Environmental Impact Assessment study of all the existing and proposed project shall be conducted.
1.5	Details of characterization of Municipal solid waste, its segregation process and disposal of waste management plan shall be submitted along with EIA.
1.6	A plan shall be submitted to minimize the least use of hard plastic getting burn into the incinerators.
1.7	Proximate and ultimate analysis, Calorific value of municipal waste proposed to be brought from nearby MSW shall be carried out for design purpose of boilers. Mass balance of waste in the process shall be submitted.
1.8	Toxicity Characteristic Leachate Procedure (TCLP) test shall be conducted for Characterization of leachate, any potential of leaching heavy metals into the surrounding areas as well as into the groundwater. TCLP analysis of heavy metals, texture, bulk density, Cation Exchange Capacity of Heavy metals in the flyash and bottom ash shall be conducted for existing plant.
1.9	The remedial measures for arresting dust generation on roads and atmosphere, Air pollution control measures including NOx control measure, treatment of leachate and stabilizing the slopes shall be taken up.
1.10	Detailed Geo-hydrological study shall be conducted w.r.t. hydraulic gradient, porosity and infiltration around 2 km of the project site.
1.11	Aquifer characteristics shall be clearly mapped by conducting in-situ studies.
1.12	Treatment and disposal of leachate shall be submitted. No water from the plant is allowed to enter

S. No	Terms of Reference
	into canal/ nallah/ stream.
1.13	Details regarding Flue gas treatment, ash generation and its disposal/utilization method shall be submitted.
1.14	Monitoring of dioxins and furans and other heavy metals shall also be carried out in the stack emissions as per the Municipal Solid Waste Rules, 2016 for one season for the existing plant.
1.15	Impact of existing Waste to Energy plant on natural environment be studied and a comparative statement clearly mentioning the impacts on existing water bodies, and other ecologically sensitive areas within 10 km radius of project be submitted.
1.16	A comparative chart shall be prepared with changes observed from previous baseline study (existing nearby Waste to Energy Plant) and present baseline study.
1.17	An epidemiological study shall be carried out within 5 km range of the existing integrated facility.
1.18	Detailed action plan shall be prepared for maintenance of air pollution control equipment.
1.19	Pond and ground water quality (10 locations within 2 km radius of the plant boundary) shall be studied and report be submitted along with EIA/EMP. Action plan for Ground water monitoring stations on all hotspots like schools/hospitals within 2 km radius of the plant boundary be submitted.
1.20	Baseline Study for Heavy metals in Ground water, Surface water and soil to be carried out and incorporated in EIA/EMP report.
1.21	Details pertaining to water source, treatment and discharge should be provided.
1.22	Zero Liquid Discharge plan shall be submitted.
1.23	Action plan for development of green belt (40% of total project cover area) along the periphery plantation with 90% survival rate and detailed plan shall be submitted.
1.24	PP shall submit action plan for using treated Sewage/Domestic wastewater for its operations.
1.25	Project Proponent to conduct Environmental Cost Benefit Analysis for the project in EIA/EMP Report.
1.26	An action plan shall be prepared for Water shed development within 10 km radius of the plant boundary in consultation with reputed government institution.
1.27	A detailed plan need to be submitted for undertaking extensive green plantation within 10 km radius of the plant focusing on water reservoir, school, hospital and other institutional area and same need to be incorporated in EIA/EMP report.
1.28	A detailed action plan of Plantation shall be prepared for nearby areas as per the parks/locations allocated by the Municipal Corporation of Delhi (MCD), with a target of planting 5,000 indigenous saplings over a period of three years, in coordination with MCD. Additionally, within the project site, Miyawaki plantation shall be implemented in designated areas as per space availability.

S. No	Terms of Reference
1.29	Recommendations of the Commission for Air Quality Management in National Capital Region and Adjoining Areas shall be submitted.
1.30	Comparative statement regarding baseline data collected during Dec 2017 to Feb 2018 & March to May 2024 along with the reasons behind the considerable changes in the baseline data shall be furnished.
1.31	Action plan for indoor saplings of plants (about 10000) shall be distributed/made available to residents in nearby residential areas. Further, vertical garden/creepers can be erected on the compound wall of premises. The fog cannon can be used to mitigate air pollution within premises of project.
1.32	PP is advised to implement the ' <i>Ek Ped Maa Ke Naam</i> ' Campaign, which was launched on 5th June 2024 on the occasion of the World Environment Day to increase the forest cover across the Country. This plantation drive is other than Green belt development. An action plan in this regard shall be submitted.

2. [B] Disaster Management

S. No	Terms of Reference
2.1	A Disaster Management Plan shall be prepared and incorporated in the EIA/EMP report.

3. [C] Socio-economic Study

S. No	Terms of Reference
3.1	Public Health Action Plan including the provisions for drinking water supply for the local population shall be in the EIA/EMP Report. The status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the needs of the labour force and local populace.
3.2	Proposed expansion of WTE project from 25 to 45 MW is exempted from the conduct of fresh public hearing in terms of the provisions contained under para 7(ii)a of EIA, 2006. However, public consultation by obtaining responses in writing from concerned persons having a plausible stake in the environmental aspects of the project or activity shall be carried out as per the procedure prescribed under EIA, 2006 as amended. As per the Ministry's OM dated 30.09.2020, to address the concern raised during the Public consultation, the Project Proponent is required to submit the detailed activities proposed with year-wise budgetary provision (Capital and recurring) for 5 years. Activities proposed shall be part of EMP. The recommendation Socio-economic study may also be considered while planning the activities & budget.
3.3	A need based Social Impact Assessment Study shall also be carried out and an action plan on its recommendations may also be submitted with budgetary provisions.
3.4	Demographic details and land use change details in 10 km area shall be submitted.

4. [D] Miscellaneous

S. No	Terms of Reference
4.1	Plot the wind rose diagram using the typical meteorological year (TMY) data for the period considered for the study. The monitoring units shall be deployed in the field based on the coverage area ratio and direction of the wind. A mathematical model shall be developed for the local site rather than using the standard model available in software for both air & water quality modeling.
4.2	PP shall align its activities to one/few of the Sustainable Development Goals (SDG) and start working on the mission of net zero by 2050. PPs shall update the same to the EAC.
4.3	PP shall submit the EIA/EMP report after the plagiarism check using authenticated plagiarism software.
4.4	Detailed description of all the court cases along with its current status shall be submitted.
4.5	PP should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. obtained for this project under various Acts, Rules and regulations shall be submitted. Further, all the permissions/MoUs obtained for this project shall be revalidated and submitted along with the EIA/EMP report.
4.6	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs, which will analyze the samples.
4.7	PP should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this PP should mention the number and designation of persons to be engaged for the implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.
4.8	PP should submit the year-wise, activity wise and time-bound budget earmarked for EMP, occupational health surveillance, and activities proposed to address the issues raised during Public Consultation. The capital and recurring expenditure to be incurred needs to be submitted.
4.9	The PP should ensure that only NABET-accredited consultants shall be engaged for the preparation of EIA/EMP Reports. PP shall ensure that the accreditation of the consultant is valid during the collection of baseline data, preparation of EIA/EMP report and the appraisal process. The PP and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the Ministry are factually correct and the PP and consultant are fully accountable for the same.
4.10	PP should provide in the EIA Report details of the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after the grant of EC.
4.11	All the certificates viz. involvement of Forestland, distance from the protected area, and list of flora & fauna should be duly authenticated by the Forest Department. The Certificate should bear the name, designation, official seal of the person signing the certificate and dispatch number.
4.12	The findings of the subcommittee report shall be incorporated in the final EIA/EMP report.

S. No	Terms of Reference
4.13	Necessary coordination shall be made with concerned SPCB (who is responsible for Compliance of OM dated 14.01.2025) regarding streamlining the implementation of GSR 702 and GSR 703 dated 12.11.2024 through which projects requiring prior EC were exempted from requirement of CTE

Standard Terms of Reference for (Thermal Power Plants)

1. Statutory Compliance

S. No	Terms of Reference
1.1	The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc. for its better identification and reference.
1.2	Vision document specifying prospective long term plan of the project shall be formulated and submitted.
1.3	Latest compliance report duly certified by the Regional Office of MoEF&CC for the conditions stipulated in the environmental and CRZ clearances of the previous phase(s) for the expansion projects shall be submitted.

2. Details Of The Project And Site

S. No	Terms of Reference
2.1	The project proponent needs to identify minimum three potential sites based on environmental, ecological and economic considerations, and choose one appropriate site having minimum impacts on ecology and environment. A detailed comparison of the sites in this regard shall be submitted.
2.2	Executive summary of the project indicating relevant details along with recent photographs of the proposed site (s) shall be provided. Response to the issues raised during Public Hearing and the written representations (if any), along with a time bound Action Plan and budgetary allocations to address the same, shall be provided in a tabular form, against each action proposed.
2.3	Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted.
2.4	The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/River and high tide level from the sea shall be specified, if the site is located in proximity to them.
2.5	Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.
2.6	Land requirement for the project shall be optimized and in any case not more than what has been specified by CEA from time to time. Item wise break up of land requirement shall be provided.

S. No	Terms of Reference
2.7	Present land use (including land class/kism) as per the revenue records and State Govt. records of the proposed site shall be furnished. Information on land to be acquired including coal transportation system, laying of pipeline, ROW, transmission lines etc. shall be specifically submitted. Status of land acquisition and litigation, if any, should be provided.
2.8	If the project involves forest land, details of application, including date of application, area applied for, and application registration number, for diversion under FCA and its status should be provided along with copies of relevant documents.
2.9	The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report.
2.10	Satellite imagery and authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.
2.11	Topography of the study area supported by toposheet on 1:50,000 scale of Survey of India, along with a large scale map preferably of 1:25,000 scale and the specific information whether the site requires any filling shall be provided. In that case, details of filling, quantity of required fill material; its source, transportation etc. shall be submitted.

3. Ecology Biodiversity And Environment

S. No	Terms of Reference
3.1	A detailed study on land use pattern in the study area shall be carried out including identification of common property resources (such as grazing and community land, water resources etc.) available and Action Plan for its protection and management shall be formulated. If acquisition of grazing land is involved, it shall be ensured that an equal area of grazing land be acquired and developed and detailed plan submitted.
3.2	Location of any National Park, Sanctuary, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridor, if any, within 10 km of the project site shall be specified and marked on the map duly authenticated by the Chief Wildlife Warden of the State or an officer authorized by him.
3.3	A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on potentially mineable mineral deposit shall be submitted.
3.4	The water requirement shall be optimized (by adopting measures such as dry fly ash and dry bottom ash disposal system, air cooled condenser, concept of zero discharge) and in any case not more than that stipulated by CEA from time to time, to be submitted along with details of source of water and water balance diagram. Details of water balance calculated shall take into account reuse and re-circulation of effluents.
3.5	Water body/Nallah (if any) passing across the site should not be disturbed as far as possible. In case any Nallah / drain is proposed to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of the area. Details of proposed diversion shall be furnished duly approved by the concerned Department of the State.

S. No	Terms of Reference
3.6	It shall also be ensured that a minimum of 500 m distance of plant boundary is kept from the HFL of river system / streams etc. and the boundary of site should also be located 500 m away from railway track and National Highways.
3.7	Hydro-geological study of the area shall be carried out through an institute/ organization of repute to assess the impact on ground and surface water regimes. Specific mitigation measures shall be spelt out and time bound Action Plan for its implementation shall be submitted
3.8	Detailed Studies on the impacts of the ecology including fisheries of the River/Estuary/Sea due to the proposed withdrawal of water / discharge of treated wastewater into the River/Sea etc shall be carried out and submitted along with the EIA Report. In case of requirement of marine impact assessment study, the location of intake and outfall shall be clearly specified along with depth of water drawl and discharge into open sea.
3.9	Source of water and its sustainability even in lean season shall be provided along with details of ecological impacts arising out of withdrawal of water and taking into account inter-state shares (if any). Information on other competing sources downstream of the proposed project and commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.
3.10	Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished. In addition, wherever ground water is drawn, PP shall submit detailed plan of Water charging activity to be undertaken.
3.11	Feasibility of near zero discharge concept shall be critically examined and its details submitted.
3.12	Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.
3.13	Plan for recirculation of ash pond water and its implementation shall be submitted.
3.14	Detailed plan for conducting monitoring of water quality regularly with proper maintenance of records shall be formulated. Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of surface / ground water) shall be submitted. It shall be ensured that parameter to be monitored also include heavy metals. A provision for long-term monitoring of ground water table using Piezometer shall be incorporated in EIA, particularly from the study area.
3.15	Hazards Characterization: Past incidents of hazard events within 10km radius of project area with detailed analysis of causes and probability of reoccurrence

4. Environmental Baseline Study And Mitigation Measures

S. No	Terms of Reference
4.1	One complete season (critical season) site specific meteorological and AAQ data (except monsoon season) as per latest MoEF&CC Notification shall be collected along with past three year's meteorological data for that particular season for wind speed analysis and the dates of monitoring shall be recorded. The parameters to be covered for AAQ shall include PM10, PM2.5, SO2, NOx,

S. No	Terms of Reference
	CO and Hg. The location of the monitoring stations should be so decided so as to take into consideration the upwind direction, pre-dominant downwind direction, other dominant directions, habitation and sensitive receptors. There should be at least one monitoring station each in the upwind and in the pre - dominant downwind direction at a location where maximum ground level concentration is likely to occur.
4.2	In case of expansion project, air quality monitoring data of 104 observations a year for relevant parameters at air quality monitoring stations as identified/stipulated shall be submitted to assess for compliance of AAQ Standards (annual average as well as 24 hrs).
4.3	A list of industries existing and proposed in the study area shall be furnished.
4.4	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects on the environment of the area shall be assessed in detail. Details of the Model used and the input data used for modelling shall also be provided. The air quality contours should be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The windrose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socio-economics.
4.5	Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.
4.6	Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.
4.7	Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished. The Ministry's Notification dated 02.01.2014 regarding ash content in coal shall be complied. For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted
4.8	Details of transportation of fuel from the source (including port handling) to the proposed plant and its impact on ambient AAQ shall be suitably assessed and submitted. If transportation entails a long distance it shall be ensured that rail transportation to the site shall be first assessed. Wagon loading at source shall preferably be through silo/conveyor belt.
4.9	For proposals based on imported coal, inland transportation and port handling and rail movement shall be examined and details furnished. The approval of the Port and Rail Authorities shall be submitted.
4.10	Details regarding infrastructure facilities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase should be adequately catered for and details furnished.

5. Environmental Management Plan

S. No	Terms of Reference
5.1	EMP to mitigate the adverse impacts due to the project along with item - wise cost of its

S. No	Terms of Reference
	implementation in a time bound manner shall be specified.
5.2	A Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be prepared. It should take into account the maximum inventory of storage at site at any point of time. The risk contours should be plotted on the plant layout map clearly showing which of the proposed activities would be affected in case of an accident taking place. Based on the same, proposed safeguard measures should be provided. Measures to guard against fire hazards should also be invariably provided. Provision for mock drills shall be suitably incorporated to check the efficiency of the plans drawn.
5.3	The DMP so formulated shall include measures against likely Fires/Tsunami/Cyclones/Storm Surges/ Earthquakes etc, as applicable. It shall be ensured that DMP consists of both On-site and Off-site plans, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. Smaller version of the plan for different possible disasters shall be prepared both in English and local languages and circulated widely.
5.4	Details of fly ash utilization plan as per the latest fly ash Utilization Notification of GOI along with firm agreements / MoU with contracting parties including other usages etc. shall be submitted. The plan shall also include disposal method / mechanism of bottom ash along with monitoring mechanism.

6. Green Belt Development

S. No	Terms of Reference
6.1	Detailed scheme for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary not less than 2000 tree per ha with survival rate of more than 85% shall be submitted. Photographic evidence must be created and submitted periodically including NRSA reports in case of expansion projects. A shrub layer beneath tree layer would serve as an effective sieve for dust and sink for CO ₂ and other gaseous pollutants and hence a stratified green belt should be developed.
6.2	Over and above the green belt, as carbon sink, plan for additional plantation shall be drawn by identifying blocks of degraded forests, in close consultation with the District Forests Department. In pursuance to this the project proponent shall formulate time bound Action Plans along with financial allocation and shall submit status of implementation to the Ministry every six months

7. Socio-economic Activities

S. No	Terms of Reference
7.1	Socio-economic study of the study area comprising of 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detail assessment of the impact on livelihood of the local communities.
7.2	Action Plan for identification of local employable youth for training in skills, relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.

S. No	Terms of Reference
7.3	If the area has tribal population, it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.
7.4	A detailed CER plan along with activities wise break up of financial commitment shall be prepared in terms of the provisions OM No. 22-65/2017-IA.III dated 30.09.2020. CER component shall be identified considering need based assessment study and Public Hearing issues. Sustainable income generating measures which can help in upliftment of affected section of society, which is consistent with the traditional skills of the people shall be identified.
7.5	While formulating CER schemes it shall be ensured that an in-built monitoring mechanism for the schemes identified are in place and mechanism for conducting annual social audit from the nearest government institute of repute in the region shall be prepared. The project proponent shall also provide Action Plan for the status of implementation of the scheme from time to time and dovetail the same with any Govt. scheme(s). CER details done in the past should be clearly spelt out in case of expansion projects.
7.6	R&R plan, as applicable, shall be formulated wherein mechanism for protecting the rights and livelihood of the people in the region who are likely to be impacted, is taken into consideration. R&R plan shall be formulated after a detailed census of population based on socio economic surveys who were dependant on land falling in the project, as well as, population who were dependant on land not owned by them.
7.7	Assessment of occupational health and endemic diseases of environmental origin in the study area shall be carried out and Action Plan to mitigate the same shall be prepared.
7.8	Occupational health and safety measures for the workers including identification of work related health hazards shall be formulated. The company shall engage full time qualified doctors who are trained in occupational health. Health monitoring of the workers shall be conducted at periodic intervals and health records maintained. Awareness programme for workers due to likely adverse impact on their health due to working in non-conductive environment shall be carried out and precautionary measures like use of personal equipments etc. shall be provided. Review of impact of various health measures undertaken at intervals of two to three years shall be conducted with an excellent follow up plan of action wherever required.

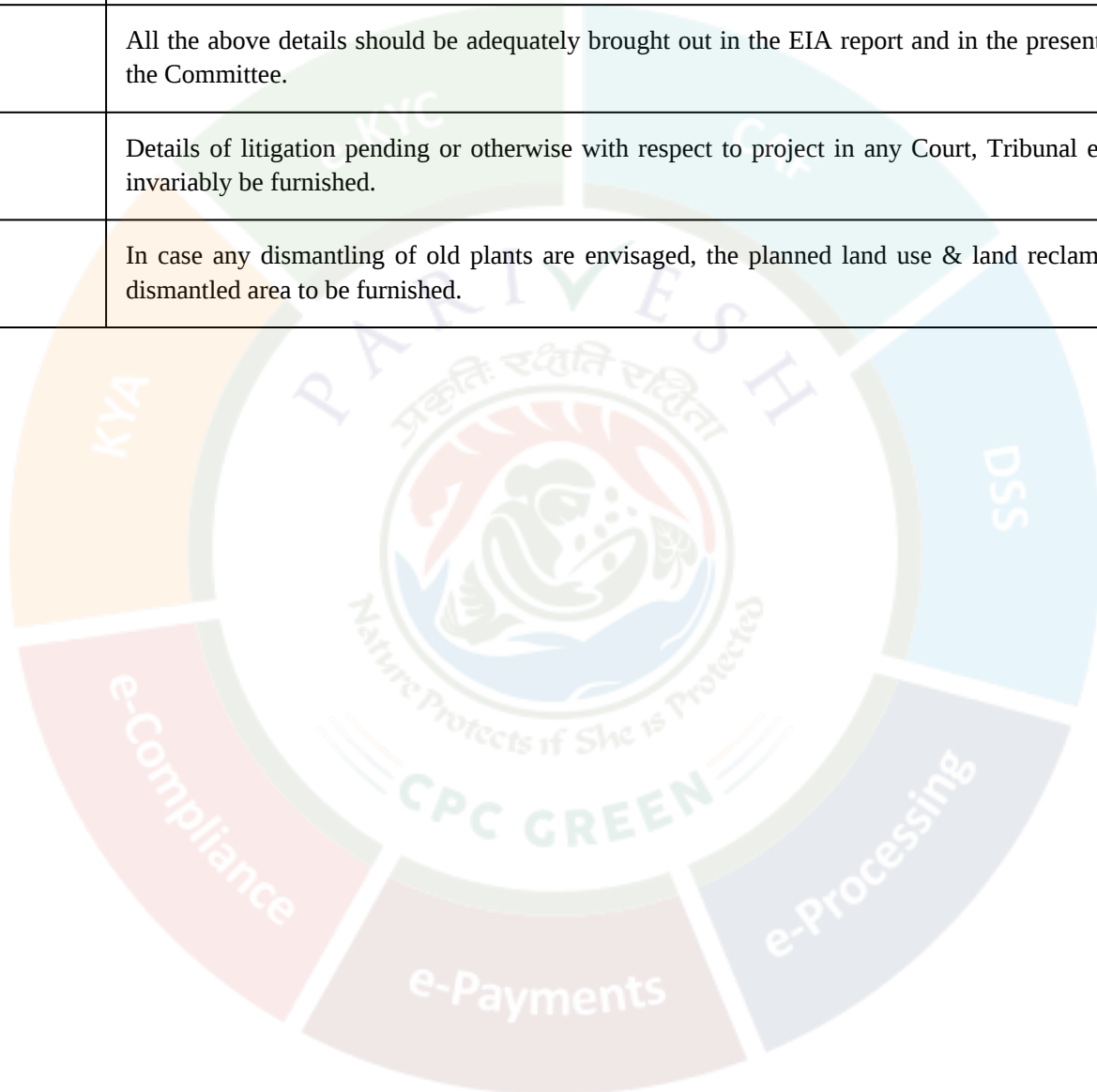
8. Corporate Environment Policy

S. No	Terms of Reference
8.1	Does the company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
8.2	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.
8.3	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.

S. No	Terms of Reference
8.4	Does the company has compliance management system in place wherein compliance status along with compliances / violations of environmental norms are reported to the CMD and the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report.

9. Miscellaneous

S. No	Terms of Reference
9.1	All the above details should be adequately brought out in the EIA report and in the presentation to the Committee.
9.2	Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.
9.3	In case any dismantling of old plants are envisaged, the planned land use & land reclamation of dismantled area to be furnished.



“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg,
New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Section C-Environmental Impact Assessment

Environmental Consultant- Perfact Enviro Solutions Pvt. Ltd.

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1. Introduction

1.1 Background about the project

M/s Tehkhand Waste to Electricity Project Limited (TWEPL) has developed a *Waste-to-Electricity (WtE) Plant* at Tehkhand, Delhi, with the primary objective of reducing the challenges associated with the disposal of unprocessed municipal solid waste in landfills. The project aims to ensure compliance with the provisions of the Solid Waste Management Rules and aligns with the national objectives set under the *Swachh Bharat Mission (SBM)*. Furthermore, the WtE facility is interlinked with the existing ESF at Okhla, thereby creating an integrated approach for sustainable municipal solid waste management in the region.

TWEPL is a special purpose vehicle promoted by Jindal Urban Infrastructure Limited (JUIL) for implementing waste management in the south zone of Delhi. Currently, the plant is handling 2000 $\pm 20\%$ TPD of MSW and converting it into 25 MW of energy, for which environmental and other statutory clearances have been obtained. Now, it is proposed to expand the existing capacity by 20 MW from an additional 1000 TPD of MSW. The total capacity of the plant after expansion will be 45 MW with waste processing capacity of 3000 $\pm 20\%$ TPD. The proposed project is expected to generate by-product (Biogas up to 20,000 Nm³/day) from biodegradable waste streams such as **leachate** and **green waste slurry**. The by-product will be channelized to Biogas purification plant to produce Bio-CNG/CBG up to 8 TPD.

As per EIA Notification dated September 14, 2006 and its subsequent amendments, the project falls under item 1(d) (Thermal power Plants), Category-A as the production capacity is >20 MW (using municipal solid non-hazardous waste as fuel). General Conditions is applicable as the site is within 5 km radius of Asola Wildlife Sanctuary ESZ and Okhla Bird Sanctuary ESZ, Delhi-Haryana Interstate Boundary, Critically Polluted Okhla Industrial Area, and will require appraisal by the Expert Appraisal Committee of Ministry of Environment, Forest and Climate Change (MoEF&CC), New Delhi for Environmental Clearance.

1.1.1 Justification of the Project

The Existing Municipal Solid Waste (MSW) to Electricity generating project is one of the most efficient and environmental friendly solutions for tackling the municipal solid waste management problem. This proposed expansion of the project has been envisaged by MCD along with TWEPL for addressing the issue of increase in the volume of municipal solid waste generated within its municipal boundaries. The proposed expansion of the project has been undertaken as a **green**

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

initiative of the JUIL (Jindal Group) and Municipal corporation of Delhi (erstwhile SDMC), serves the dual purposes, scientific disposal of municipal solid waste and generation of renewable power.

1.2 Purpose of the EIA Study

The purpose of preparing this Environment Impact Assessment Report is for obtaining Environmental Clearance as per EIA Notification 2006 & subsequent amendments based on the Terms of Reference issued by the MOEF&CC, vide TOR Identification NO. TO25A0603DL5903895N, File No:J-13012/03/2017-IA.I(T) dated 16.09.2025 for the expansion of existing Waste to Energy plant upto 45 MW. The report is prepared by identifying environmental aspects, impacts arising from the proposed project and its mitigation measures.

This Report is prepared based on ‘Generic Structure of EIA Report’ given in Appendix III and IIIA of EIA Notification 2006 & amendments till date.

1.3 Identification of Project & Project Proponent

1.3.1 Identification of Project

Delhi is generating about 11,852 TPD of municipal solid waste at the rate of 50 kg/capita/day. Out of this, nearly 4,241 TPD of waste remains untreated and has to be dumped at one site or the other. The landfill/dumping sites have already exceeded the prescribed limit and height. The dumps have attained a height of over 40 meters as opposed to the permissible limit of 20 meters. MSW management through treatment and disposal in Delhi are as follows:

- Supply of about 1,950 TPD to the TOWMCL WTE Plant, Okhla
- Supply of about 2,000 TPD to the TWEPL WTE Plant, Tehkhand
- Supply of about 1,300 TPD to the DMSWSL WTE Plant, Bawana
- Supply of about 1,300 TPD to the EDWPCL, WTE Plant, Ghazipur
- Supply of about 1061 TPD to the other processing facilities and
- Balance approx. 4241TPD to landfill.

(Source: DPCC Annual Report SWM for 2024-25)

The Govt. of India launched the Swachh Bharat Mission (SBM) in 2014, covering 4041 statutory towns to clean the streets, roads and infrastructure of the country. The SBM recommends preparation of ‘city sanitation plan’ and ‘state sanitation strategy. SBM Phase II launched on October 2021 with a vision of achieving **Garbage Free** Status for all cities through 100% source segregation, door to door collection and scientific management of the Municipal Solid Waste. This highlights the importance of WtE projects as a potential vehicle for addressing the MSW woes in the cities.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Waste to Energy plant is one of the most sustainable waste management programs & most economical and environment friendly solution for management of MSW. Tehkhand Waste to Electricity Project Limited is proposing to expand its capacity with a view to reduce the problem associated with disposal of unprocessed quantities of MSW, thereby complying with the various regulations as well as the objective and goal set for the country under the Swachh Bharat Mission (SBM).

1.3.2 Identification of Project Proponent

Jindal Urban Infrastructure Limited (JUIL) has vast experience in Waste to Energy projects. Below are the details of JUIL’s operational WtE plants in India as follows:

S. No.	Project	Location	Capacity (MW)	Commercial Operation Date	MSW/RDF processed From operation till 30 th June-2025 (Lakh Ton)	Total Electricity Generation (Million kWh)
1	Okhla WtE	Okhla - Delhi	23	01 st Sep, 2012	86.0	2,034
2	Guntur WtE	Guntur (A.P.)	15	01 st Oct, 2021	15.8	465.8
3	Vizag WtE	Vizag (A.P.)	15	23 rd Feb, 2022	15.1	385.6
4	Tehkhand WtE	Tehkhand - Delhi	25	26 th Jan, 2023	17.1	537.9
5	Ahmedabad WtE	Ahmedabad, Gujarat	15	13 th Oct, 2024	2.68	72.29
6	Jaipur WtE	Jaipur, Rajasthan	12	20 th Feb, 2025	1.13	32.74
Total			105	Year 2012 to 2025	122.71	3528.33

Table 1. Identification of Project Proponent

Name and Address of the Project Proponent: Tehkhand Waste to Electricity Project Limited, located at adjacent Tehkhand DTC Depot, Maa Anandmai Marg, Tehkhand, New Delhi-110020.

Name & Address of Contact Person: Shri Sandip Dutt (Director),

Address: M/s Tehkhand Waste to Electricity Project Limited, Adjacent to DTC Tehkhand Depot, Maa Anandmai Marg, Tehkhand, New Delhi-110020.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

1.4 Brief description of the project and its importance to the country of region

1.4.1 Brief Description of the Project

To overcome the deficient solid waste management (SWM) system in the area, it is proposed to expand the existing Waste to Energy plant at Tehkhand from 25±15% MW to 45 MW. Municipal Solid Waste in South Delhi is collected by MCD from different sources of generation such as residential, commercial, institutional, street sweeping, markets, function halls, etc.

The brief description of the proposed project is as follows:

S. No	PARTICULARS	DETAILS			
1	Nature of Project	“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.			
2	Activity & Category of the Project	1 (d), Category ‘A’			
3	Proposed site/land details (Ha)	Total Area - 6.07 Ha.			
4	Greenbelt details (Ha)	2.01 (33.0 %)			
5	Proposed fuel/ Raw Material				
		Particulars	Existing Capacity TPD	Expansion Capacity TPD	Total in TPD
		Raw material (MSW)	2000 ±20%	1000 ±20%	3000 ±20%
		Fuel: Refuse derived fuel prepared from Municipal Solid Waste.			
6	Production Capacity				
		Particulars	Existing Capacity in MW	Expansion Capacity in MW	Total capacity in MW
		Power Generation	25 ±15%	20	45
7	By Product (Biogas & Bio-CNG production)- Leachate & Green				
		Particulars	Existing Capacity	Expansion Capacity	Total

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No	PARTICULARS	DETAILS																		
	waste Slurry (Biodegradable waste)	Bio-CNG/CBG	0	Up to 8 TPD	Up to 8 TPD															
8	Project Location	Address: Adjacent Tehkhand DTC Depot, Maa Anandmai Marg, Tehkhand, New Delhi-110020.																		
9	Project Co-ordinates	 <table><thead><tr><th>Corner</th><th>Latitude</th><th>Longitude</th></tr></thead><tbody><tr><td>A</td><td>28°30'35.37"N</td><td>77°16'50.82"E</td></tr><tr><td>B</td><td>28°30'32.41"N</td><td>77°16'56.59"E</td></tr><tr><td>C</td><td>28°30'22.99"N</td><td>77°16'51.15"E</td></tr><tr><td>D</td><td>28°30'25.49"N</td><td>77°16'44.93"E</td></tr></tbody></table>				Corner	Latitude	Longitude	A	28°30'35.37"N	77°16'50.82"E	B	28°30'32.41"N	77°16'56.59"E	C	28°30'22.99"N	77°16'51.15"E	D	28°30'25.49"N	77°16'44.93"E
Corner	Latitude	Longitude																		
A	28°30'35.37"N	77°16'50.82"E																		
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C	28°30'22.99"N	77°16'51.15"E																		
D	28°30'25.49"N	77°16'44.93"E																		
10	Specific/General condition applicable	General Condition is applicable as the following particulars are located within 5 km radius of the project boundary; A. Protected Area & Eco Sensitive Zone - Okhla Bird Sanctuary ESZ is located at 4.76 Km NE and Okhla Bird Sanctuary is located at 4.83 km NE. Asola Wildlife Sanctuary ESZ is located at 0.72 km SW & Asola Wildlife Sanctuary is located at 1.65 km SW. B. Okhla Industrial Area- CPA is located at 0.61 Km North																		

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No	PARTICULARS	DETAILS															
11	Project Cost (INR. Cr.)	Rs. 900 Crores (Cost of Existing project= Rs. 465 Crores, Cost of proposed expansion= Rs. 435 Crores)															
12	Proposed Cost for Environment Protection Measures:	<table><tr><th colspan="3">Environment Protection Measures Cost (Rs. in Crores)</th></tr><tr><th>Description</th><th>Capital</th><th>Recurring/annum</th></tr><tr><td>Existing</td><td>42.87</td><td>6.70</td></tr><tr><td>Proposed</td><td>1.97</td><td>0.33</td></tr><tr><td>Total after expansion</td><td>44.84</td><td>7.03</td></tr></table> ❖ Capital Cost: Rs. 4484.02 lakhs ❖ Average Recurring Cost/annum: 703.64 lakhs/Annum	Environment Protection Measures Cost (Rs. in Crores)			Description	Capital	Recurring/annum	Existing	42.87	6.70	Proposed	1.97	0.33	Total after expansion	44.84	7.03
Environment Protection Measures Cost (Rs. in Crores)																	
Description	Capital	Recurring/annum															
Existing	42.87	6.70															
Proposed	1.97	0.33															
Total after expansion	44.84	7.03															
13	Details if project falls under the purview of A) FCA,1980, B) WPA,1972, C) CRZ, 2011	Not applicable															
14	CPA/SPA/ESA/ESZ, if any	Not within CPA/SPA/ESZ/ESA															
15	Interlinked project, if any, with status	Yes, the current project is interlinked to the Engineered Sanitary Landfill site at Tehkhand, which has obtained Environmental Clearance letter vide F. No.10-8/2018-1A-III dated 29.10.2018. It is being operated by Municipal Corporation of Delhi and it is located adjacent to the site. (The same is under preview of MCD)															
16	Water Requirement	Source: Domestic Water : Delhi Jal Board (DJB) Industrial Water : Treated water from STP, Okhla. <table><tr><th>Particulars</th><th>Existing Capacity</th><th>Expansion Capacity</th><th>Total</th></tr><tr><td>Domestic</td><td>5 KLD</td><td>2 KLD</td><td>7 KLD</td></tr><tr><td>Industrial Process</td><td>490 KLD</td><td>135 KLD</td><td>625 KLD</td></tr></table>	Particulars	Existing Capacity	Expansion Capacity	Total	Domestic	5 KLD	2 KLD	7 KLD	Industrial Process	490 KLD	135 KLD	625 KLD			
Particulars	Existing Capacity	Expansion Capacity	Total														
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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No	PARTICULARS	DETAILS						
17	Power Requirement	Source: Inhouse (WtE Plant) <table> <tr> <th>Existing</th><th>Expansion</th><th>Total requirement after expansion</th></tr> <tr> <td>3,500 KW</td><td>2,800 KW</td><td>6300 KW</td></tr> </table> Solar Panels are installed on the roof top area of 3 KW capacity and further ~686 KW capacity of solar panels will be installed.	Existing	Expansion	Total requirement after expansion	3,500 KW	2,800 KW	6300 KW
Existing	Expansion	Total requirement after expansion						
3,500 KW	2,800 KW	6300 KW						

Table 2. Brief Description of the Project

1.4.2 Importance to the Country and the Region

This is completely an indigenous plant to produce power from the Municipal Solid Waste. India has a surplus quantity of Municipal Solid Waste. The objective of the proposed expansion is to reduce the burden on the sanitary landfill sites in Delhi. Delhi is generating about 11,852 TPD of municipal solid waste out of this nearly 4,241 TPD of waste remains untreated and has to be dumped at land fill site as per DPCC report.

The Installed Generation Capacity (Sector-wise) as per the report of Central Electricity Authority Report (September 30,2024) is given as follows:

Installed Generation Capacity (sector-wise) as on 30.09.2024

Sector	Installed Capacity (MW)	% Share in Total Generation
Central	1,04,453	23.1%
State	1,08,282	23.9%
Private Sector	2,39,960	53.0%
Total	4,52,695	100 %

Table 10. Installed Generation Capacity (sector-wise) as on 30.09.2024

The contribution of fuel in power generation is given as follows:

Contribution of Fossil Fuel in Power Generation

Fuel	Installed Capacity (MW)	% Share in Total Generation
Coal	2,11,030	46.6%
Lignite	6,620	1.5%
Gas	24,818	5.5%
Diesel	589	0.1 %
Total Fossil Fuel	2,43,057	53.7%

Table 11. Contribution of Fossil Fuel in Power Generation

Contribution of Non-Fossil Fuel in Power Generation

Fuel	Installed Capacity (MW)	% Share in Total Generation
Hydro	46,928	10.4
Wind	47,243	10.5

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Solar	90,762	20.0
BM Power/Cogeneration	10,724	2.4
Waste to Energy	6,04	0.1
Small Hydro Power	5,076	1.1
Total	2,01,458	44.5%
Nuclear	8,180	1.8%
Total Capacity from Non-Fossil Fuel including Nuclear	2,09,638	46.3 %

Table 12. Contribution of Non-Fossil Fuel in Power Generation

Contribution of waste to energy in power generation is only 0.1% as per CEA report.

Ref.: Central Electricity Authority Report dated 30th September, 2024.

1.5 Scope of the study - Details of Regulatory scoping carried out

1.5.1 Scope of EIA Study

- **Terms of Reference (TOR):** Terms of Reference issued by the MOEF&CC, vide TOR Identification NO. TO25A0603DL5903895N, File no. J-13012/03/2017-IA.I(T) dated 16.09.2025.
- **Existing Environmental Clearance (EC):** Environmental Clearance vide file No. J-13012/03/2017-IA.I(T) dated 26.07.2018 and Amendment in Environmental Clearance vide File No. J-13012/03/2018-IA.I(T) dated 15.01.2019.
- **Certified Compliance Report (CCR) for EC:** Applicable. CCR obtained from MOEF&CC Regional Office, Lucknow vide File No. V/ENV/DLI/1412/2018/220 dated 01.08.2025. Minor Non-Compliances observed. Action Taken Report for minor Non-compliances points has been submitted to IRO vide Letter Ref. No. TWEPL/EXP/2025-26/008, dated 14.08.2025.
- **Coastal Regulation Zone (CRZ):** Not Applicable as it is located far away from the coastal area.
- **Wildlife Clearance:** Not Applicable as the project is not located within ESZ or protected area. Asola Wildlife Sanctuary ESZ is located at 0.72 km SW & Asola Wildlife Sanctuary is located at 1.65 km SW and Okhla Bird Sanctuary ESZ is located at 4.76 Km NE and Okhla Bird Sanctuary is located at 4.83 km NE.
- **Other Permissions (CTE & CTO):** Applicable. Consent To Establish order No.: DPCC/WMC II/2019 dated 31.01.2020 validity upto 25.02.2021 & Latest Consent to Operate Order No.: DPCC/WMC-II/Tehkhand-WTE/2025/02 dated 10.01.2025 validity upto 06.10.2029 The consent chronology for the industry is mentioned in the table below.

S. No.	Consent	Validity from	Validity to	Consent No.
1	CTE	31.01.2020	25.02.2021	DPCC/WMC-II/Tehkhand-WTE/2018/3090

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S. No.	Consent	Validity from	Validity to	Consent No.
2	CTE (renew)	09-02.2021	25.02.2022	DPCC/WMC-II/Tehkhand-WTE/2018/5375-5377
3	CTE (renew)	15.02.2022	25.02.2023	DPCC/WMC-II/Tehkhand-WTE/2018/8970-8972
4	CTO	07.10.2022	06.04.2023	DPCC/WMC-II/Tehkhand-WTE/2018/620-626
5	SWM Authorization	07-10-2022	06.04.2023	DPCC/WMC-II/Tehkhand WTE/2018/627-633
6	SWM Authorization (renew)	01.06.2023	06.10.2024	DPCC/WMC-II/Tehkhand WTE/2018/4380-4386
7	CTO (renew)	01.06.2023	06.10.2024	DPCC/WMC-II/Tehkhand-WTE/2018/4387-4393
8	SWM Authorization (renew)	10.01.2025	06.10.2029	DPCC/WMC-II/Tehkhand WTE/2018/57-62
9	CTO (renew)	10.01.2025	06.10.2029	DPCC/WMC-II/Tehkhand-WTE/2025/02

Table 13. Other Permissions (CTE & CTO)

● Applicable Statutory

The list of identified statutory applicable to the company is given in Table below:

Legal/ Applicable Statutory Provisions
The Environment Protection Act, 1986, Amended 1991, 2006 & Rules, 1986 Including Amendment Rules 2022.
The Air (Prevention & Control of Pollution) Act, 1981, Amended 1987 & Rules 1982.
The Water (Prevention & Control of Pollution) Act, 1974, Amended 1988 & Rules, 1975, Amended Rules 2011.
Solid Wastes Management Rules, 2016 as amended to date.
E-waste (Management) Rules 2022, as amended to date.
Hazardous and Other Waste (Management & Transboundary Movement) Rules, 2016 as amended to date.
Plastic Waste Management Rules, 2021, Notification 2018, Its Amendments In 2019, 2022 & Guidelines Thereto.
Construction And Demolition Waste Management Rules, 2016

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Legal/ Applicable Statutory Provisions
Batteries (Management and Handling) Rules, 2022.
The Noise Pollution (Regulation and Control) Rules, 2000 as amended to date.
Public Liability Insurance Act, 1991 as amended to date.
The Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989 as amended to date.
Central Motor Vehicle Act 1988 and Central Motor Vehicles Rules, 1989 as amended to date.
Electricity Rule, 2005 as amended to date.
Environmental Impact Assessment Notification, 2006 as amended to date.
Occupational, Safety, Health and Working Conditions Code, 2020

Table 14. Applicable Statutory

1.6 ToR Compliance

S. No.	Tor Point	TOR Compliance	Citation in EIA Report
Specific Points			
[A] Environmental Management and Biodiversity Conservation			
1	Project proponent shall submit an action plan to comply with the additional environmental safeguards as per MoEF&CC O.M. dated 31/10/2019 shall be submitted as the project site is located at a distance of 0.61 km from the Okhla Industrial Area which is a Critically Polluted Area (CPA).	The project is located 0.61 km north of Okhla Industrial Area which is a Critically Polluted Area (CPA), Hence, it is not covered under the CPA's regulations. The additional safeguards as per MoEF&CC O.M. dated 31/10/2019 are as follows: - Green belt is developed over 33% of land as per plant layout with local species and properly maintained by TWEPL. - Addition three tier green belt will be developed over the land provided by MCD along the Nala or any other land.	-
2	PP shall obtain No Objection Certificate from Archeological Survey of India for its impact on Nai-kakot in Tughlaqabad; Walls, gate and bastions of Adilabad (Mohammadabad) and Tomb of Ghiyasuddin Tughlakabad.	25 MW TWEPL is operational WtE project. This proposed 45 MW expansion of existing 25MW TWEPL project is on the same plant out. No additional land is required for the proposed expansion. There is no requirement to obtain a No Objection Certificate from the Archaeological Survey of India (ASI). The distance from the ASI monuments from project site as follows:	-

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report												
		<table><tr><th>ASI Monument Name</th><th>Distance</th><th>Direction</th></tr><tr><td>Nai-ka-kot in Tughlaqabad</td><td>0.44 Km</td><td>SW</td></tr><tr><td>Walls, gate and bastions of Adilabad (Mohammadabad) and causeway leading there to from Tughlakabad</td><td>1.18 Km</td><td>SW</td></tr><tr><td>Tomb of Ghiyasuddin Tughlakabad</td><td>1.76 Km</td><td>W</td></tr></table> Guidelines of ASI NOC are required when the project lies in Prohibited Zone- i.e. within 100 m or the regulatory zone i.e. 200 m.	ASI Monument Name	Distance	Direction	Nai-ka-kot in Tughlaqabad	0.44 Km	SW	Walls, gate and bastions of Adilabad (Mohammadabad) and causeway leading there to from Tughlakabad	1.18 Km	SW	Tomb of Ghiyasuddin Tughlakabad	1.76 Km	W	
ASI Monument Name	Distance	Direction													
Nai-ka-kot in Tughlaqabad	0.44 Km	SW													
Walls, gate and bastions of Adilabad (Mohammadabad) and causeway leading there to from Tughlakabad	1.18 Km	SW													
Tomb of Ghiyasuddin Tughlakabad	1.76 Km	W													
3	Project proponent shall submit the authenticated map of Chief Wildlife Warden indicating the distance between the boundary of the project site and Asola Wildlife Sanctuary ESZ , located at 0.72 km SW Asola Wildlife Sanctuary, located at 1.65 km SW, Okhla Bird Sanctuary ESZ located at a distance of 4.76 km NE and Okhla Bird Sanctuary located at 4.83 km NE	The proposed 45 MW WtE project is an expansion of existing 25MW TWEPL. No additional land is required for the proposed expansion. Authenticated Map from Chief Wildlife Warden indicating the project site, Asola Wildlife Sanctuary & Asola Wildlife Sanctuary is given in EIA chapter 2.	Chapter 2 Section 2.3.6 Given as Annexure 30.												
4	Cumulative Environmental Impact Assessment study of all the existing and proposed project shall be conducted.	As this is an expansion project, the Environmental Impact Assessment (EIA) study has been conducted holistically to evaluate the cumulative environmental impacts. This study has comprehensively assessed the combined effects of the existing plant operations and the proposed expansion on all environmental parameters. The detailed Impact assessment for both proposed construction and Operation phase is given in Chapter 4.	Section C												
5	Details of characterization of Municipal solid waste, its segregation process and disposal of waste management plan shall	Details of characterization of Municipal solid waste and its composition breakup is given at Chapter 2 at section 2.7.	Chapter 2 Section 2.7												

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	be submitted along with EIA.	The waste segregation process and disposal of waste management plans are given in EIA Chapter 2, section 2.8.	Chapter 2 Section 2.8
6	A plan shall be submitted to minimize the least use of hard plastic getting burn into the incinerators.	The Municipal Solid Waste (MSW) received at the waste-to-energy facility is largely devoid of hard plastic due to prior manual segregation by rag pickers. These individuals undergo training to identify various types of hard plastics through visual inspection, ensuring precise segregation from other materials.	-
7	Proximate and ultimate analysis, Calorific value of municipal waste proposed to be brought from nearby MSW shall be carried out for the design purpose of boilers. Mass balance of waste in the process shall be submitted.	Proximate and Ultimate analysis has been carried out to estimate the calorific value of MSW and to design the boilers. The analysis shows that the calorific value of the MSW ranges from 1500 °C to 2500 °C Material balance of waste to be received at the WTE Plant is given in EIA Chapter 2, section 2.7.	Chapter 2 Section 2.7
8	Toxicity Characteristic Leachate Procedure (TCLP) test shall be conducted for Characterization of leachate, any potential of leaching heavy metals into the surrounding areas as well as into the groundwater.	Toxicity Characteristic Leachate Procedure (TCLP) test has been conducted for Characterization of leachate any potential of leaching heavy metals into the surrounding areas as well as into the groundwater. The analysis shows that the leachate has heavy metals which are below the quantification limit. The details results are given in chapter 2, section 2.8.1 Test reports for leachate are attached as Annexure 18 d.	chapter 2, section 2.8.1 Annexure 18 d.
	TCLP analysis of heavy metals, texture, bulk density, Cation Exchange Capacity of Heavy metals in the flyash and bottom ash shall be conducted for existing plant.	The TCLP test was carried out for estimating the Heavy metals in Fly Ash & Bottom Ash in May 2025. The Analysis shows that the quantity of heavy metals in both Fly Ash & Bottom Ash are below the TCLP regulatory levels. The detailed results are given in chapter 2 section 2.11.	Chapter 2, section 2.11 The test reports are attached as Annexure 18 e & f.

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
		The test reports are attached as Annexure 18 e & f .	
9	The remedial measures for arresting dust generation on roads and atmosphere, Air pollution control measures including NOx control measure, treatment of leachate and stabilizing the slopes shall be taken up.	Remedial measures for dust mitigation on roads and other areas where dust will be generated are as follows : • 3 No. of Anti Smog Gun is available at the site for dust mitigation in vulnerable dusty areas like ash handling points and transfer areas. • Fixed sprinklers are installed at the site to reduce dust while movement of trucks. • Manual Sprinkling is also done regularly. • The entry gates have sensor based wheel washing systems for vehicle cleaning and washing. • The materials are kept covered using green net. The same is given in chapter 2, section 2.9. Air Pollution Control measures implemented in the project are as follows: A. Treatment of the Flue Gas from the Boilers: Existing Control Measures: • There are 2 x 65 TPH (each) capacity of boilers installed at the existing plant, the flue gas from Boilers directed into the turbo-reactor via a venturi nozzle, creating a fluidized bed. • The flue gas comes into turbulent contact with hydrated lime and activated carbon, which absorb SO₂, HCl and other acidic compounds, heavy metals, and dioxins & furans.	Chapter 2 Section 2.9 Chapter 2 Section 2.9.1

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
		- The remaining dust particles are carried with the flue gas into the baghouse filter through a central duct to chambers. - The flue gas passes through filter bags, trapping solids on the outside of the bags, forming a filtration-aiding layer (filter cake). This process ensures the removal of particulate matter. - SNCR technology is installed for the control of NOx emission. B. Proposed Control Measures: - The proposed Boiler of up to 100 TPH will be installed as the 3rd boiler with the Best available technology and State-of-the-art technology pollution control devices. - The proposed bag filters will be designed with 130% capacity, providing additional margin for efficient emission control. - The proposed Flue Gas Cleaning System (FGCS) will be designed with 130% capacity, providing an additional margin for efficient emission control. The best available fabric filter materials will be used for filter bags. The leachate generated in the project from MSW pit is treated in the Leachate treatment plant consisting of Primary, secondary treatment system and RO. The details of Leachate treatment and methodology is given in chapter 2, section 2.10.1. Not applicable, as the present proposal is for expansion of existing WTE plant and it does not include landfill within the project premises.	Chapter 2 Section 2.10.1
10	Detailed Geo-hydrological study shall be conducted w.r.t. hydraulic gradient,	The hydrology of the study area is	Chapter 3

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	porosity and infiltration around 2 km of the project site.	explained in Chapter 3 section 3.8. A detailed hydrological study is under process and will be submitted along with final EIA.	section 3.8
11	Aquifer characteristics shall be clearly mapped by conducting in-situ studies.	As per CGWA report, three distinct potential aquifer groups within the depth of 450 m below ground level, identified and grouped on basis of various hydrogeological mapping and groundwater exploration, are as follows: 1. Aquifer Group I - Down to 65 m below ground level (Un-confined) 2. Aquifer Group II -Between 65 to 200 m below ground level (Confined/Semi-Confined) 3. Aquifer Group III - Between 200 to >300 m below ground Level(Confined).	-
12	Treatment and disposal of leachate shall be submitted. No water from the plant is allowed to enter into the canal/ nallah/ stream.	Treatment of leachate collection, storage and treatment facilities based on chemical, biological and membrane-based treatment. LTP treated water and WTP treated water will be used to produce RO and DM water that will be used for the cooling tower, boiler make-up and Selective Non-Catalytic Reduction (SNCR). Recycling and utilization of reject water generated from WTP & LTP is used for Boiler slag extractor for Ash quenching and FGCS Gas Cooling, Road, Cleaning & Housekeeping. Details of the same are given in EIA Chapter 2. No water from the plant is discharged outside the premises. All the treated water from the plant is reused within the project site and zero liquid discharge is implemented. The same shall be followed after proposed expansion also.	Chapter 2 Section 2.9.4
13	Details regarding Flue gas treatment, ash generation and its disposal/utilization	The installation of “State-of-the-Art” Flue Gas Cleaning System (FGCS) will be	Chapter 2 Section 2.9

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report																																																												
	method shall be submitted.	provided. Details of Flue gas is given in EIA Chapter 2. Section 2.9 The Bottom Ash Generated is given for construction of Highway embankment. Any unutilized material will be sent to ESLF. The Fly Ash generated from the project is being supplied to ash brick manufacturers and any unutilized material will be sent to ESLF. The quantities of ash generation and disposal methods are given in EIA Chapter 2 section 2.11.	Chapter 2 Section 2.11																																																												
14	Monitoring of dioxins and furans and other heavy metals shall also be carried out in the stack emissions as per the Municipal Solid Waste Rules, 2016 for one season for the existing plant.	The Stack emissions monitoring is regularly carried out. The parameters like dioxin & Furan and other heavy metals are also considered in the analysis. The results of recent reports are briefed below: <table><tr><th>Parameters</th><th>UoM</th><th>Jan-25</th><th>Feb-25</th><th>Mar-25</th></tr><tr><td>Dioxins & Furans</td><td>ngTEQ/ Nm3</td><td>0.041</td><td>0.0327</td><td>0.0524</td></tr><tr><td>Cadmium as Cd + its compound</td><td>mg/Nm3</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>Thorium as Th + its compound</td><td>mg/Nm3</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>Total Mercury as Hg and its compound</td><td>mg/Nm3</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>Lead as Pb</td><td>mg/Nm3</td><td>0.014</td><td>0.016</td><td>0.018</td></tr><tr><td>Chromium as Cr</td><td>mg/Nm3</td><td>0.022</td><td>0.02</td><td>0.019</td></tr><tr><td>Manganese as Mn</td><td>mg/Nm3</td><td>0.02</td><td>0.02</td><td>0.02</td></tr><tr><td>Arsenic as As</td><td>mg/Nm3</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>Antimony as Sb</td><td>mg/Nm3</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>Cobalt as Co</td><td>mg/Nm3</td><td>0.021</td><td>0.026</td><td>0.024</td></tr><tr><td>Copper as Cu</td><td>mg/Nm3</td><td>0.005</td><td>0.008</td><td>0.006</td></tr></table>	Parameters	UoM	Jan-25	Feb-25	Mar-25	Dioxins & Furans	ngTEQ/ Nm3	0.041	0.0327	0.0524	Cadmium as Cd + its compound	mg/Nm3	0.002	0.002	0.002	Thorium as Th + its compound	mg/Nm3	0.001	0.001	0.001	Total Mercury as Hg and its compound	mg/Nm3	0.002	0.002	0.002	Lead as Pb	mg/Nm3	0.014	0.016	0.018	Chromium as Cr	mg/Nm3	0.022	0.02	0.019	Manganese as Mn	mg/Nm3	0.02	0.02	0.02	Arsenic as As	mg/Nm3	0.002	0.002	0.002	Antimony as Sb	mg/Nm3	0.002	0.002	0.002	Cobalt as Co	mg/Nm3	0.021	0.026	0.024	Copper as Cu	mg/Nm3	0.005	0.008	0.006	Attached as Annexure. 18 b
Parameters	UoM	Jan-25	Feb-25	Mar-25																																																											
Dioxins & Furans	ngTEQ/ Nm3	0.041	0.0327	0.0524																																																											
Cadmium as Cd + its compound	mg/Nm3	0.002	0.002	0.002																																																											
Thorium as Th + its compound	mg/Nm3	0.001	0.001	0.001																																																											
Total Mercury as Hg and its compound	mg/Nm3	0.002	0.002	0.002																																																											
Lead as Pb	mg/Nm3	0.014	0.016	0.018																																																											
Chromium as Cr	mg/Nm3	0.022	0.02	0.019																																																											
Manganese as Mn	mg/Nm3	0.02	0.02	0.02																																																											
Arsenic as As	mg/Nm3	0.002	0.002	0.002																																																											
Antimony as Sb	mg/Nm3	0.002	0.002	0.002																																																											
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S. No.	Tor Point	TOR Compliance					Citation in EIA Report															
		<table><tr><td>Nickel as Ni</td><td>mg/Nm3</td><td>0.02</td><td>0.02</td><td>0.02</td></tr><tr><td>Vanadium as V</td><td>mg/Nm3</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>Zirconium as Zr</td><td>mg/Nm3</td><td>0.001</td><td>0.001</td><td>0.001</td></tr></table>					Nickel as Ni	mg/Nm3	0.02	0.02	0.02	Vanadium as V	mg/Nm3	0.001	0.001	0.001	Zirconium as Zr	mg/Nm3	0.001	0.001	0.001	
Nickel as Ni	mg/Nm3	0.02	0.02	0.02																		
Vanadium as V	mg/Nm3	0.001	0.001	0.001																		
Zirconium as Zr	mg/Nm3	0.001	0.001	0.001																		
		The detailed test reports are attached as Annexure. 18 b.																				
15	Impact of existing Waste to Energy plant on natural environment be studied and a comparative statement clearly mentioning the impacts on existing water bodies, and other ecologically sensitive areas within 10 km radius of project be submitted.	The proposed project is an expansion of the existing WTE plant. The baseline study has been conducted to assess the impact on existing water bodies within the study area of 10 km. The baseline study is given in Chapter 3 section 3.9 The details of other ecologically sensitive areas are given in chapter 2, section 2.3.6.					Chapter 3 section 3.9 Chapter 3 section 2.3.6															
16	A comparative chart shall be prepared with changes observed from previous baseline study (existing nearby Waste to Energy Plant) and present baseline study.	A comparative study of Previous baseline i.e, December 2017 to February 2018 v/s current baseline study of March to May 2024 has been done and the detailed results and interpretation are given EIA Chapter 3.					Chapter 3 Section 3.6.7															
17	An epidemiological study shall be carried out within 5 km range of the existing integrated facility.	The study is in progress and will be submitted with the final EIA report.					-															
18	Detailed action plan shall be prepared for maintenance of air pollution control equipment.	The action plan is detailed in Chapter 6 section 6.1.3.					Chapter 6 section 6.1.3.															
19	Pond and ground water quality (10 locations within 2 km radius of the plant boundary) shall be studied and reports submitted along with EIA/EMP. Action plans for Ground water monitoring stations on all hotspots like schools/hospitals within 2 km radius of the plant boundary be submitted.	The study is in process. The results will be submitted along with Final EIA					-															
20	Baseline Study for Heavy metals in Ground water, Surface water and soil to be carried out and incorporated in EIA/EMP	Baseline Study for Heavy metals in Ground water, Surface water and soil have been					Chapter 3 Section 3.9.7 &															

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	report.	carried out. The detailed results are given in Chapter 3	3.9.9
21	Details pertaining to water source, treatment and discharge should be provided.	Source of freshwater for domestic purposes from Delhi Jal Board and for other plant process Treated water from Okhla STP is being taken and treated in inhouse Water treatment plant. Sewage water will be treated in Primary treatment (Biological section) in LTP plants. Leachate generated from MSW is treated in LTP of 360 KLD (354 KLD-leachate + 6 KLD-Sewage) which will be treated in existing leachate treatment plants. No effluent is/ will be discharged from the plant premises. ZLD will be maintained.	Chapter 2 Section 2.10
22	Zero Liquid Discharge plan shall be submitted.	After expansion, it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants. ZLD will be maintained. Details of the same are given in EIA Chapter 2.	Chapter 2 Section 2.9.4
23	Action plan for development of green belt (40% of total project cover area) along the periphery plantation with 90% survival rate and detailed plan shall be submitted	Greenbelt covering 33% of the plot area i.e. 2.0142 ha has been developed along the periphery of the plant. Approx 6219 nos. of trees (including ornamental & fragrant species) are planted at the site. Three tier plantations & width of green belt ranging from 20 -30 m all across the boundary of the project. Further, a request letter is submitted to MCD for allocation of land near nallah for thick green plantation. The same is attached as Annexure 27.	Chapter 2 Section 2.14 The request letter to MCD is attached as Annexure 27.
24	PP shall submit an action plan for using treated Sewage/Domestic wastewater for	Source of water - Treated water from Okhla STP file	Chapter 2 Section

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	its operations.	No.F-1/DJB/EE(SDW)V/2017/1346 date 03.19.2917 and Fresh Water for Domestic purposes from Delhi Jal Board. Both treated water and fresh water are supplied through underground pipelines. The Treated water from Okhla STP is attached as Annexure 7. During Operation Phase- The water will be used in activities - domestic purpose, Industrial Boiler make-up water, cooling tower, Central monitoring basin. 625 KLD of water will be needed for plant operation which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB). ZLD will be maintained within the premises. Detailed Water management Plan is given in EIA Chapter 2.	2.10 The approval is attached as Annexure 7.
25	Project Proponent to conduct Environmental Cost Benefit Analysis for the project in EIA/EMP Report.	Environmental Cost Benefit Analysis has been conducted, and the details are given in EIA Chapter 9.	Chapter 9 Section 9.1
26	An action plan shall be prepared for Water shed development within 10 km radius of the plant boundary in consultation with a reputed government institution.	The Study is under process. The same shall be submitted along with final EIA.	-
27	A detailed plan needs to be submitted for undertaking extensive green plantation within 10 km radius of the plant focusing on water reservoir, school, hospital and other institutional areas and the same needs to be incorporated in EIA/EMP report.	A request has been placed to MCD to allocate us parks or land for green area development. The detailed action plan for green area development will be prepared in consultation with MCD and will be submitted along with Final EIA.	-
28	A detailed action plan of Plantation shall be prepared for nearby areas as per the parks/locations allocated by the Municipal Corporation of Delhi (MCD), with a target of planting 5,000 indigenous saplings over a period of three years, in coordination	Greenbelt covering 33% of the plot area i.e. 2.0142 ha has been developed along the periphery for the existing plant. Additional plantation will be undertaken in nearby areas as per the parks/locations	-

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	with MCD. Additionally, within the project site, Miyawaki plantation shall be implemented in designated areas as per space availability.	allocated by the Municipal Corporation of Delhi (MCD), with a target of planting 5,000 indigenous saplings over a period of three years, in coordination with MCD. Additionally, within the project site, Miyawaki plantation will be implemented in designated areas as per space availability.	
29	Recommendations of the Commission for Air Quality Management in National Capital Region and Adjoining Areas shall be submitted.	A request for Recommendation of Commission for Air Quality Management (CAQM) in the National Capital Region and Adjoining areas has been submitted. The Request application is enclosed as Annexure 26 .	Annexure 26
30	Comparative statements regarding baseline data collected during Dec 2017 to Feb 2018 & March to May 2024 along with the reasons behind the considerable changes in the baseline data shall be furnished.	A comparative study of Previous baseline i.e, December 2017 to February 2018 v/s current baseline study of March to May 2024 has been done and the detailed results and interpretation are given EIA Chapter 3.	Chapter 3 Section 3.6.7
31	Action plan for indoor saplings of plants (about 10000) shall be distributed/made available to residents in nearby residential areas. Further, vertical garden/creepers can be erected on the compound wall of premises. The fog cannon can be used to mitigate air pollution within the premises of the project.	A tentative action plan for distribution of indoor plant saplings is prepared and the same is given in chapter 10, section 10. 8. Vertical Green/creepers will be planted/erected in the project compound walls . 3 No. of Anti Smog Gun is available at the site for dust mitigation in vulnerable dusty areas like ash handling points and transfer areas.	chapter 10, section 10. 7
32	PP is advised to implement the 'Ek Ped Maa Ke Naam' Campaign, which was launched on 5th June 2024 on the occasion of the World Environment Day to increase the forest cover across the Country. This plantation drive is other than Green belt development. An action plan in this regard shall be submitted.	Noted. We will implement the ' Ek Ped Maa Ke Naam' Campaign as advised. In essence, "Ek Ped Maa Ke Naam" is more than just a tree-planting drive; it's a social movement aimed at fostering a culture of environmental consciousness by connecting it with a universal and deeply personal human emotion—love for one's mother.	-

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		We will undertake a dedicated tree plantation drive in consultation with MCD. The native species will be selected for plantation drive. The action plan for the same will be submitted after allocation of land from MCD	
[B] Disaster Management			
1	A Disaster Management Plan shall be prepared and incorporated in the EIA/EMP report.	The Disaster Management Plan is related to the identification of sources from which hazards can arise and the maximum credible loss scenario that can take place in the concerned area. The detailed DMP is given in EIA Chapter 7.	Chapter 7 Section 7.9
[C] Socio-economic Study			
1	Public Health Action Plan including the provisions for drinking water supply for the local population shall be in the EIA/EMP Report.	Public Health Action Plan including Regular Medical Check-up & First Aid facility will be provided, Conduct of Mock drills, Training programme on health & Safety, Health Check-up camps shall be organized. Support to the occupational Health center. The detailed action plan and Budget for Occupational health and Safety & Public Health are given in EIA Chapter 7.	Chapter 10 Section 7.9
	The status of the existing medical facilities in the project area shall be discussed.	The list of nearby existing medical facilities like hospitals are given at Chapter 2 section 2.3.6. Health checkup of employees for occupation related diseases. Also, periodical medical check-up is conducted to ensure good health and also early detection of any ailments. The details are given in EIA Chapter 7	Chapter 2 section 2.3.6. Chapter 7 Section 7.9

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	Possibilities of strengthening existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the needs of the labour force and local populace.	Safety in Work Environment for Worker Health includes Pre-employment tests, Annual/Bi-annual Medical Tests will be conducted. Occupation Health Centre (OHC) is already established within the premises. Nearest hospital ESIC is located at 500 mtr. from the plant. The Occupational health & safety & Public Health is given in EIA Chapter 7.	Chapter 7 Section 7.9
2	Proposed expansion of WTE project from 25 to 45 MW is exempted from the conduct of fresh public hearing in terms of the provisions contained under para 7(ii)a of EIA, 2006. However, public consultation by obtaining responses in writing from concerned persons having a plausible stake in the environmental aspects of the project or activity shall be carried out as per the procedure prescribed under EIA, 2006 as amended.	Noted. Public Hearing is exempted as per Para 7(ii)(a) and Public Consultation will be carried out as per EIA Notification, 2006.	Chapter 7 Section 7.1

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	As per the Ministry's OM dated 30.09.2020, to address the concern raised during the Public consultation, the Project Proponent is required to submit the detailed activities proposed with year-wise budgetary provision (Capital and recurring) for 5 years. Activities proposed shall be part of EMP. The recommendation Socio-economic study may also be considered while planning the activities & budget.	Noted. The amount already spent is Rs. 4287 Lakhs as Capital cost and approx. Rs 565 Lakhs/Year as recurring cost and proposed Budget of Rs. 197.44 lakhs as capital cost & Rs. 33.64 lakhs/year as recurring cost has been estimated as a part of EMP. After public consultation, the detailed activities proposed with year-wise budgetary provision (Capital and recurring) for 5 years will be submitted. The tentative detailed EMP Budget with activities is given in EIA Chapter 10. The socio-economic study has been conducted and gap analysis for needs of nearby villages is also addressed. The same is given in Chapter 3 Section 3.13 An action plan for the proposed cost along with activities under CER of Rs. 43.2 lakhs for the period FY.2025-26 and 2026-27. The detailed budgetary is given in Chapter 10 section 10.8	Chapter 10 Section 10.7 Chapter 3 section 3.13 Chapter 10 section 10.8

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3	A need based Social Impact Assessment Study shall also be carried out and an action plan on its recommendations may also be submitted with budgetary provisions.	A socio-economic survey was conducted to assess the demographic and infrastructural conditions within the influence zone of the proposed expansion project. As per the 2011 Census, details of the Study Area is as below • Total Population: 5458526 • Total House Hold: 1165232 • Sex Ratio: 862 • Child Population (0-6 years): 679914 • Overall Literacy Rate: 86.3% • Male Literacy Rate: 91.4% • Female Literacy Rate: 80.5% • Scheduled Caste (SC) %: 12.9% • Scheduled Tribe (ST) %: 0% • Others (not SC/ST): 87.1 Social Impact Assessment Study is given in EIA Chapter 3. the has been conducted and gap analysis for needs of nearby villages is also addressed An action plan for the proposed cost along with activities under CER of Rs. 43.2 lakhs for the period FY 2025-26 to 2026-27. Budgetary under Social Welfare Responsibility is given in EIA Chapter 10.	Chapter 3 Section 3.13 Chapter 10 Section 10.8
4	Demographic details and land use change details in a 10 km area shall be submitted.	According to the 2011 Census, the area is composed of 8 villages, and 29 census towns are present within a 10 km radius. As per the 2011 Census, details of the Study Area is as below • Total Population: 5458526 • Total House Hold: 1165232 • Sex Ratio: 862 • Child Population (0-6 years): 679914 • Overall Literacy Rate: 86.3% • Male Literacy Rate: 91.4% • Female Literacy Rate: 80.5% • Scheduled Caste (SC) %: 12.9% • Scheduled Tribe (ST) %: 0%	Chapter 3 Section 3.13

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		Others (not SC/ST): 87.1 Details of Demographic are given in EIA Chapter 3.	
		Agriculture Land: The Agricultural Land area is about 1281.5 hectares which is 3.95 percent of the total 10 km radius study area. Built up Land: Based on analysis of imagery, using GIS and ground truth the total built up area is about 20435.8 hectares which is 63.0 percent of the total study area. Waste/Barren Land: The Barren Land area occupies around 1762.3 ha which is 5.43 percent of the study area. Forest Land: The Barren Land area occupies around 7342.7 ha which is 22.64 percent of the study area. Wet Land-Water Bodies: Based on satellite data and ground truth, the total area covered by the inland wetland, river and water bodies is 1614.3 hectares which is 4.98 percent of the total study area. Details of Land use change within 10km area are given in Chapter 3 Section 3.10.3.	Chapter 3 Section 3.10.3
[D] Miscellaneous			
1	Plot the wind rose diagram using the typical meteorological year (TMY) data for the period considered for the study. The monitoring units shall be deployed in the field based on the coverage area ratio and direction of the wind.	Wind rose diagram using the typical meteorological year (TMY) data for the period 2010-2019 is given in EIA Chapter 3. The season wise predominant wind directions is NW and SE.	Chapter 3 Section 3.5
	A mathematical model shall be developed for the local site rather than using the standard model available in software for both air & water quality modeling.	Air dispersion modeling has been done considering all the sources of the pollution. AERMOD developed by Lakes Environmental Inc. is used to calculate incremental Ground Level concentrations (GLC) for the proposed sources of air pollution in the current expansion, for	Chapter 4 Section 4.4

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		Particulate emissions, Gaseous emissions. For study, various stack heights have been considered for dispersion modelling, taking into account environmental concerns. It is well established that dispersion improves with increased stack height. Based on the emission levels, an appropriate stack height has already been selected for air dispersion which is two times (>100%) higher than the minimum requirement. The modelling results indicate that there is no significant difference in Ground Level Concentration (GLC) values across the evaluated heights. Therefore, a stack height of 60 meters has been optimized, as it offers effective dispersion efficiency, enhanced atmospheric mixing at higher elevations, reduced pollutant accumulation near ground level, and minimized fumigation and downwash effects. Compliance assurance, at 60 m, the resultant GLCs of PM₁₀ and SO₂ remain well within permissible limits when combined with APCS efficiency Therefore, 60 m height of stack is optimized considering all the conditions. Details of the same are given in EIA Chapter 4. Water Quality Modeling for external effluent discharge outside the premises is not applicable. The ZLD system will ensure that all Effluent is recycled and reused within the premises.	Air dispersion report is attached as Annexure 21
2	PP shall align its activities to one/few of the Sustainable Development Goals (SDG) and start working on the mission of net zero by 2050. PPs shall update the same to the EAC.	Sustainable Development Goals (SDG) and start working on the mission of net zero by 2050 is given in EIA Chapter 10.	Chapter 10 Section 10.11
3	PP shall submit the EIA/EMP report after	Noted. A plagiarism check of EIA Report	-

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	the plagiarism check using authenticated plagiarism software.	using authenticated plagiarism software will be done and submitted along with the final EIA Report.	
4	Detailed description of all the court cases along with its current status shall be submitted.	Court – Delhi Electricity Regulatory Commission. Brief - Petition file under Section 79(1)(b) read with Section 79(1)(f) of the Electricity Act, 2003 for (i) approval of 'Change in Law' event; and (ii) consequential relief to compensate for the increase in capital cost due to promulgation of Notification No. 08/2021 – Integrated Tax (Rate) dated 30.09.2021 issued by Ministry of Finance, Government of India. Status – Pending before Court The court Order is attached as Annexure 31.	Annexure 31
5	PP should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. obtained for this project under various Acts, Rules and regulations shall be submitted.	Details of all statutory clearances, permissions, consents etc. have been obtained and are given in EIA Chapter 1.	Chapter 1 Section 1.5.1
	Further, all the permissions/MoUs obtained for this project shall be revalidated and submitted along with the EIA/EMP report.	Noted and complied.	
6	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs, which will analyze the samples.	Photographs of monitoring stations of all parameters mentioned latitude & longitude with dates, time of monitoring & sampling locations are enclosed in EIA Chapter 3. Original Test Report and Certificate of the Lab are attached as Annexure 17.	Chapter 3 Section _ Annexure 17.
7	PP should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition	The proposed total no. of Manpower required will be 468 nos. The details of the same are given in EIA Chapter 2.	Chapter 2 Section 2.5.5

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	to this PP should mention the number and designation of persons to be engaged for the implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.	Number and designation of persons to be engaged for the implementation of environmental management plan (EMP) is given in EIA Chapter 10. Budget of Rs. 4484.02 lakhs as capital cost & Rs. 703.64 Lakhs/year as recurring cost has been proposed by the industry. The detailed Budget with activities is given in EIA Chapter 10.	Chapter 10 Section 10.5.1 Chapter 10 Section 10.7
8	PP should submit the year-wise, activity wise and time-bound budget earmarked for EMP, occupational health surveillance, and activities proposed to address the issues raised during Public Consultation. The capital and recurring expenditure to be incurred needs to be submitted.	Year-wise, activity wise and time-bound budget earmarked for EMP, occupational health surveillance is given in EIA Chapter 10. During the Public hearing, 08 participants expressed their views, queries, suggestions, and questions, while 57 written suggestions and opinion slips were received. All the queries raised were duly responded. Overall, the public expressed satisfaction and welcomed the project for effective management of solid waste in the area. The Activities proposed to address the issues raised during Public Consultation are given in EIA Chapter 7. Budget of Rs. 4484.02 lakhs as capital cost & Rs. 703.64 Lakhs/year as recurring cost has been proposed by the industry.	Chapter 10 Section 10.7 Chapter 7 Section 7.1 Chapter 10 Section 10.7
9	The PP should ensure that only NABET-accredited consultants shall be engaged for the preparation of EIA/EMP Reports. PP shall ensure that the accreditation of the consultant is valid during the collection of baseline data, preparation of EIA/EMP report and the appraisal process. The PP and consultant should submit undertaking the information and data provided in the EIA	EIA Consultant :- M/s Perfect Enviro Solutions Pvt Ltd. The accreditation is attached as Annexure 1. Details about the EIA consultant are given in Chapter 12. For baseline data Monitoring results is prepared by other consultant M/s Aseries Envirotek India Pvt Ltd. The accreditation is attached as Annexure 17.	Chapter 12 Annexure 1. Annexure 17

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	Report and submitted to the Ministry are factually correct and the PP and consultant are fully accountable for the same.	An undertaking the information and data provided in the EIA Report and submitted to the Ministry are factually correct and the PP and consultant are fully accountable for the same is attached as Annexure 35 .	Undertaking at annexure 35.
10	PP should provide in the EIA Report details of the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and Regulations and their status or estimated timeline after the grant of EC.	Details of all statutory clearances, permissions, consents etc. have been obtained, are given in EIA Chapter 1. The same is attached as Annexure_5 to 10 . The Status or estimated timeline after the grant of EC is given in EIA Chapter 2.	Chapter 1 Section 1.5.1 Chapter 2 Section 2.6
11	All the certificates viz. involvement of Forestland, distance from the protected area, and list of flora & fauna should be duly authenticated by the Forest Department. The Certificate should bear the name, designation, official seal of the person signing the certificate and dispatch number.	The list of Flora & fauna has been prepared along with list of Schedule I species. The Wildlife conservation plan along with List of Flora & fauna is submitted to DCF for authentication. The WLCP & Receipt of submission is attached as Annexure 22.	Annexure 22
12	The findings of the subcommittee report shall be incorporated in the final EIA/EMP report.	Executive summary is included at the beginning of the EIA report as Section B.	Section B
13	Necessary coordination shall be made with concerned SPCB (who is responsible for Compliance of OM dated 14.01.2025) regarding streamlining the implementation of GSR 702 and GSR 703 dated 12.11.2024 through which projects requiring prior EC were exempted from requirement of CTE.	Noted.	-
Standard Points			
1(d)	Thermal Power Plants		
1.	Statutory compliance		

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1.1	The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc. for its better identification and reference.	Noted. M/s Tehkhand Waste to Electricity Project Limited has developed a “Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi with a view to reduce the problem associated with disposal of unprocessed municipal solid waste as landfill. The Details of the same is given in EIA Chapter 1.	Chapter 1 Section 1.4
1.2	Vision document specifying prospective long term plan of the project shall be formulated and submitted.	The vision Document is attached as Annexure 13.	Annexure 13
1.3	The latest compliance report duly certified by the Regional Office of MoEF&CC for the conditions stipulated in the environmental and CRZ clearances of the previous phase(s) for the expansion projects shall be submitted.	CCR obtained from MOEFCC Regional Office, Lucknow vide File No. V/ENV/DLI/1412/2018/220 dated 01.08.2025. Minor Non-Compliances observed. Action Taken Report for minor Non-compliances points has been submitted to IRO dated 14.08.2025. CRZ Clearance is not applicable for the said project.	-
2.	Details of the Project and Site		
2.1	The project proponent needs to identify minimum three potential sites based on environmental, ecological and economic considerations, and choose one appropriate site having minimum impacts on ecology and environment. A detailed comparison of the sites in this regard shall be submitted..	The current proposal is for expansion of existing waste to energy plants. Hence no examination of potential alternative sites is required. The proposed expansion is within the same plot of 6.07 ha.	-

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2.2	Executive summary of the project indicating relevant details along with recent photographs of the proposed site (s) shall be provided. Response to the issues raised during Public Hearing and the written representations (if any), along with a time bound Action Plan and budgetary allocations to address the same, shall be provided in a tabular form, against each action proposed.	Executive summary covers all relevant details is given in Section B. The recent photographs of the project site are given at chapter 2, section 2.3.7. The details of earlier public hearing are given at chapter 7.	Section B chapter 2, section 2.3.7. The details of earlier public hearing is given at chapter 7.
2.3	Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted	Solar Panels are installed on the roof top area of 3 KW capacity and further ~686 KW capacity of solar panels will be installed. The details of the same is given in EIA Chapter 2	Chapter 2 Section 2.16
2.4	The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/River and high tide level from the sea shall be specified, if the site is located in proximity to them.	The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, is given in Chapter 2. Elevation of the site ranges from -249-260m. There is no ash pond on the project site. The nearest water body is Yamuna River and its HFL is 207.48 m.	Chapter 2 Section 2.3.4
2.5	Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.	Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. is given in EIA Chapter 2.	Chapter 2 Section 2.3.2 Annexure 23
2.6	Land requirements for the project shall be optimized and in any case not more than what has been specified by CEA from time to time. Item wise break up of land	The proposed project is located in an area of 6.07 ha in which no forest land is involved. Land use Distribution is given in	Chapter 2 Section 2.4.2

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	requirement shall be provided.	EIA Chapter 2.	
2.7	Present land use (including land class/kism) as per the revenue records and State Govt. records of the proposed site shall be furnished. Information on land to be acquired including coal transportation system, laying of pipeline, ROW, transmission lines etc. shall be specifically submitted. Status of land acquisition and litigation, if any, should be provided.	A total land of 5 Acre (6.07 ha) has been given on lease by the Municipal Corporation of Delhi (MCD) to M/s Tehkhand Waste to Electricity Project Limited on 25.09.2018. The existing Land use of the project site is Industrial. There will be no change in the land use pattern of the site as the proposed expansion is within the same plot area. As per Gazette Notification dated 12.01.2018, the land is already notified for utility purposes by the Delhi Development Authority. The land is on lease from MCD for expansion of the WTE plant. There will not be use of coal transportation.	Chapter 2 Section 2.3.8
2.8	If the project involves forest land, details of application, including date of application, area applied for, and application registration number, for diversion under FCA and its status should be provided along with copies of relevant documents.	Not Applicable as it is an industrial land. There will be no change in the land use pattern of the site as the proposed expansion is within the same plot area.	-
2.9	The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report	Not Applicable, there is no need for R&R activities for the proposed project as it will take place within the existing land.	-
2.10	Satellite imagery and authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.	Satellite imagery (Specific Location Map) is given in Chapter 2. An authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. is given in EIA Chapter 2.	Chapter 2 Section 2.3.1 Chapter 2 Section 2.3.4

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2.11	Topography of the study area supported by toposheet on 1:50,000 scale of Survey of India, along with a large scale map preferably of 1:25,000 scale and the specific information whether the site requires any filling shall be provided. In that case, details of filling, quantity of required fill material; its source, transportation etc. shall be submitted.	Topomap of the study area supported by toposheet on 1:50,000 scale of Survey of India is given in EIA Chapter 2. No, the site does not require filling material.	Chapter 2 Section 2.3.4 Annexure 24
3.	Ecology biodiversity and Environment		
3.1	A detailed study on land use patterns in the study area shall be carried out including identification of common property resources (such as grazing and community land, water resources etc.) available and an Action Plan for its protection and management shall be formulated. If acquisition of grazing land is involved, it shall be ensured that an equal area of grazing land be acquired and developed and a detailed plan submitted.	Land use pattern is given in EIA chapter 3. Land does not involve grazing as There will be no change in the land use pattern of the site as the proposed expansion is within the same plot area. As per Gazette Notification dated 12.01.2018, the land is already notified for utility purposes by the Delhi Development Authority.	Chapter 3 Section 3.10.3
3.2	Location of any National Park, Sanctuary, Elephant/Tiger Reserve (existing as well as proposed), migratory routes/ wildlife corridor, if any, within 10 km of the project site shall be specified and marked on the map duly authenticated by the Chief Wildlife Warden of the State or an officer authorized by him.	Details of Eco-sensitivity within 10 km is given in EIA Chapter 2. An Authenticated Map from Chief Wildlife Warden is given in EIA chapter 2.	Chapter 2 Section 2.3.6 Chapter 3 Section 2.3.6
3.3	A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on a potentially mineable mineral deposit shall be submitted.	Not applicable; It is an industrial site. As the site is not located on a potentially mineable mineral deposit.	-
3.4	The water requirement shall be optimized (by adopting measures such as dry fly ash and dry bottom ash disposal system, air cooled condenser, concept of zero discharge) and in any case not more than that stipulated by CEA from time to time, to be submitted along with details of	Source of water - Treated water from Okhla STP file No.F-1/DJB/EE(SDW)V/2017/1346 date 03.19.2917. and Fresh Water for Domestic purposes from Delhi Jal Board	Chapter 3 Section 2.10

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	source of water and water balance diagram. Details of water balance calculated shall take into account reuse and re- circulation of effluents.	Both treated water and fresh water are supplied through underground pipelines. During Operation Phase- The water will be used in activities - domestic purpose, Industrial Boiler make-up water, cooling tower, Central monitoring basin. 625 KLD of water will be needed for plant operation which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB). ZLD will be maintained within the premises. Detailed Water Management Plan with water balance is given in EIA Chapter 2.	
3.5	Water body/Nallah (if any) passing across the site should not be disturbed as far as possible. In case any Nallah / drain is proposed to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of the area. Details of proposed diversion shall be furnished duly approved by the concerned Department of the State.	Not applicable; There is no nallah/stream within 1 km of the project site. The nearest drain is near Okhla Phase 2 located at a distance of 1.6 Km N.	-
3.6	It shall also be ensured that a minimum of 500 m distance of plant boundary is kept from the HFL of river system/ streams etc. and the boundary of site should also be located 500 m away from railway track and National Highways.	The nearest water body is Pond Near Prem Nagar and its HFL is 510 m . The nearest railway station is Tughlakabad Railway Station - 1.57 Km, ESE direction away from the project boundary.	Chapter 2 Section 2.3.5
3.7	Hydro-geological study of the area shall be carried out through an institute/ organization of repute to assess the impact on ground and surface water regimes. Specific mitigation measures shall be spelt out and a time bound Action Plan for its implementation shall be submitted.	The baseline study of the Hydro-geological is given in EIA Chapter 3. Impact identification and mitigation measures are covered in Chapter 4.	Chapter 3 Section 3.8.6 Chapter 4
3.8	Detailed Studies on the impacts of the ecology including fisheries of the River/Estuary/Sea due to the proposed withdrawal of water / discharge of treated	Not applicable. No effluent is/ will be discharged from the plant premises. ZLD will be maintained.	-

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	wastewater into the River/Sea etc shall be carried out and submitted along with the EIA Report. In case of requirement of marine impact assessment study, the location of intake and outfall shall be clearly specified along with depth of water drawl and discharge into open sea.		
3.9	Source of water and its sustainability even in lean season shall be provided along with details of ecological impacts arising out of withdrawal of water and taking into account inter-state shares (if any).	Fresh Water source for Domestic purposes is from Delhi Jal Board. Treated water from Okhla STP. No effluent is/ will be discharged from the plant premises. ZLD will be maintained. There will be no withdrawal of groundwater hence , there will be no impact on ecological.	Chapter 2 Section 2.10
	Information on other competing sources downstream of the proposed project and commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.	Source of water - Treated water from Okhla STP file No.F-1/DJB/EE(SDW)V/2017/1346 date 03.19.2917. Fresh Water for Domestic purposes is being/will be supplied from the Delhi Jal Board. Both treated water and fresh water are supplied through underground pipelines. The treated water from Okhla STP is enclosed as Annexure 7	Annexure 7
3.10	Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished. In addition, wherever ground water is drawn, PP shall submit a detailed plan of Water charging activity to be undertaken.	A detailed Rainwater Harvesting system is given in EIA Chapter 2. The source of Freshwater is Delhi Jal Board. There will be no groundwater extraction. The details of rainwater harvesting being carried out in the project is given at section 2.15.	Chapter 2 Section 2.15
3.11	Feasibility of near zero discharge concept shall be critically examined and its details submitted.	The existing 244 KLD (240 KLD-leachate + 4 KLD-Sewage) leachate is being treated in a leachate treatment plant of capacity up to 360 KLD. After expansion,	Chapter 2 Section 2.10

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
		it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants. ZLD will be maintained. Details of the same is given in EIA Chapter 2.	
3.12	Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.	The STP treated water is procured from nearby Okhla STP, the same is treated in the inhouse water treatment plant. The treated water will be used in activities - Industrial Boiler make-up water, cooling tower, Central monitoring basin. The treated water from LTP & WTE will be used to produce RO and DM water that will be used for the cooling tower, boiler make-up and Selective Non-Catalytic Reduction (SNCR) similarly to the existing plant. This leads to reduction in freshwater demand and reuse of treated water. Hence, 100 % of treated water generated from the project is reused and ZLD is maintained within the project site.	Chapter 2 Section 2.10
3.13	Plan for recirculation of ash pond water and its implementation shall be submitted.	There is no ash pond within the proposed project premises. Hence, it is not applicable.	-
3.14	Detailed plans for conducting monitoring of water quality regularly with proper maintenance of records shall be formulated.	Detail of monitoring water quality is given in Chapter 6.	Chapter 6 Section 6.1.2
	Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of surface / ground water) shall be submitted.	Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of	Chapter 3 Section 3.9 Chapter 3

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	It shall be ensured that parameters to be monitored also include heavy metals.	surface / ground water) is given in Chapter 3. Heavy metals were all monitored the same as given in Chapter 3.	Section 3.9.7
	A provision for long-term monitoring of ground water tables using Piezometer shall be incorporated in EIA, particularly from the study area.	A provision for long-term monitoring of ground water tables using Piezometer shall be incorporated in EIA, is given in Chapter 3.	Chapter 3 Section 3.8.6
3.15	Hazards Characterization: Past incidents of hazard events within 10km radius of project area with detailed analysis of causes and probability of reoccurrence	Not Applicable; Based on a comprehensive review of historical data and site-specific information, no past accidents or hazardous incidents were found within a 10 km radius of the project area. To fulfill the compliance requirement, a Hazard Identification and Risk Assessment (HIRA) was performed. This analysis pinpointed potential hazards related to the project's activities and established a detailed plan for risk mitigation. The plan includes specific safety protocols and measures to ensure the project operates safely and to prevent any future accidents. The details of the same are given in Chapter 7.	- Chapter 7 Section 7.2
4.	Environmental Baseline study and mitigation measures		
4.1	One complete season (critical season) site specific meteorological and AAQ data (except monsoon season) as per latest MoEF&CC Notification shall be collected along with past three year's meteorological data for that particular season for winds speed analysis and the dates of monitoring shall be recorded. The parameters to be covered for AAQ shall include PM10, PM2.5, SO2, NOx, CO and Hg.	Meteorological data of the last ten years (2015-2024) is given in Chapter 3. AAQ data of PM10, PM2.5, SO2, NOx, CO is given in Chapter 3. AAQ data for Hg is not applicable for the same.	Chapter 3 Section 3.4 Chapter 3 Section 3.6

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	The location of the monitoring stations should be so decided so as to take into consideration the upwind direction, pre-dominant downwind direction, other dominant directions, habitation and sensitive receptors. There should be at least one monitoring station each in the upwind and in the pre - dominant downwind direction at a location where maximum ground level concentration is likely to occur.	The predominant wind direction is NW to SE. Details of Ambient Air Quality sampling locations considering the upwind and pre-dominant downwind direction is given in EA Chapter 3.	Chapter 3 Section 3.6.6
4.2	In case of expansion project, air quality monitoring data of 104 observations a year for relevant parameters at air quality monitoring stations as identified/stipulated shall be submitted to assess for compliance of AAQ Standards (annual average as well as 24 hrs).	A CAAQMS station is installed within the premises to monitor the continuous ambient air quality at the site. The system is also connected to CPCB and DPCC server.	-
4.3	A list of industries existing and proposed in the study area shall be furnished.	The list of industries in the study area is given in EIA Chapter 2.	Chapter 2 Section 2.3.3
4.4	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects on the environment of the area shall be assessed in detail.	As this is an expansion project, the Environmental Impact Assessment (EIA) study has been conducted to holistically evaluate the cumulative environmental impacts. This study has comprehensively assessed the combined effects of the existing plant operations and the proposed expansion on all environmental parameters. The detailed Impact assessment for both proposed construction and Operation phase is given in Chapter 4.	Section C Chapter 4
	Details of the Model used and the input data used for modelling shall also be provided. The air quality contours should be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	Air dispersion modeling has been done considering all the sources of the pollution. AERMOD developed by Lakes Environmental Inc. is used to calculate incremental Ground Level concentrations	Chapter 4 section 4.4 Annexure 21

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
		(GLC) for the proposed sources of air pollution in the current expansion, for Particulate emissions, Gaseous emissions. The details are given in Chapter 4 section 4.4 and the same is enclosed as Annexure 21 .	
	The Windrose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socioeconomics.	The Windrose and Study on water, soil and socio economics is given in chapter 3.	Chapter 3
4.5	Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.	Not applicable as it is a waste to energy plant wherein MSW is used as fuel to generate electricity.	-
4.6	Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc. should also be furnished.	Fuel Description is given in Chapter 2. Raw material/ Fuel is given in EIA Chapter 2.	Chapter 2 Section 2.5.3 Chapter 2 Section 2.7
4.7	Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished.	Quantity of fuel required, its source is given in EIA Chapter 2.	Chapter 2 Section 2.7
	The Ministry's Notification dated 02.01.2014 regarding ash content in coal shall be complied.	The coal is not used for the said project. The Ministry's Notification dated 02.01.2014 is a notification by the Ministry of Environment, Forest and Climate Change (MoEF&CC) requiring coal-based thermal power plants to use raw or blended/beneficiated coal with an ash content not exceeding 34%. Hence the same is not applicable.	-

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted.	CCR obtained from MOEFCC, Regional Office, Lucknow vide File No. V/ENV/DLI/1412/2018/220 dated 01.08.2025. Action Taken Report for minor Non-compliances points has been submitted to IRO dated 14.08.2025.	-
4.8	Details of transportation of fuel from the source (including port handling) to the proposed plant and its impact on ambient AAQ shall be suitably assessed and submitted. If transportation entails a long distance it shall be ensured that rail transportation to the site shall be first assessed. Wagon loading at source shall preferably be through silo/conveyor belt.	The project involves transportation of MSW via covered dumpers & trucks from landfill site to the WTE plant. The AAQ modelling is done considering the transportation of MSW. The report is attached as Annexure 21 .	Annexure 21
4.9	For proposals based on imported coal, inland transportation and port handling and rail movement shall be examined and details furnished. The approval of the Port and Rail Authorities shall be submitted	Not applicable as the coal is not used as fuel. The project involves transportation of MSW via covered dumpers & trucks from landfill site to the WTE plant.	-
4.10	Details regarding infrastructure facilities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase should be adequately catered for and details furnished.	Details of Infrastructure & Amenities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. are already present as existing project. The details of the same are given in EIA Chapter 2.	Chapter 2 Section 2.7
5.	Environmental Management Plan		
5.1	EMP to mitigate the adverse impacts due to the project along with item - wise cost of its implementation in a time bound manner shall be specified.	Environmental Impact & Mitigation measures for all project activities, addressing aspects such as Air Environment, water Environment, Landuse, soil Environment, Socio-Economic, Ecology & Biodiversity, Noise & Vibration, Hydrology & Geology, Solid & Hazardous waste for both	Chapter 4 Section 4.1, 4.2 & 4.3.

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
		construction & operation phase are given in EIA Chapter 4.	
5.2	A Disaster Management Plan (DMP) along with risk assessment studies including fire and explosion issues due to storage and use of fuel should be prepared. It should take into account the maximum inventory of storage at site at any point of time. The risk contours should be plotted on the plant layout map clearly showing which of the proposed activities would be affected in case of an accident taking place.	Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be prepared as given in EIA Chapter 7. The risk contours shall be plotted on the plant layout map and the same shall be submitted.	Chapter 7 Section 7.9.
	Based on the same, proposed safeguard measures should be provided. Measures to guard against fire hazards should also be invariably provided	Measures to guard against fire hazards are given in EIA Chapter 7.	Chapter 7 Section 7.8.
	Provision for mock drills shall be suitably incorporated to check the efficiency of the plans drawn.	Provision for mock drills shall be suitably incorporated to check the efficiency of the plans drawn is given in EIA Chapter 7.	Chapter 7 Section 7.9.3
5.3	The DMP so formulated shall include measures against likely Fires/Tsunami/Cyclones/Storm Surges/ Earthquakes etc, as applicable. It shall be ensured that DMP consists of both On-site and Off-site plans, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. A smaller version of the plan for different possible disasters shall be prepared both in English and local languages and circulated widely.	Disaster Management Detailed for onsite and offsite Plan are given in Chapter 7	Chapter 7 Section 7.9
5.4	Details of fly ash utilization plan as per the latest fly ash Utilization Notification of GOI along with firm agreements / MoU with contracting parties including other usages etc. shall be submitted. The plan shall also include disposal method / mechanism of bottom ash along with monitoring	Fly ash of 47 MT/Day will be generated and will be supplied to ash brick manufacturers and any unutilized material will be sent to ESLF. The fly ash will be utilized for the manufacturing of Bricks and paver blocks. Bottom ash of 310 MT/Day will be	Chapter 2 Section 2.11

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	mechanism.	generated and will be given for construction of Highway embankment, and any unutilized material will be sent to ESLF. Details of both Fly ash and Bottom ash are given in EIA Chapter 2.	
6.	Green belt development		
6.1	Detailed scheme for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary not less than 2000 trees per ha with survival rate of more than 85% shall be submitted.	Greenbelt covering 33% of the plot area i.e. 2.0142 ha has been developed along the periphery for the existing plant. Three tier plantation & width of green belt ranging from 20 -30 m all across the boundary of the project. Approx. 6219 number trees (including ornamental & fragrant species) are planted at the site.	Chapter 2 Section 2.14
	Photographic evidence must be created and submitted periodically including NRSA reports in case of expansion projects. A shrub layer beneath tree layer would serve as an effective sieve for dust and sink for CO ₂ and other gaseous pollutants and hence a stratified green belt should be developed.	Greenbelt covering 33% of the plot area i.e. 2.0142 ha has been developed along the periphery for the existing plant. Approx. 6219 number trees (including ornamental & fragrant species) are planted at the site. Hence, it is effectively a sieve for dust and sink for CO ₂ and other gaseous pollutants. The photographic evidence of green area developed within the project site along with lat-long coordinates is given as annexure 32 .	annexure 32
6.2	Over and above the green belt, as a carbon sink, plans for additional plantation shall be drawn by identifying blocks of degraded forests, in close consultation with the District Forests Department. In pursuance to this the project proponent shall formulate time bound Action Plans along with financial allocation and shall submit status of implementation to the	33% of the total plot area has already been developed as greenbelt/ green cover including a 20-30 m wide greenbelt around the project boundary. Apart from this, plantation has also been done outside of premises along boundary. Further, a request has been made to MCD for allocation of parks or any other locations for additional plantation. Application is attached as Annexure 28 .	Annexure 28

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	Ministry every six months		
7.	Socio-economic activities		
7.1	Socio-economic study of the study area comprising 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detailed assessment of the impact on livelihood of the local communities.	The baseline status of the socio-economic study is given in Chapter 3.	Chapter 3 Section 3.13
7.2	Action Plan for identification of local employable youth for training in skills relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.	Action Plan for identification of local employable youth for training in skills relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.	-
7.3	If the area has a tribal population, it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.	There is no tribal population hence, Not Applicable	-
7.4	A detailed CER plan along with activities wise break up of financial commitment shall be prepared in terms of the provisions OM No. 22-65/2017-IA.III dated 30.09.2020. CER components shall be identified considering need based assessment study and Public Hearing issues. Sustainable income generating measures which can help in upliftment of affected section of society, which is consistent with the traditional skills of the people shall be identified.	The total expenditure of Rs. 78.38 lakhs have been done under CER during the period FY 2018-19 to 2024-25 over various activities. An action plan for the proposed cost along with activities under CER of Rs. 43.2 lakhs for the period FY. 2025-26 to 2026-27. Proposed Action Plan for CER Activities along with activities wise break up of financial commitment is given in Chapter 10.	Chapter 10 Section 10.8
7.5	While formulating CER schemes it shall be ensured that an in-built monitoring mechanism for the schemes identified are in place and a mechanism for conducting annual social audits from the nearest government institute of repute in the region shall be prepared.	Noted & will be complied	-

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
	The project proponent shall also provide an Action Plan for the status of implementation of the scheme from time to time and dovetail the same with any Govt. scheme(s).	Noted.	-
	CER details done in the past should be clearly spelt out in case of expansion projects.	The total amount of Rs. 121.58 lakhs were earmarked for the CER activities out of which expenditure of Rs. 78.38 lakhs have been accomplished for the same during the period FY 2018-19 to 2024-25. An action plan for the CER balance amount of Rs. 43.2 lakhs has been undertaken for the period FY. 2025-26 to 2026-27. The details are given in Chapter 10.	Chapter 10 Section 10.8
7.6	R&R plan, as applicable, shall be formulated wherein a mechanism for protecting the rights and livelihood of the people in the region who are likely to be impacted, is taken into consideration. The R & R plan shall be formulated after a detailed census of population based on socio economic surveys who were dependent on land falling in the project, as well as, population who were dependent on land not owned by them.	Not Applicable, there is no need for R&R activities for the proposed project as it will take place within the existing land.	-
7.7	Assessment of occupational health and endemic diseases of environmental origin in the study area shall be carried out and an Action Plan to mitigate the same shall be prepared.	Emphasizing commitment to a safe working environment and to minimizing the project's impact on public health. Following measures will be taken: Vector Control: Implementing a robust plan to prevent water stagnation, regularly fogging the site, and distributing mosquito nets to project personnel. Sanitation and Hygiene: Providing access to clean drinking water, proper sanitation facilities, and training on personal hygiene practices to prevent the spread of water-borne diseases. Community Engagement: Conducting	-

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S. No.	Tor Point	TOR Compliance	Citation in EIA Report
		awareness campaigns for both workers and the local community on disease prevention, recognizing symptoms, and seeking timely medical help. Health Facilities: Setting up a first-aid center or a clinic on-site, equipped to handle medical emergencies and to provide basic health services.	
7.8	Occupational health and safety measures for the workers including identification of work related health hazards shall be formulated. The company shall engage full time qualified doctors who are trained in occupational health. Health monitoring of the workers shall be conducted at periodic intervals and health records maintained.	Occupational health and safety measures for the workers including identification of work related health hazards is given in Chapter 11. The medical checkup for the employees is being carried out regularly and the record for the same has been maintained. The same will be maintained after expansion.	Chapter 11 Section 11.5
	Awareness programmes for workers due to likely adverse impact on their health due to working in a non-conductive environment shall be carried out and precautionary measures like use of personal equipment etc. shall be provided. Review of impact of various health measures undertaken at intervals of two to three years shall be conducted with an excellent follow up plan of action wherever required.	Following action plan for the workers will be taken: Awareness Program: We will educate all workers on potential health risks through regular training, safety meetings, and visual materials. Precautionary Measures: We will provide and enforce the use of necessary Personal Protective Equipment (PPE) like masks, goggles, earplugs, and gloves, and will implement engineering and administrative controls to minimize hazards. Health Safety provisions & fire safety provisions. Review and Follow-up: Workers will be subjected to primary health check-up. Regular Medical check-up & First Aid facility will be organized.	-
8.	Corporate Environment Policy		
8.1	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.	Yes, the Environment Policy is given in Chapter 10.	Chapter 10 Section 10.3

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8.2	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, the Environment Policy prescribes the standard operating processes and is given in Chapter 10.	Chapter 10 Section 10.3
8.3	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.	Detailed hierarchical chart given in Chapter 10.	Chapter 10 Section 10.3.1
8.4	Does the company has compliance management system in place wherein compliance status along with Compliances / violations of environmental norms are reported to the CMD and the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report.	Yes, the company has a system of reporting non-compliances / violations of environmental norms. Detailed hierarchical chart given in Chapter 10.	Chapter 10 Section 10.3.1
9.	Miscellaneous		
9.1	All the above details should be adequately brought out in the EIA report and in the presentation to the Committee.	Noted and will be complied.	
9.2	Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished	Noted. There is no litigation or court order pending towards the proposed project, the undertaking for the same is attached as Annexure 33 .	Annexure 33
9.3	In case any dismantling of old plants are envisaged, the planned land use & land reclamation of the dismantled area to be furnished.	Not Applicable. There will be no change in the land use pattern of the site as the proposed expansion is within the same plot area.	

Table 15. ToR Compliance

2. Project Description

2.1 Type of Project

The proposed project is an expansion of the existing Waste to Energy plant at Tehkhand, to generate power from MSW. There is an interlinked project of Environmental Clearance letter F. No.10-8/2018-1A-III dated 29.10.2018 has been obtained. This project would help in reducing loads on the existing landfill sites which have exhausted their capacity to manage the daily generated municipal solid waste in Delhi.

2.2 Need for the Project

Rapid urbanization in the last few decades has led to significant increase in municipal solid waste generation in India. Municipal Solid Waste Management (MSWM) has always been a big challenge for Urban Local Bodies (ULBs) in India.

The problem of municipal solid waste management is a major economic burden on local Government & furthermore, open burning of MSW adversely affects the environment by emitting pollutants to the atmosphere. Similar is the case in South Delhi metropolitan city which has witnessed rapid urbanization in the past decade & has become a commercial & educational hub. For efficient management of MSW, it is proposed to expand the capacity of existing Waste to Energy plant from 25 MW up to 45 MW at Tehkhand, which is a good step towards sustainable waste management program and most economical and environment friendly solution for Municipal Solid Waste problem. It is stated that segregation of MSW as mandated by MSW rules encourages the opportunities for circular economy.

2.2.1 Demand-Supply Gap

This is not applicable for this project. The expansion of the existing plant is proposed with the objective of addressing the issue of ever increasing municipal solid waste. However, it would also provide an opportunity of tapping potential energy of MSW to meet part of the electricity demand of Delhi.

Delhi has a surplus quantity of Municipal Solid Waste. The objective of the proposed expansion is to reduce the burden on the sanitary landfill sites in Delhi. Delhi is generating about 11,852 TPD of municipal solid waste out of this nearly 4,241 TPD of waste remains untreated and has to be dumped at land fill site as per CPCB report.

2.2.1.1 Export Possibility

It is a waste-to-energy plant using Municipal solid waste as fuel. Hence, this is not applicable to this project.

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2.3 Location of The Project Site (Maps showing general location, specific location, project boundary and project site layout)

2.3.1 General and Specific Location of the Site

The proposed expansion project is located adjacent to DTC Tehkhand Depot, Maa Anandmai Marg, Tehkhand, New Delhi. The geographical location of the project site is covered under the Survey of India Toposheet No.53H/6 The location map of the site is shown in **Figure 1**. A Google map of 500 m radius showing the project site is shown below as **Figure 2**.

- **General Location**



Figure 1. General Location Map of 1km.

- **Specific Location Map**

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

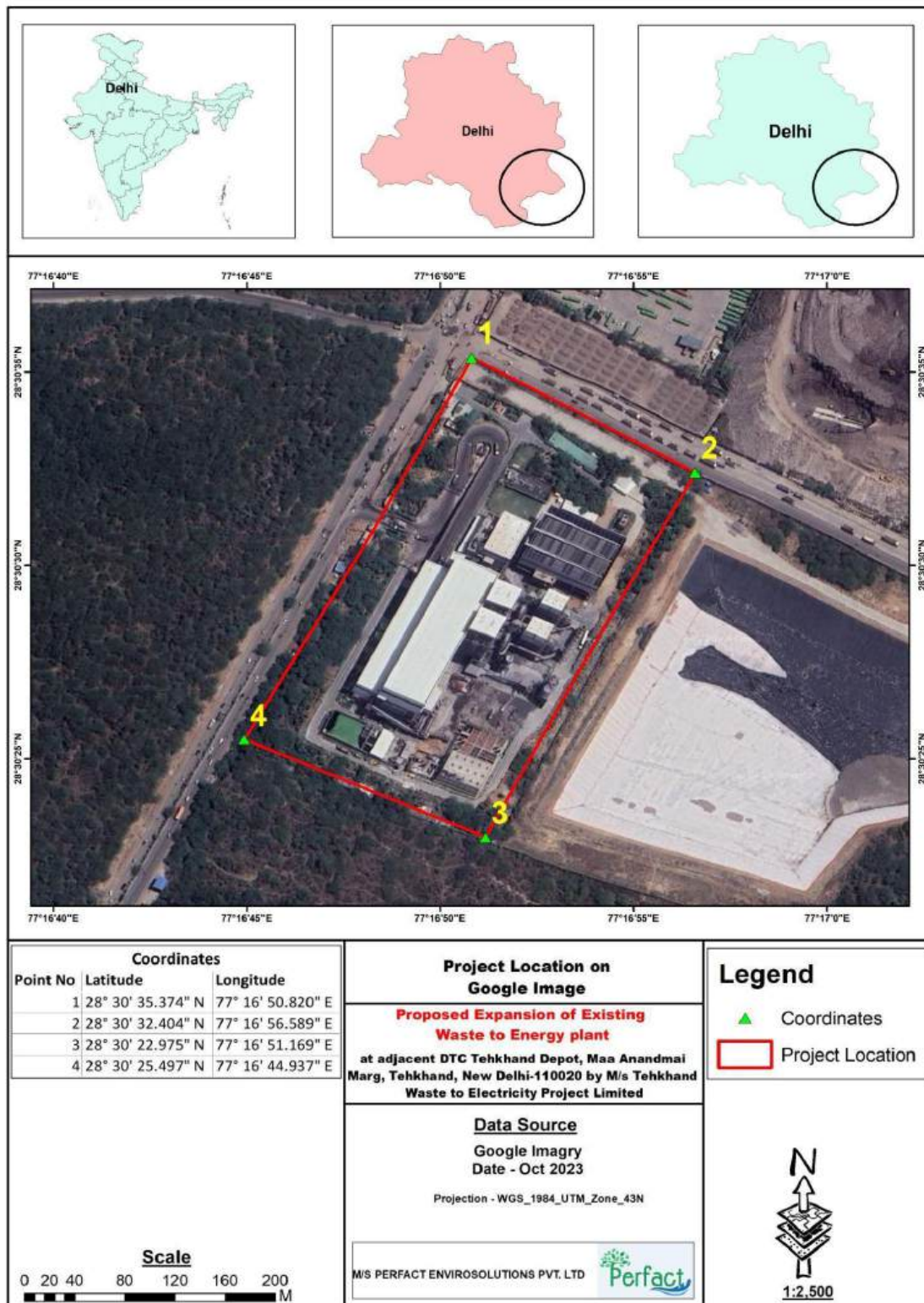


Figure 2. Specific location Map

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"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

The GPS pillar Coordinates of the plant are given in table below:

Table

Corner	Latitude	Longitude
A	28°30'35.31"N	77°16'50.83"E
B	28°30'32.42"N	77°16'56.59"E
C	28°30'23.04"N	77°16'51.19"E
D	28°30'25.47"N	77°16'44.93"E

18.

Coordinates of the project site

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.3.2 Site Layout

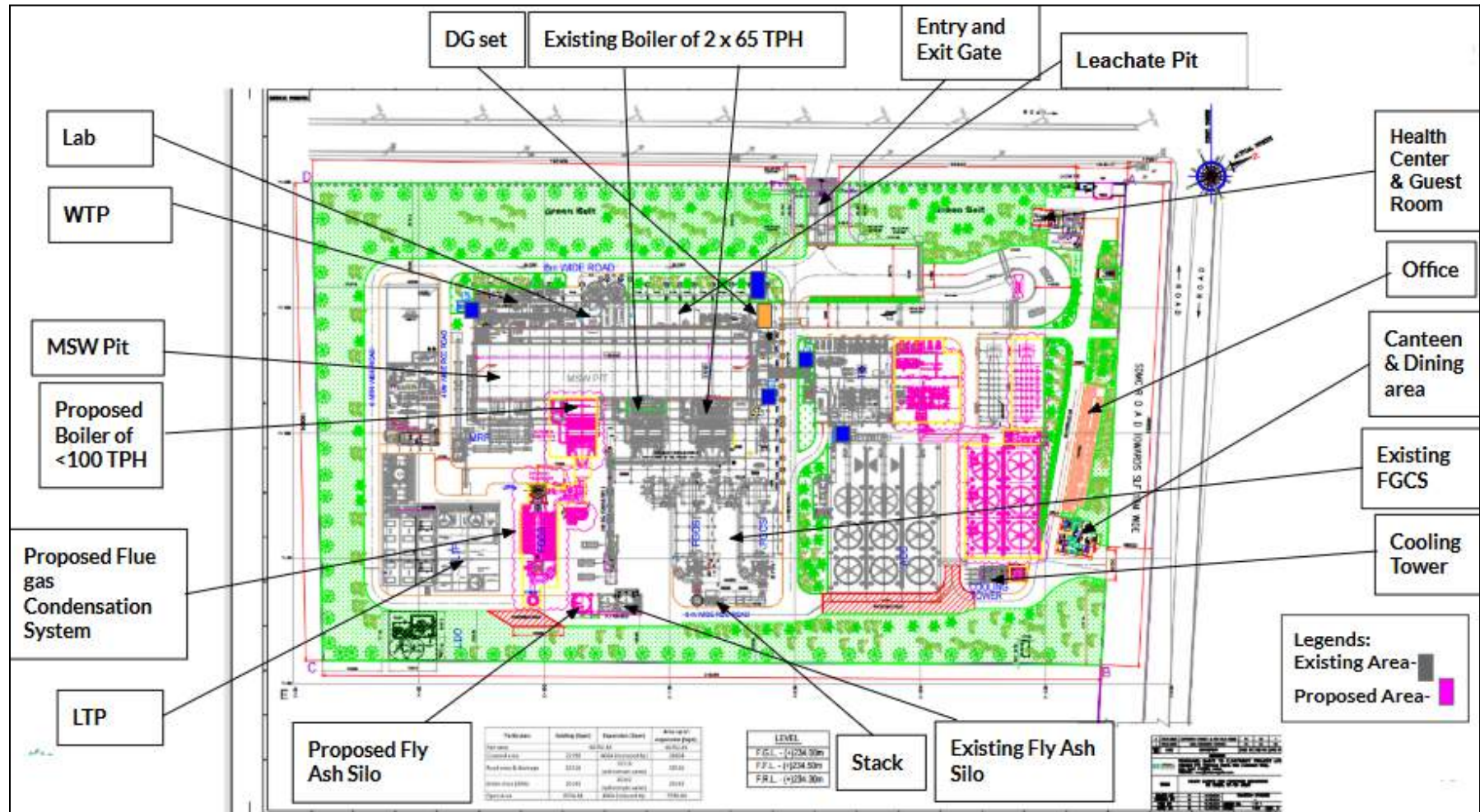


Figure 3. .Site Layout

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.3.3 Major Industries within 10 km radius of Project Site

S. No.	List of industries	Distance & Direction
1.	ICD Tughlakabad - Container terminal Railway Colony, Tughlakabad New Delhi	0.49 km, E
2.	Feather Touch Ceramics Private Limited - Manufacturer F-2-8, Okhla Pocket F, Okhla Phase I, Okhla Industrial Estate New Delhi,	0.93 Km NNW
3.	MULTITECH INDUSTRIES - Manufacturer, 1065 & 1072 Bazar Mohalla Tughlaqabad Village New Delhi,	0.99 Km NW
4.	AN Pharmaceuticals Pvt Ltd - F-1/4 Pocket F, Okhla Phase I, Okhla Industrial Estate New Delhi	1.05 Km NNW
5.	Sharda Motor Industries Limited - Manufacturer, D-188 Pocket D, Okhla Industrial Area, Phase - I, Okhla Industrial Estate New Delhi	1.21 Km NNW
6.	KEI Industries Limited - Manufacturer D-90, Pocket D, Okhla Phase I, Okhla Industrial Estate New Delhi,	1.21 Km North
7.	Ceasefire Industries Pvt. Ltd., B-1, above Audi Showroom, H-1, Mohan Cooperative Industrial Estate, Badarpur, New Delhi, Delhi 110044	1.40 Km East
8.	Nagpal Industries, E - 26 , B-1 Extension, Mohan Cooperative Industrial Estate Mathura Road, Badarpur., New Delhi, Delhi 110044	1.46 Km ESE
9.	CONSOLE INDUSTRIES - Manufacturer 61 DSIDC Complex Pocket C, Okhla Phase I, Okhla Industrial Estate New Delhi,	1.76 Km NNE
10.	Aweri Foods - Food manufacturer B 241, C Block Road Pocket A, Okhla Phase I Industrial Estate, Okhla New Delhi,	1.88 Km NNW
11.	Wiscon Industries Limited - Electronics manufacturer DDA Complex C-64 DDA Sheds, Pocket A, Okhla Phase I, Okhla Industrial Estate New Delhi,	2.0 Km NNW
12.	A.K. Precision Industries - Manufacturer DDA Sheds, Pocket A, Okhla Phase I, Okhla Industrial Estate New Delhi,	2.05 Km NNW
13.	Bambino Agro Industries Limited - Manufacturer 115 DLF Prime Towers Pocket F, Okhla Phase I, Okhla Industrial Estate New Delhi,	2.12 Km NNW
14.	Badarpur Power Plant (NTPC)	2.21 Km, E
15.	Asian Contec Ltd - Construction equipment supplier B-28, Okhla Estate Marg Pocket B, Okhla Phase I, Okhla Industrial Estate New Delhi	2.42 Km North
16.	Pioneer Plastic Industries Limited - Plastic fabrication company A-135 Pocket W, Okhla Phase II, Okhla Industrial Estate New Delhi,	2.48 Km NNW
17.	Akash Industries, T19, Block T Okhla Industrial Estate Phase 2 Rd, Pocket W, Okhla Phase II, Okhla Industrial Estate, New Delhi, Delhi 110020	2.67 Km NNW
18.	Vinko Auto Industries Limited, FIEE Complex, A-69, Block A, Okhla Phase II, Okhla Industrial Estate, New Delhi, Delhi 110020	2.86 Km NNW

Environmental Consultant- Perfact Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	List of industries	Distance & Direction
19.	BHAWANI REALLINES INDUSTRIES - Manufacturer, A 52 Sector 80, Molarband, Sector - 106 Noida, New Delhi	3.04 Km ESE
20.	Vaish Industries, ph 2, y - 50, Sanjay Colony II, Pocket Y, Sanjay Colony, Okhla Phase II, Okhla Industrial Estate, New Delhi, Delhi 110020	3.39 Km NNW
21.	Able Industries - Manufacturer, Y-3 opposite Okhla Metro Station Sanjay Colony II, Pocket Y, Sanjay Colony, Okhla Phase II, Okhla Industrial Estate New Delhi,	3.62 Km NNW
22.	Ar Industries, Gali No. 3, Plot no. 79/A, Gurukul Rd, Industrial Area, Sector 42, Faridabad, Haryana 121010	4.03 Km SSE
23.	Shree Industries - Machining manufacturer, Gali-2, Gurukul Rd Ind Area, Sarai khwaja Faridabad, Haryana 121003	4.16 Km SE
24.	Imperial Auto Industries, 13/6, NH-19, Sector 32 DLF Area, Block C, DLF Industrial Area, Sector 32, Faridabad, Haryana 121003	5.78 Km SSE
25.	Bunty Pipe Industries - Manufacturer, G-15, Shaheed Arjun Sardana Marg, Pocket H, Sector 9, Noida, Uttar Pradesh	9.53 Km NE

Table 19. List of Major Industries

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Map showing nearby Industries within 10 km from the project site

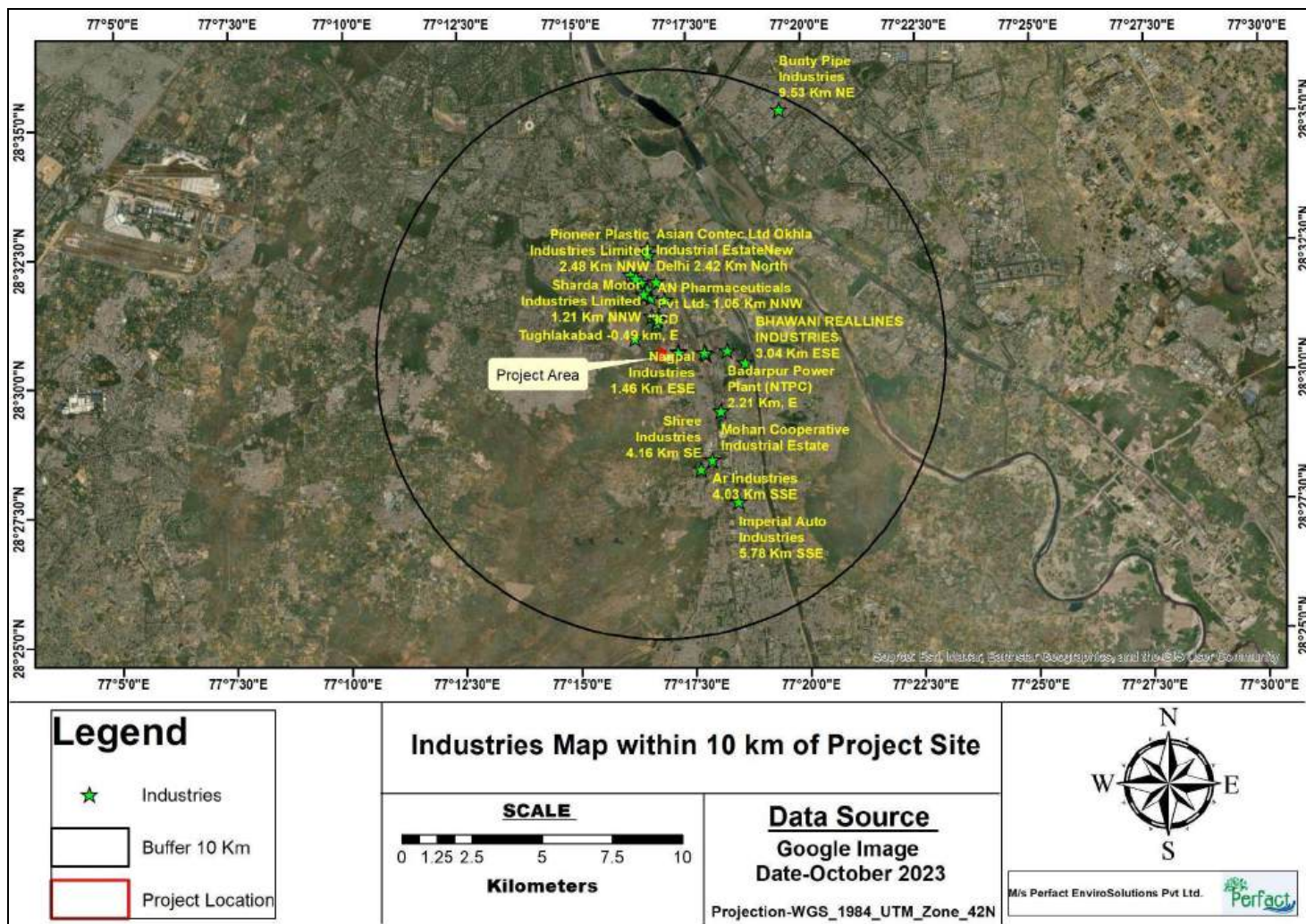


Figure 4. Map showing nearby Industries within 10 km from the project site

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.3.4 Topographical Map for 15km radius of Project Site

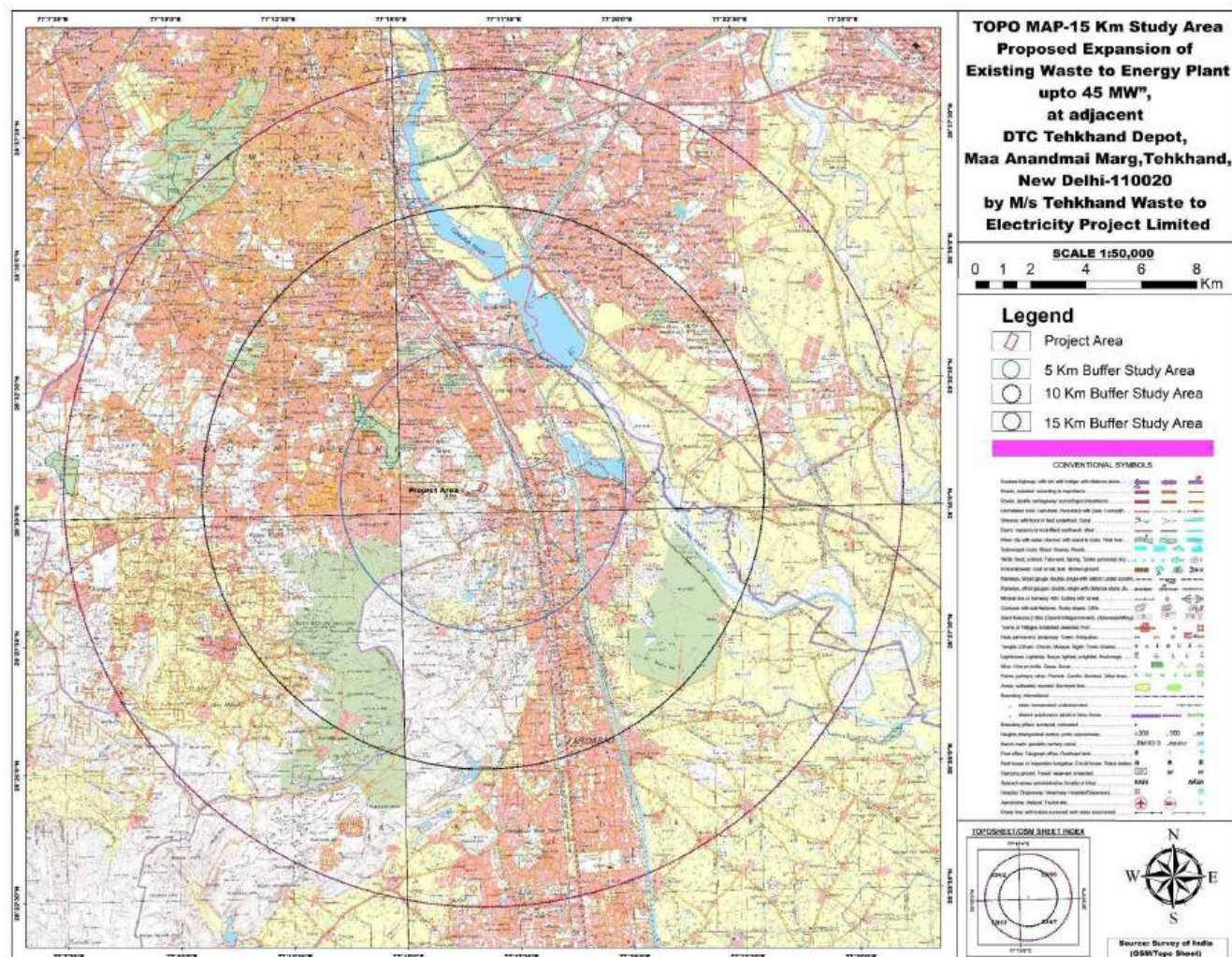


Figure 5. Topographical Map for 15km radius of Project Site

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.3.5 Site Accessibility with Map for 1 km radius of Project Site

Accessibility Map for 1km



Figure 6. Accessibility Map for 1km

Road connectivity: NH – 19 (erstwhile NH-2) - 1.56 km, ENE direction

Rail connectivity: Tughlakabad Railway Station - 1.57 Km, ESE direction

Airport: Safdarjung Airport- 10.64 Km, NW

Nearest Metro station: Mohan Estate Metro Station-1.67 km, NE direction

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.3.6 Project Site Specific Environmental Sensitivity Details

S. No.	Type of area	Description name	Distance from the project boundary
1.	Reserved Forest	Jahanpanah City Forest	2.78 km in WNW
2.	National Park/ Wildlife Sanctuary /Biosphere Reserve	Asola Wildlife Sanctuary Okhla Bird Sanctuary	1.65 km in SW 4.83 km in NE
3.	Eco-sensitive Zone	Asola ESZ Okhla ESZ	0.72 Km SW 4.76 km NE
4.	Area already subjected to Pollution or environmental damage	Okhla Industrial Area	0.61 km in North
5.	ASI Monuments:	Nai-ka-kot in Tughlaqabad Walls, gate and bastions of Adilabad (Mohammadabad) and the causeway leading there to from Tughlakabad	0.44 Km in SW 1.18 Km in SW
6.	Water bodies	Pond Near Prem Nagar Hari Singh Pond Pond Near Chugi No 2 Pond Near Tughlakabad District Park Pond Near Tughlakabad Fort Pond Pond Near Tughlakabad Pond Near Laal Kuwa Pond Near Gali No1 Drain near Okhala Phase 2 Suraj Kund Pond near Kakkurpur Agra Canal Gurgaon Canal Feeder Gurukul Lake Drain near Khanpur Sehatpur Drain Drain near Abdulfazal Enclave Pond near Mithapur Extension Drain near Jasaula Vihar Yamuna River Shahadra Drain Bhuriya Nala Unknown Valley	0.51 km in SSW 0.60 Km in W 0.57 Km in SSW 1.00 Km in W 1.03 Km in WSW 1.10 Km in NNW 1.15 Km in SE 1.39 Km in SSW 1.60 Km in N 2.46 Km in S 2.77 Km in SE 2.86 Km in NE 3.00 Km in E 3.34 Km in SSE 4.07 Km in WNW 4.23 Km in SE 4.28 Km in N 4.53 Km in ESE 4.87 Km in N 4.98 Km in NE 5.18 Km in NE 5.56 Km in SSE 6.17 Km in SSW

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Type of area	Description name	Distance from the project boundary
		Okhala-Yamuna Lake	6.24 Km in NNE
		CITM Lake 1	6.27 Km in SSW
		CITM Lake 2	6.53 Km in SSW
		Dolphin Lake	6.68 Km in SSW
		Sandy Lake 11 (Konark's Coral Lake)	6.73 Km in SSW
		Kashyap marg (Swimming Lake)	6.82 Km in SSW
		Hindon Cut	6.84 Km in NNE
		Bhardwaj Lake	7.00 Km in SW
		Maa Meera Devi Lake	7.76 Km in SE
		Mawai Drain	8.36 Km in SSE
		Chhainsa Distributary	8.98 Km in SSE
		Drain near Hauz khas	9.15 Km in WNW
		Drain near Sectore-36	9.25 Km in NE
		Nayabas Escape (not showing google Earth)	9.57 Km in NE
		Badhkal Lake	9.63 Km in S
		Hauz khas Tank	9.83 Km in WNW
		Shamshi Talab	9.91 Km in W
7.	Seismic Zone	Zone-IV	
8.	State, National boundaries	Delhi - Haryana Boundary	1.30 km SE
		Delhi - Uttar Pradesh Boundary	5.02 Km SE
9.	Defence installation	Defence Area Near Sainik Farms	5.89 Km West
10	Densely populated or built-up area	Railway Colony, Tughlakabad	0.41 Km East
11.	Hospital	OKHLA PH-I ESI HOSPITAL BRANCH - Hospital	0.50 Km NE
		OKHLA PH-I ESI HOSPITAL BRANCH - Hospital	0.54 Km NE
		MAX LAB (A UNIT OF MAX HOSPITAL SAKET)	0.92 Km SE
		Tuglakabad Railway Health Unit N R Hospital - Hospital	1.02 Km E
		Western Central Railway Hospitals - Hospital Tughlakabad New Delhi	1.02 Km E
		Jeewan Jyoti Hospital T-43, Main Rd, Mata Mohalla, Tekhand, Okhla Phase	1.21 Km NE
		Jain Charitable Hospital, Suraj Kund	1.24 Km SE
		SARVOPARI HOSPITAL	1.56 Km SE
		Supreme Hospital, Suraj Kund Rd	1.98 Km SE
		BTPS Hospital, Badarpur Village,	2.03 Km E
		SJM Hospital Supreme Hospital, Eros Garden	2.05 Km SE
		ECHS Polyclinic Hospital 106/9, Mehrauli	2.44 Km WNW
		Health City Clinic Landmark, police station,	2.70 Km SE

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Type of area	Description name	Distance from the project boundary
		Majeedia Unani Hospital, Jamia Hamdard	2.77 Km WNW
		Hakeem Abdul Hameed Centenary Hospital	2.86 Km WNW
		UNITY HOSPITAL Plot No 1, Tajpur Rd	3.11 Km SE
		Batra Hospital & Medical Research Centre 1,	3.35 Km WNW
		Universal Hospital DND-KMP Expy	3.41 Km SE
12.	School	MCD PRIMARY SCHOOL (BOYS)	0.45 Km SE
		Apollo Public School	0.76 Km SW
		Government Girls Senior Secondary School	0.80 Km W
		Sky High Modern School	0.93 Km W
		MCD Primary School, Railway Colony	1.07 Km SE
		New Sangam Public School	1.19 Km W
		Nav Jai bharti Public School	1.39 Km SE
		Manav Rachna International School	1.43 Km SSE
		New Motherland Public School	1.56 Km SE
		Govt. Boys Sr. Sec. School No 1	1.67 Km W
		Bal Upwan Public School	1.86 Km SE
		Ramchander Memorial Public School	1.92 Km SSE
		St. Columbus School Suraj Kund	2.19 Km ESE
		Saraswati Vidya Niketan Public School	2.39 Km ESE
		Little wings play school	2.41 Km SSE
		Ashiyani Public School	2.46 Km SSE
		Kinderzone School 16	3.23 Km SSE
13.	Post Office	Railway Colony Post Office	0.95 Km SE
		Pul Pehlad Pur Brnach Post Office	1.81 Km SE
		Post office suraj kund	1.85 Km SE
		Post Office Pul Pehladpur	1.96 Km SE
		Badarpur-India Post Office 10,	2.01 Km ESE
14.	Place of Worship	Old Shiv Mandir D 280, Lakkarpur, Shiv Durga	2.62 Km SE
		Bethany Gospel Church E-655	2.63 Km SE
		Radha krishna mandir	2.70 Km ESE
		Kali Mandir	2.85 Km SE
		Radhe Krishna Mandir F-II/102,	2.86 Km SE
		Lakkarpur, Shiv Durga Vihar, Faridabad,	3.12 Km SE
15.	Bank	HDFC Bank, Aggarwal Plaza	1.19 Km NNW
		ICICI Bank Okhla Phase 1	1.33 Km NNE
		City Union Bank Okhla	1.44 Km NNW
		Axis Bank Branch,	1.52 km ENE
		HDFC BANK	1.53 Km ENE

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Type of area	Description name	Distance from the project boundary
		Bank of Maharashtra	1.60 Km SE
		IndusInd Bank	1.60 Km E
		Axis Bank Branch	1.61 Km SE
		CANARA BANK	1.66 Km SSE
		Karur Vysya Bank	1.68 Km NNW
		State Bank of India	1.69 Km ENE
		ICICI Bank Mohan Co, operative	1.73 km E
		Union Bank	1.74 Km N
		Indian Overseas Bank	1.88 Km ESE
		Punjab National Bank	1.89 Km ESE
		State Bank Of India	1.89 Km SE
		Ujjivan Small Finance Bank	1.96 Km E
		Axis Bank Branch	2.29 Km ESE
		ICICI Bank Ahmedabad	2.48 Km SE
		HDFC Bank	2.56 Km NE

Table 20. Environmental Sensitivity Details

Authenticated Map from Chief Wildlife Warden indicating the distance between the boundary of the project site and Asola Wildlife Sanctuary ESZ , located at 0.72 km SW Asola Wildlife Sanctuary, located at 1.65 km SW, Okhla Bird Sanctuary ESZ located at a distance of 4.76 km NE and Okhla Bird Sanctuary located at 4.83 km NE is given below:

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

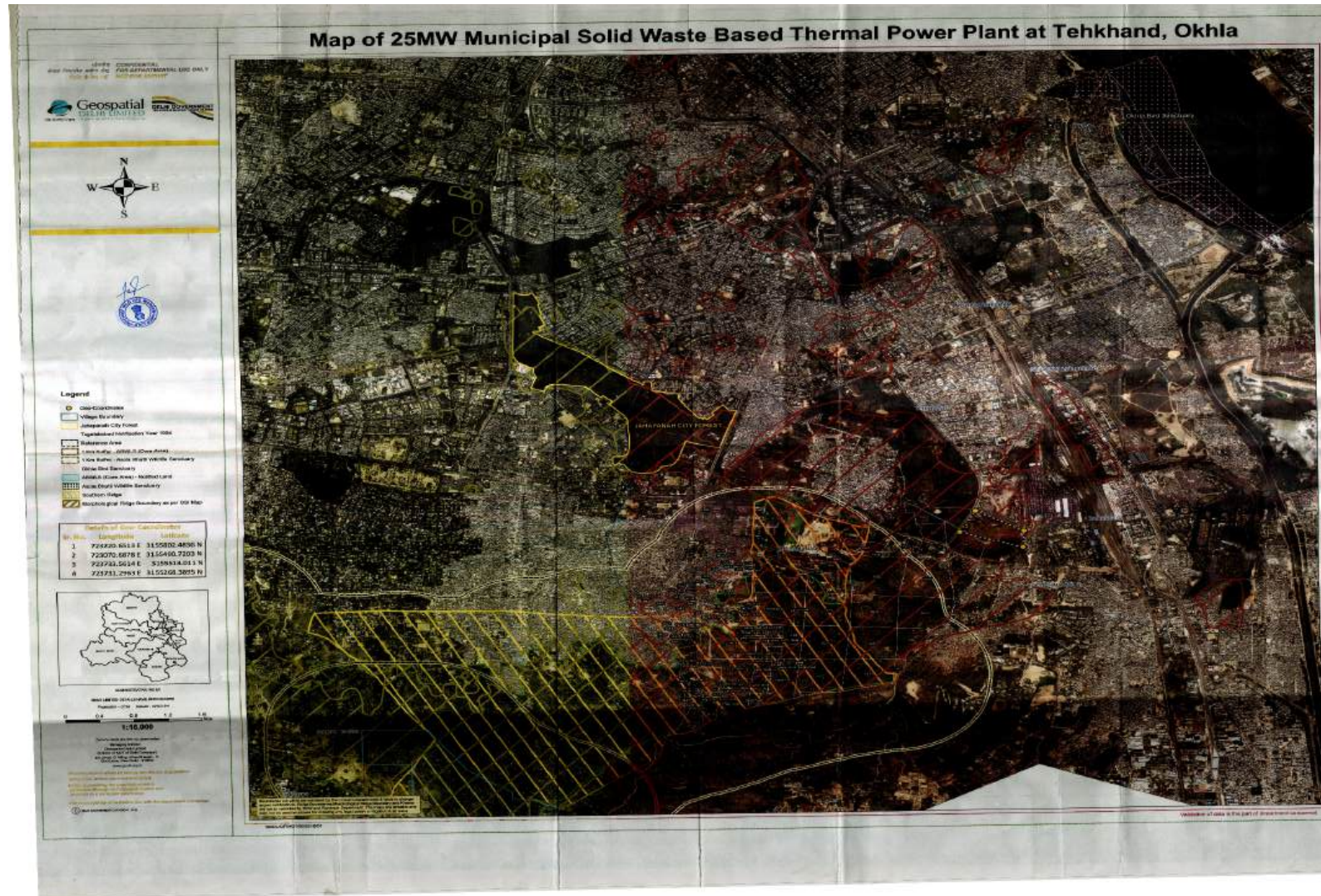
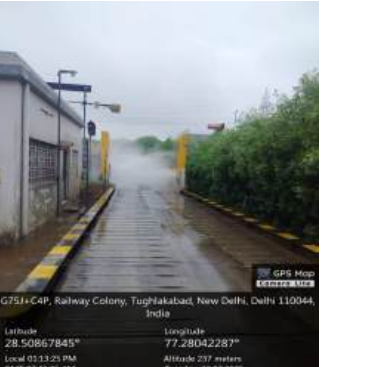


Figure 7. Map of 25MW Municipal Solid waste based thermal Power Plant.

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.3.7 Photographs of the Existing Site

 New Delhi, Delhi, India Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India GPS: 28.50816211°N 77.28064866°E Altitude: 237 meters Local: 12:20:23 PM GMT: 06:30:21 AM Tuesday, 22.07.2025	 New Delhi, Delhi, India Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India GPS: 28.50816211°N 77.28064866°E Altitude: 237 meters Local: 12:20:23 PM GMT: 06:30:21 AM Tuesday, 22.07.2025	 G751+98F, Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India Latitude: 28.50867845° Longitude: 77.28042287° Local: 01:13:25 PM Altitude: 237 meters GMT: 07:43:25 AM Tuesday, 22.07.2025
Main Gate (Gate No. 1)	Truck entry & exit gate (Gate No. 2)	Weighbridge
 G751+98F, Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India Latitude: 28.50816211° Longitude: 77.28064866° Local: 12:20:23 PM Altitude: 237 meters GMT: 06:30:21 AM Tuesday, 22.07.2025	 New Delhi, Delhi, India Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India GPS: 28.50816211°N 77.28064866°E Altitude: 237 meters Local: 12:20:23 PM GMT: 06:30:21 AM Tuesday, 22.07.2025	 New Delhi, Delhi, India Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India GPS: 28.50816211°N 77.28064866°E Altitude: 237 meters Local: 12:20:23 PM GMT: 06:30:21 AM Tuesday, 22.07.2025
MSW and RDF Pit	Grab Control Room	Material Recovery
 G751+98F, Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India Latitude: 28.50808825° Longitude: 77.28088296° Local: 12:24:54 PM Altitude: 237 meters GMT: 06:39:54 AM Tuesday, 22.07.2025	 New Delhi, Delhi, India Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India GPS: 28.50816211°N 77.28064866°E Altitude: 237 meters Local: 12:20:23 PM GMT: 06:30:21 AM Tuesday, 22.07.2025	 G751+98F, Railway Colony, Tughlakabad, New Delhi, Delhi 110044, India Latitude: 28.50867275° Longitude: 77.28091577° Local: 12:35:37 PM Altitude: 238 meters GMT: 07:05:37 AM Tuesday, 22.07.2025

Environmental Consultant- Perfact Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Boiler	Turbine	DCS Control Room
		
Switchyard (66 kV)	Gas Conditioning Tower (GCT)	Bag filters followed by GCT and Reactor Tower
		
Activated Charcoal & Lime silo	ID Fan	Stack
		
Inhouse Laboratory	Herbal mist spray for odour control	Water sprinklers in ash handling area

Environmental Consultant- Perfact Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

		
Water sprinklers in greenbelt area	OCEMS & CAAQMS data display board at gate	Online Continuous Emission Monitoring Station (OCEMS)

Table 8. Photographs of the Existing Site

2.3.8 Type of land, land use & Status of Land Acquisition of the project site

A total land of 15 Acre (6.07 ha) has been given on lease by the Municipal Corporation of Delhi (MCD) to M/s Tehkhand Waste to Electricity Project Limited on 25.09.2018.

The existing Land use of the project site is Industrial. There will be no change in the land use pattern of the site as the proposed expansion is within the same plot area. As per Gazette Notification dated 12.01.2018, the land is already notified for utility purposes by the Delhi Development Authority.

2.4 Size or Magnitude of Operation

2.4.1 Size of Operation

The proposed project is an expansion of the existing Waste-to-Energy plant. The Plot area is not increasing, and space for expansion is already available at the same plot. Details of the magnitude of the operation in terms of production capacity, area, cost etc. given below.

Details	Existing Plant	Proposed Plant	Total After Expansion
A. Key details (existing +expansion)			
Total Plot Area	6.07 Ha	0	6.07 Ha
Green Area	2.01 Ha	0	2.01 Ha
Product (Waste to Energy Power)	25±15% MW	20 MW	45 MW
By-Product	0	Biogas = upto	Biogas = upto

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Details	Existing Plant	Proposed Plant	Total After Expansion
(Biogas & Bio-CNG production)-Leachate & Green waste		20,000 Nm ³ /day Bio-CNG/CBG = upto 8 TPD	20,000 Nm ³ /day Bio-CNG/CBG = upto 8 TPD

Table 22. Project Salient Features (Existing + Expansion)

2.4.2 Land Use Distribution

S. No.	Particulars	Existing (Ha)	Expansion (Ha)	After expansion (Ha)	%
1	Covered area	2.2190	0.4664 (increased by)	2.6854	44.2
2	Road area & drainage	1.0116	0 (will remain same)	1.0116	16.7
3	Green Area	2.0142	0 (will remain same)	2.0142	33.2
4	Open Area	0.8255	0.4664 (reduction)	0.3591	5.9
Total area		6.0703		6.0703	100.0

Table 23. Area Distribution Details

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

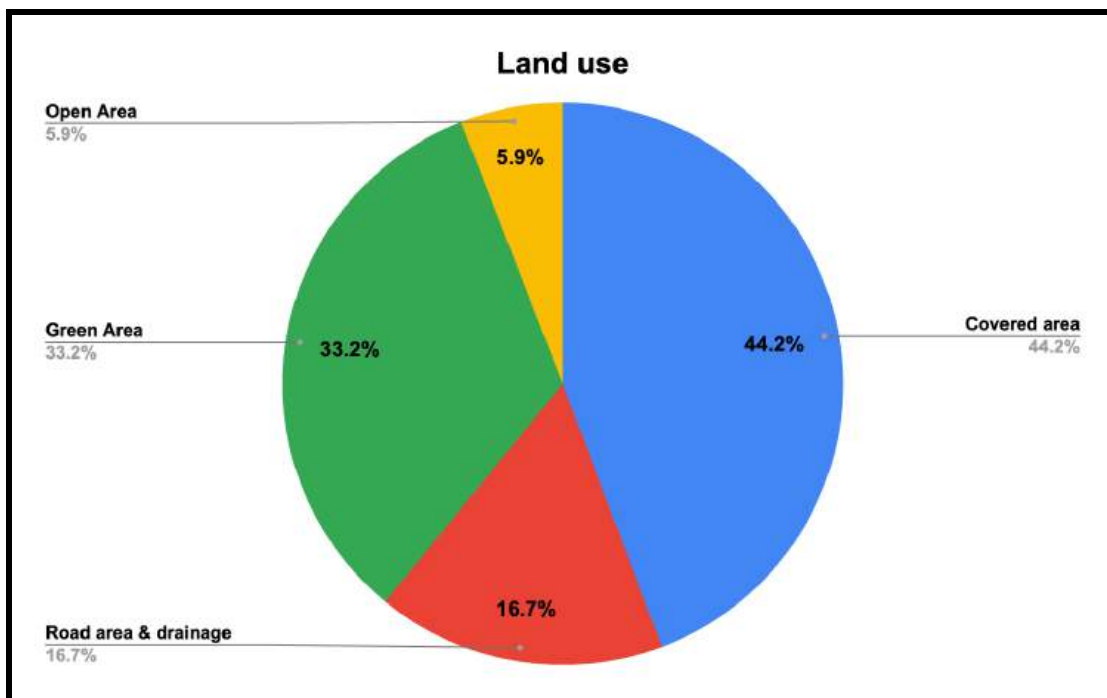


Figure 9. Land Use Distribution

2.4.3 Production Details

Particulars	Existing Capacity	Expansion Capacity	Total capacity	Mode of Transport/Transmission	End Use of products
Product					
Power Generation	25 ±15% MW	20 MW	45MW	Through 66 kV underground cable	DISCOM
By-products					
Biogas or Bio-CNG/CBG	0	Upto 20,000 Nm ³ /day Or Upto 8 TPD	Upto 20,000 Nm ³ /day Or Upto 8 TPD	CNG cascade or pipeline	Will be give to authorise agency

Table 24. Details of Proposed Production Capacity

2.4.4 Project Cost

Details	Project cost
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Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Estimated Project Cost	Rs. 900.0 Crores
Existing project Cost	Rs. 465 Crores
Proposed expansion project Cost	Rs. 435 Crores

Table 25. Project cost

2.5 Associated Activities required by or for the project

2.5.1 Utilities

S. No	Source	Existing Capacity	Proposed Capacity	After expansion Capacity
1	DG Set	1x750 kVA	1x750 kVA	2x750 kVA
2	Boiler	2 x 65 TPH	≤100 TPH	≤230 TPH

Table 26. Utilities

2.5.2 Details of Power requirements

S.No.	Particulars	Existing	Proposed	Total after Expansion	Source
1.	Power Requirement during Construction Phase	-	200 KVA	-	DISCOM
	Power Requirement during Operation Phase	3,500 KW	2,800 KW	6300 KW	Inhouse (WtE Plant)
2.	DG sets	1x750 kVA	1x 750 kVA	2x750 kVA	-
3	Solar Panel	3 KW	~686 KWp	~689 KWp	-

Table 27. Power requirement

2.5.3 Fuel Description

LDO is used widely as a heating fuel in boilers and care is essential in preventing explosive pockets forming within lines and boxes particularly during start-up and shutdown. It is only used as kickstart fuel.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

All "W t E" facilities require some degree of pre-processing of MSW leading to what is commonly known as refuse derived fuel (RDF). The objectives of preparation of RDF from MSW are multifold, which include:

- Meeting the terminal goal of solid waste management (SWM) practices for inversion of SWM pyramid.
- Enhancing the fuel quality for better technological and environmental performance of the "W t E" projects.
- Optimizing the level of investment for fuel preparation as well as energy generation plants.
- Complying with various statutory and regulatory requirements.

The proposed project is based on combustion technology.

Quality of the Municipal waste, i.e. calorific value is a vital consideration for power generation projects based on different types of fuel including waste. Both actual and reported CV values can vary widely due to various reasons such as:

- Seasonal variation due to climatic conditions.
- Zonal variation due to lifestyle impact-more CV due to presence of more combustibles in wastes from affluent colonies.
- Mixing of sweepings, silts & C&D wastes.
- Sampling and analysis error.
- Absence of standardized methodology for preparation analysis of waste samples (as received, air dried, oven dried).

Preparation of RDF

The various stages of MSW processing for preparation of RDF following this technology are as follows:

- Mixed MSW received at site will have a high level of moisture content. It will be heterogeneous in terms of content and size. Raw waste will also contain metal and inert in various sizes in addition to finer organic matter.
- Municipal Solid waste (MSW) arriving at the facility in trucks will be weighed at the weigh bridge and unloaded into MSW storage pits near the Tipping floor. The tipping floor will have gates to enable MSW trucks to unload material into the storage pit.
- Initially mesophilic bacteria will be added which oxidizes carbon to CO₂, liberates large amounts of heat. Temperature up to 50°C will reach within 2 days leading to reduction in moisture content. Moisture reduction leads to free flow ability of waste and loosening of material for easy separation and shedding.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

- Partially dried material will be fed to the hopper for mechanical segregation for removal of inert and fines. Other undesirable materials will also be separated manually from the conveyor system.

The processing of MSW will involve segregation of material into following components:

- Inert material for disposal to landfills.
- Recyclable including metals for disposal by sale
- Fine compostable material for conversion into stable compost for sale and
- Processed MSW for use in boilers as fuel for energy generation.

2.5.4 Water

Water Requirement

During Construction Phase - Approximately 50 KLD of water will be required during the construction phase which will be supplied by Okhla STP (STP treated water)

During Operation Phase-

Source- Treated water from Okhla STP file No. F-1/DJB/EE(SDW)V/2017/1346 date 03.19.2917. and Fresh Water for Domestic purposes from Delhi Jal Board. Both treated water and fresh water are supplied through underground pipelines.

The water will be used in activities - domestic purpose, Industrial Boiler make-up water, cooling tower, Central monitoring basin.

625 KLD of water will be needed for plant operation which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB). The detailed breakup of water requirement is given below:

2.5.5 Manpower

Manpower	Existing Manpower		Proposed		Total after Expansion
	Permanent	Temporary	Permanent	Temporary	
Construction Phase	-	-	12	250	262
Operation Phase	78	83	25	20	206
Total	78	83	37	270	468

Table 28. Manpower details

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The construction work is expected to commence in April, 2026 and to be completed by December, 2027. However, commencement of construction will be done after obtaining Environmental Clearance and other necessary clearances from the departments concerned.

Detailed list of activities and approvals required after receipt of EC and the tentative time frame required is given below:

Activity / month, year	Month 0	Month 3	Month 4	Month 9	Month 18	Month 21
Receipt of EC						
CTE/NOC						
Construction Work						
CTO/CCA						
Commissioning of Plant						

Table 29. Proposed Schedule for Approval and Implementation

2.7 Proposed details of Raw material with its storage & transportation details

The source, quantity, storage & transportation details of the raw material & product are given below:

Name of the facility	Unit	Existing	Proposed	Total after Expansion Capacity	Storage	No. of Trucks/day	Source	Distance & Mode of Transportation
Raw Material Intake- Municipal Solid Waste (Fuel)	TPD	2000 ±20%	1000 ±20%	3000 ±20%	Pit (>3000 TPD)	231	Municipal Corporation of Delhi (MCD)	5-15 Km distance in Closed Trucks (Approx. 230 trucks are envisaged)

Table 30. Raw material Details

The Municipal Solid waste is used as Raw material/ Fuel for the generation of electricity through a boiler. The Agreement has been done with the Municipal Corporation of Delhi for the same.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

The Characteristics of Municipal Solid (Material Balance) waste is given below:

Description	Quantity (upon expansion)	% fraction (upon expansion)
Total Waste for processing	3,000 ton	100%
Total RDF to storage	2,100 ton	70%
Inert removal in processing	444 ton	15%
Leachate/Green Slurry recovered	354 ton	12%
Moisture	96 ton	3%
Fines/Compost	2 ton	0.1%
Recyclables	4 ton	0.1%

Table 31. Characteristics of MSW

Plant and Machinery

S. No.	Particulars	Unit	Existing	After Expansion
1	MRF	TPD	3000 ±20%	
2	DG sets	kVA	1x750 kVA	2x750 kVA
3	Boiler			
i	Throughput	TPD	2x600	2100
ii	Operating Pressure	kg/cm ²	41	41
iii	Operating temp.	deg. C	400	400
iv	MCR	TPH	2 x 65 TPH	≤230 TPH
4	Turbine	MW	25	45
i	Operating Pressure	kg/cm ²	39	39
ii	Operating temp.	deg. C	395	395
5	FGCS	Nm ³ /hr	2x1,50,000	130% of actual flue gas generation of Boiler
6	LTP	KLD	360	360
7	WTP	KLD	490	625

Table 32. List of Plant and Machinery

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Infrastructure & Amenities

All facilities/amenities like medical, educational, housing, transportation, communication, shopping etc. are available nearby places. The existing infrastructure of the Waste to Energy (WtE) plant (25 MW) will be utilized during construction as well as operation phase.

The following facilities/amenities are available at existing WtE plant and the same will be used for the expansion project:

- Paved internal roads to ensure free movement of vehicles and machinery and to avoid dust generation.
- Waste Inspection facility, office facility for record keeping, shelter for keeping equipment for machinery including pollution monitoring equipment.
- Fencing has been done at the gate entrance for monitoring incoming wastes/vehicles, to prevent entry of cattle, to keep record movement of vehicles, etc.
- Weigh bridge to measure quantity of MSW.
- Arrangements for safe and healthy working conditions & temporary rest shelters.
- Drinking water & sanitary facility.
- Availability of PPEs.
- Health inspection of workers at regular intervals.
- Conducting medical camps for workers and nearby areas at regular intervals.
- Availability of fire extinguisher & fire protection equipment.

2.8 TECHNOLOGY AND PROCESS DESCRIPTION

2.8.1 Process

The description of process involved in the generation of electricity from municipal waste is given below:

- A. MSW receiving
- B. Pre Segregation and preparation of RDF
- C. Heat Recovery & Steam Generation
- D. Power Generation
- E. Flue Gas Cleaning System
- F. Leachate Treatment

A. Municipal Solid Waste Receiving

Weigh bridge: Two weigh bridges (1-input & 1-output) of minimum 60 tons weighing capacity have been installed at the facility. The platform scales have the capability of accurately measuring tare and net weights of range of vehicles. The scales have a minimum designated level of accuracy (i.e. $\pm 5\text{kg}$).

The weigh bridge has a permanent structure furnished with appropriate space to maintain and operate the computerized weight recording system, store historical records and has sufficient room for two weigh bridge operators.

The weigh bridge generates and maintains an electronic database for each delivery with a time stamp and provides a print out of the specifications and details for each consignment received at the Project Site.

Municipal Solid waste (MSW) arriving at the facility in trucks will be weighed at the weigh bridge and unloaded into MSW storage pits near the Tipping floor. The tipping floor will have gates to enable dump MSW trucks to unload material into the storage pit.

B. Pre segregation and Preparation of RDF :

Material processing consists of MSW unloading, manual / mechanical segregation and RDF preparation. Processing of waste is being done in 3 shifts and two-hours / shift is for maintenance and cleaning of the processing section. Equipment sizing has been done accordingly to handle the waste in this stipulated time. Proper redundancy has been designed for critical equipment to reduce the breakdown time.

B 1. Tipping floor

Each truck carrying the municipal solid waste is visually inspected before it goes to a weighbridge. If the MSW vehicle contains a high percentage of unwanted materials, then it will not be accepted in the plant. For effectiveness the drivers of the truck have also been provided with training on different materials in the MSW and their uses. The weighbridge operator then instructs the driver to proceed to the tipping floor, where the driver unloads the waste in the designated area only. This tipping floor is elevated at 13.0 meter from the bottom of the pits for effective unloading of waste. Sufficient quantity of sanitizer is inoculated at this point with a sprayer to reduce odor.

B 2. Natural drying section

- In the natural drying section, there are drying pits and tipping floor equipped with EOT crane and grab bucket for MSW aeration and feeding to the hoppers for further segregation / processing.
- Tipping bay is on the front side and MSW is retained in the bay for one day, hence maximum leachate will be collected here.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

- MSW kept in pit for drying to reduce moisture from the waste. This area is covered. The air required for the boilers is drawn through ducts opening into the covered space thereby protecting the surrounding areas from the nuisance created by foul odour. Transparent sheets are provided on the roof for sunlight.
- The pit area is equipped with EOTs (Electric Overhead Travel) cranes and cactus grab on each side.
- The drying pit is designed to accommodate the 3,000±20% TPD material and size of the pit is 108.5 m x 21.25. Material is disturbed with the help of grab crane for aeration and on 6th day, this material is fed into the hopper for manual/ mechanical segregation. Thus, there will be 3-5 days' retention time for natural drying and moisture reduction. EOT grabs are used to turn material for aeration and feed dried material into the hoppers.
- Aerobic composting of Municipal Solid Waste (MSW) involves stacking waste in heaps and turning it for aeration. The process starts with mesophilic bacteria raising the temperature to 50°C within 2 days. Thermophilic bacteria then take over, increasing the temperature to 55-65°C for about two weeks and release carbon dioxide, minerals, organic substrate, energy and moisture. This high heat effectively eliminates pathogens and weed seeds. The main requirements are adequate supply of air and moisture. The process is preferred over anaerobic methods because it's fast, exothermic, odor-free, cost effective and reduces moisture content by up to 20%, making the waste easier to shred. The technology is approved by the Central Public Health and Environmental Engineering Organization (CPHEEO). Moisture reduction (up to 20%) leading to free flow ability of waste and loosening of material for easy shredding will be achieved.

B 3. Segregation

a. Manual & mechanical segregation and preparation of RDF

A magnetic separator is installed to remove the ferrous scrap before feeding. Ballistic separator performs screening action as well as gravity separation segregates the waste into following fractions.

- MSW received at site is being unloaded into MSW storage pit under negative pressure from where the material is lifted by overhead grab cranes and fed to the hopper of the MRF system.
- From the hopper, MSW is transferred to the ballistic separator by a hydraulic operated ram feeder.
- Ballistic separator has two size mesh 200 mm and 50 mm which separates the materials into four fractions based on density separation.
- Inert and heavy materials wastes will be separated as one fraction and further sent to slow speed belt conveyors. Magnetic separator installed over a slow speed belt to recover the ferrous metal.
- <50 mm materials having dust, silt and combustible materials are separated as second fraction and sent to a vibrating screen of 10 mm sieve. Above 10mm combustible

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

material is transferred to the RDF belt and less than 10 mm dust and silt are collected separately and sent to the sanitary landfill sites designated by MCD.

- >50 mm and <200 mm materials are separated as a third fraction which is a lighter fraction called RDF fluff and sent to the RDF storage pit for further utilization as a fuel in the boiler.
- Material above 200 mm size is separated as a fourth fraction and sent to the shredder/cutter for further sizing.
- After shredding, the material is transferred to the RDF carrying conveyor and will be sent to the RDF storage pit.
- The processing of MSW will involve segregation of material into following components:
 1. Inert material for disposal to landfills.
 2. Recyclable including metals for disposal by sale
 3. Fine compostable material for conversion into stable compost for sale.

b. RDF Storage & feeding

Prepared RDF will be stored in the RDF storage area. Capacity of RDF storage will be for buffer storage only. This area will be covered with a roof and equipped with EOTs (Electric Overhead Travel) cranes and cactus grab to feed RDF into the boiler.

c. Disposal of rejected material

All rejected materials will be sent to landfill sites through vehicles. The weighbridge operator weighs the tare vehicle as well as loaded vehicle after the rejected material is loaded.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

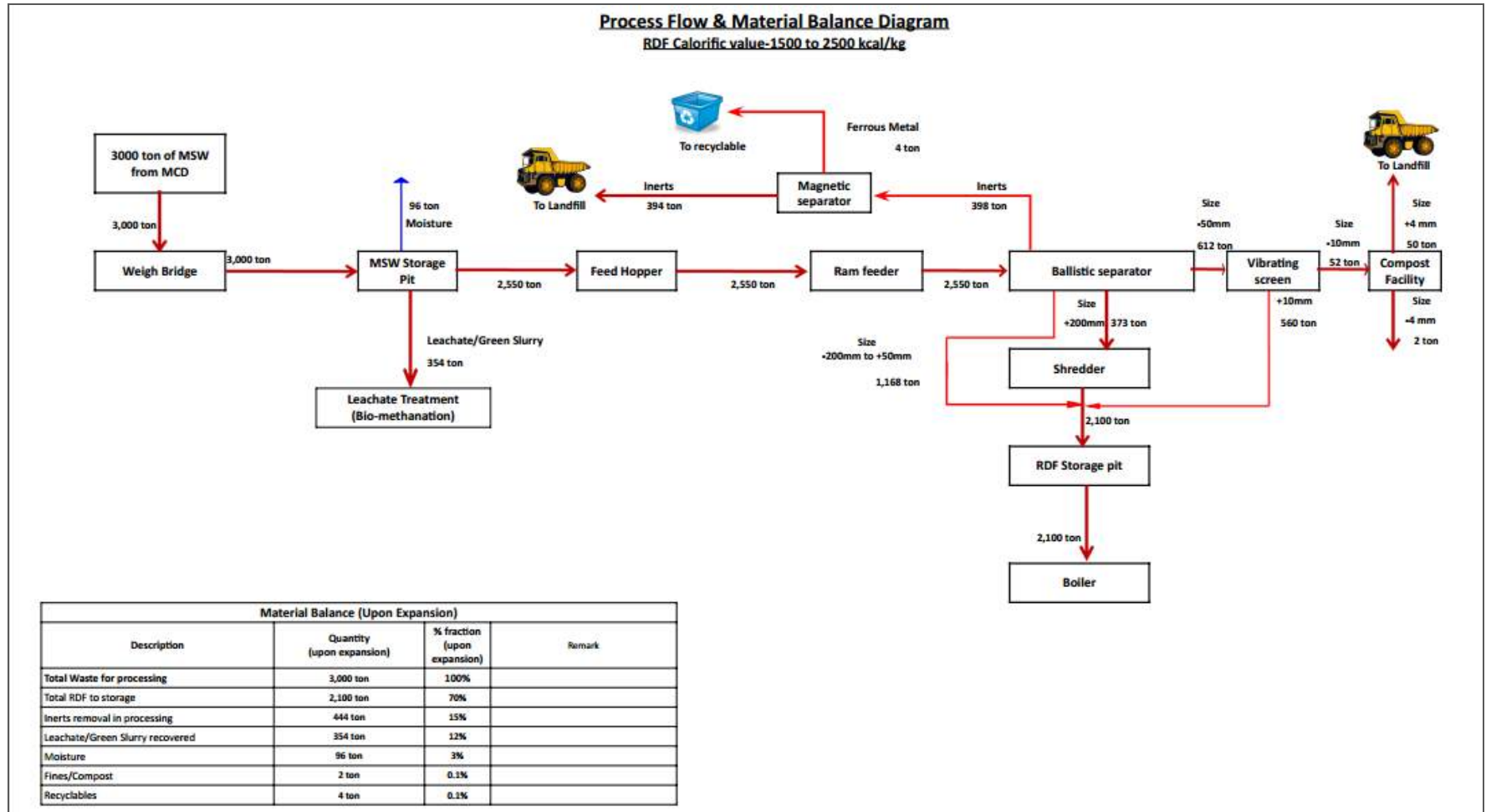


Figure 10. Process flow with material balance of proposed WtE plant

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Process flow diagram is given below:

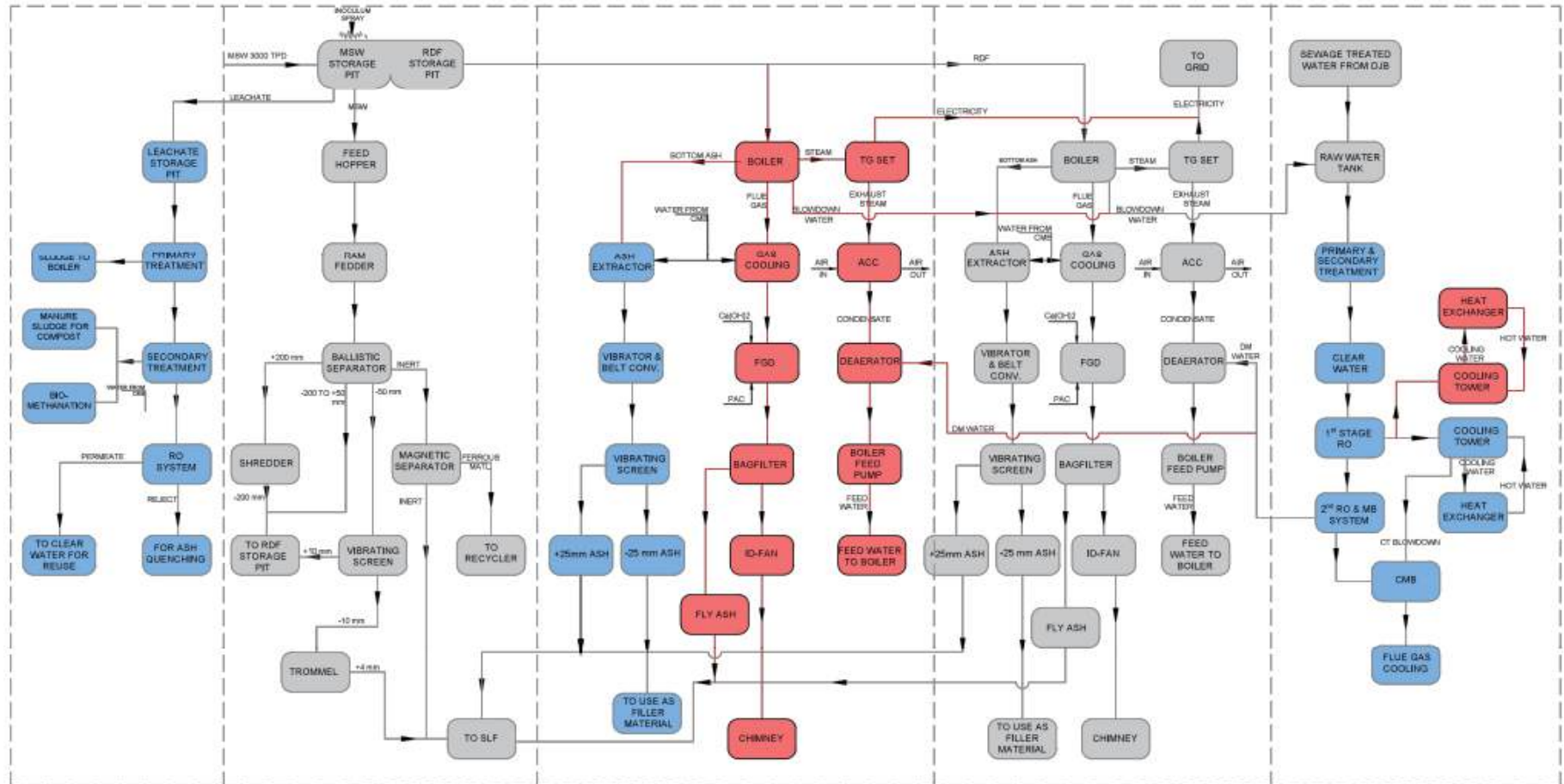


Figure 11.Waste To Energy PFD

C. Combustion & Steam Generation

- Processed MSW will be used for steam generation by incineration in boilers.
- Reverse reciprocating with forward feed inclined grate has performed most successfully in WtE projects under different fuel conditions all over the world.
- MSW is slowly propelled through the combustion chamber (furnace) by a hydro-mechanically actuated grate. Fuel continuously enters one end of the furnace and ash is continuously discharged at the other after going through several to and fro movement within the chamber. The plant is configured to enable complete combustion as MSW Moves through the furnace.
- Primary combustion air is preheated to dry the fuel and then allow complete combustion.
- Process conditions are controlled to optimize the feed moisture by steam heated air pre-heater and control the residence time of the fuel in the furnace for complete combustion.
- Boilers are provided with sophisticated instrument, control and monitoring and temperature gauge for the various sections in the boilers.

a. Boilers Including Auxiliaries

The steam requirements for a project, which are calculated using a specific heat and mass balance tool. The plant is at present using **two boilers**, each capable of processing **600 TPD of Refuse Derived Fuel (RDF)**. These boilers are designed to handle RDF with a **Calorific Value (CV) between 1,500 and 2,500 kcal/kg** to ensure reliable and safe operation.

Design Specifications of Boiler:

S. No.	Parameter	Unit	Details of proposed boiler
1	Number of boilers	No.	1
2	Boiler grate	-	Forward Feed reciprocating grate - air Cooled
3	Boiler type	-	Vertical
4	Boiler steam capacity (MCR)	t/h	<u>≤ 100</u>
5	Superheated steam pressure	kgf/cm ² (a)	~ 41
6	Superheated steam temperature	°C	~ 400
7	Feed water temperature economizer inlet	°C	~130
8	Fuel rate	t/d	~900
9	RDF calorific value	kcal/Kg	1500 - 2500
10	Excess air %	%	70 - 90
11	Primary air temperature	°C	200 - 220

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Parameter	Unit	Details of proposed boiler
12	Secondary air temperature	°C	120 to 165
13	Efficiency	%	77 - 83
14	Exit flue gas temperature at Eco O/L	°C	170 - 190
15	Peak capacity	%	110 MCR
16	Steam Quality at MSSV outlet	-	
	• Conductivity measured at 25 °C	μS/cm	< 0.2
	• Silica as SiO ₂	ppm	< 0.02
	• Hardness as CaCO ₃	ppm	Nil

Table 33. Design specifications

The boiler works on the principle of **Incineration, which is** a thermal process for waste treatment. This method, which uses processed waste (RDF) as fuel, converts waste into useful energy. Combustion occurs at temperatures over 950°C, producing flue gas and solid residue called **bottom ash**. This process significantly reduces the original waste's mass by 80-85% and volume by 90-95%, thereby minimizing landfill requirements.

i. Reciprocating Grate Incinerator

The project will use a Reciprocating Grate incinerator, a technology chosen for its reliability and widespread use. The grate is divided into three stages for drying, combustion, and ash quenching. It's designed with a supply of preheated air to maintain flame stability, even with varying moisture levels in RDF fuel.

The movement of the MSW particles in a grate would be influenced by:

- Properties of waste-particle size, shape, density and bulk density impacting angle of repose of the mass under different conditions.
- Geometry of the grate-ratio of length to width, inclination of grate, angle of fixed & reciprocating.
- Operating parameters such as feed rate, reciprocation speed, point of ignition and combustion conditions (air fuel mixing).

The main advantages of reciprocating Grate Incinerator are as follows:

- The technology is widely used and thoroughly tested for waste incineration and meets the demands for technical performance.
- It can accommodate large variations in waste composition and calorific value.
- Allows for an overall thermal efficiency of up to 77~83%.
- The system is able to operate around 8,000 hours per year with one scheduled stop for inspection and maintenance of a duration of roughly one month.

ii. Auxiliary fuel and firing System:

There shall be a dedicated oil firing system for each boiler, these burner system comprises set of start-up and auxiliary burners. The main purposes of these burners are:

Start-up burner, it will support during refractory dry out for gradually heat up the furnace during start-up for drying and baking of the refractory lining Preheating (if necessary) of the furnace during normal start up procedure of the furnace.

iii. Auxiliary burner.

Auxiliary burners are used during startup and shutdown to maintain a consistent temperature and prevent damage. To control the temperature of pre-heated air and optimize the system's efficiency, the project will use a two-stage **Steam-Heated Air Pre-Heater (SCAPH)**. This system, which uses low and high-pressure steam, allows for precise temperature regulation based on the moisture content of the RDF fuel, ensuring both operational efficiency and environmental performance.

D. Process of Power generation

Process of generation of electricity from turbo-generator is described below:

Turbo-generator

- Rankine steam cycle is used for power generation. Efficiency of the Rankine cycle depends upon the pressure and temperature of the superheated steam with a view to contain the corrosion impact at higher temperatures for MSW power plants is maintained at around 400°C and consequently the pressure at around 39 Kgf/cm² (a).
- Air cooled condensers will be used for condensing steam exhaust from the turbine. Power will be generated in Alternator at 11 kV. Additional switch yard will be installed for export of power to the DISCOM grid.

Turbo-generators convert the thermal energy of steam into electricity. The turbine transforms the steam's thermal energy into mechanical work, which the alternator then converts into electrical energy. In "Waste-to-Energy" projects, a gearbox often connects the turbine and alternator due to the smaller machine size. High-pressure steam is expanded within the turbine to generate power. After expansion, low-pressure steam can be either extracted for plant processes (like preheating feed water and the Steam-Heated Air Pre-Heater (SCAPH) to improve efficiency or condensed to maximize power generation.

Condensing plant

To maximize power from steam, a condenser is used. While water-cooled condensers are common, they require periodic "blow down" to manage increasing salt concentrations (TDS) from

evaporation, which can cause scaling and reduce performance. TDS in the circulating water is normally not allowed to exceed the range of 2,500-3,000 ppm for circulating water. Since using treated sewage water for cooling is not economically viable, and to comply with the MoEFCC's "zero water discharge" regulations from 2017, the project uses an **air-cooled condenser (ACC)** instead. ACCs are a more economically attractive option for this type of project over the long term.

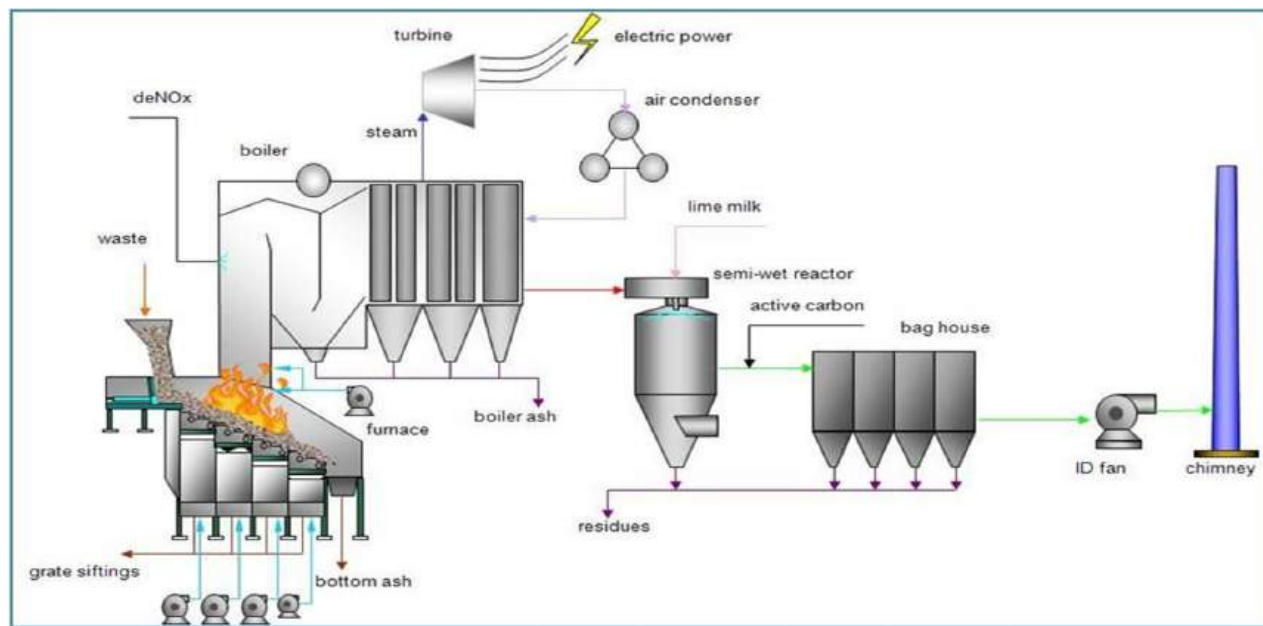


Figure 12. Flow Diagram of Power Generation

Electrical system

The plant electrical system comprises the main generator unit, step up sub-station for power evacuation and plant auxiliary system. Power would be generated at 11 kV and would be stepped up to 66 kV for transmission to the grid sub-station. Four step down transformers each of 11/0.433 kV, 2.5 MVA rating would be installed for supply of power to the plant auxiliary system and equipment.

Power evacuation

Power evacuation is an important aspect of a power project that allows generated power to be immediately evacuated from the power plant to the grid for distribution or further transmission. Major and important components of the system are as follows: Power transformer Circuit breaker (CB) Current transformer (CT) Potential transformer (PT) Lightning arrestor (LA) Cables & conductors Isolator (Iso) Energy meter Transmission lines or cables.

Evacuation of power would be carried out by installing a 66/11 kV switchyard in the plant and laying 66 kV transmission cables (underground) between plant and the 400/220/66 kV Tughlaqabad sub-station grid. The plant will generate approximately 20 MW of minimum power.

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Interconnecting facilities

Dedicated transmission cables with protective equipment will be laid till 400/220/66 kV substation at Tughlaqabad which is approximately 2 km from the project site.

E. Flue Gas Cleaning System

The project has installed latest technology for controlling pollution.

Air Pollution Control

Air pollution control technology has been developed to take care of all concerns through elaborate arrangement of multistage treatment and control and monitoring system. The flue gas treatment system consisting of lime and activated carbon injection system, quenching chamber and reaction tower followed by bag filters ensures total compliance with the regulatory requirement. Process control for the flue gas treatment facility consists of three loops, in which the first loop, continuously controls the flow of re-circulated absorbent to the reactor by continuously monitoring the quantity of flue gas. The second loop is controlled by a temperature measurement of the outlet gas which ensures that the flue gas is cooled down by controlling the quantity of water sprayed. Water required to cool down flue gases is very less and get evaporated in system itself. The third loop is used to control the adding quantity of lime and activated carbon for removal of acid gases (HCl, SO₂). The activated carbon adsorbs heavy metals. Flue gas flowing out from the reactor then goes into the bag filter for removal of micro particles including hazardous substances. The purified flue gas is discharged by ID fan and vented into the atmosphere. Online stack monitoring and display system for the unit.

Treatment of the Flue Gas from the Boilers:

Existing Control Measures: There are 2 x 65 TPH (each) capacity of boilers installed at the existing plant, the flue gas from Boilers directed into the turbo-reactor via a venturi nozzle, creating a fluidized bed. The flue gas comes into turbulent contact with hydrated lime and activated carbon, which absorb SO₂, HCl and other acidic compounds, heavy metals, and dioxins & furans. The remaining dust particles are carried with the flue gas into the baghouse filter through a central duct to chambers. The flue gas passes through filter bags, trapping solids on the outside of the bags, forming a filtration-aiding layer (filter cake). This process ensures the removal of particulate matter.

SNCR technology is installed for the control of NO_x emission.

Proposed: The proposed Boiler of up to 100 TPH will be installed as the 3rd boiler with the Best available technology and State-of-the-art technology pollution control devices. The

proposed bag filters will be designed with **130% capacity**, providing additional margin for efficient emission control.

F. Leachate Treatment System

Leachate is a percolating liquid from the municipal solid waste stored in a pit and routed to the Leachate treatment plant for further treatment.

- 2000 $\pm$ 20% ton /day MSW (Fuel) being received for a process in which around 12% water known as leachate percolates from MSW and collected into a pit for treatment.
- Existing leachate generation is around 240 KLD after expansion from 3000 $\pm$ 20% ton MSW leachate generation will be approx. 360 KLD.
- 360 KLD Leachate Treatment Plant Installed to achieve the treated leachate quality parameter.
- Leachate is highly contaminated with pollutants such as organic and inorganic compounds, heavy metals, and other harmful substances.
- Treatment Process comprises: Primary (Chemical Treatment), Secondary (Biological Treatment) & Tertiary (Membrane Filtration) treatment.
- Treated leachate recycle in WTP to reduce raw water intake from STP of DJB.
- LTP rejects water use in ash quenching, and sludge as **manure**.

Sr. No.	PARAMETERS	UOM	RAW LEACHATE	PRE-TREATMENT	AFTER TERTIARY (RO) TREATMENT
1.	COD	mg/l	70000- 100000	<2000	50-100
2.	BOD	mg/l	30000-50000	<1000	20-50
3.	Oil & Grease	mg/l	2000- 5000	NIL	NIL
4.	pH	-	4.5 - 7.5	7.0 - 8.0	7.0 - 8.0
5.	TDS	mg/l	42000 - 70000	<30000	600- 950
6.	Total Hardness	mg/l	20000	10000	150
7.	Chloride	mg/l	17000-20000	<10000	100-200
8.	TSS	mg/l	150-3200	<100	NIL

Table 34. Quality parameters

TCLP Analysis conducted by FARE LABS Private Limited (Testing Division) for Raw and Pre-treated leachate samples in February 2025. The Test reports are attached as Annexure.

Detailed Treatment Scheme of LTP

Oil & Grease Tank

- Leachate from collection pit feed to O&G tank
- O&G tanks are used to remove the free oil, which floats on the surface.
- Floating oil will be removed manually from the manhole.
- O&G tank outlet water moves to the Equalization tank through nozzles installed below the water surface.

Equalization Tank

- Equalization tank comprises bottom air grid system and acid dosing system for pH neutralization. Blower of aeration tanks provide air supply in equalization tank bottom air grid.

Purpose of Aeration:

- Homogenation of feed water.
- Maintain alkali pH.
- Reduce hydraulic fluctuation load on upstream units.
- Reduction in carbon dioxide
- Oxidation of Iron & Manganese

Primary Clarifier

- Remove suspended solids by settling to bottom and drain out by pump to sludge holding tank.
- Remove 50-70% TSS.
- Remove 25-35% BOD

Dissolved Air Floatation Unit

- Air & Chemical feed together with leachate into DAF.
- Remove emulsified oil from the surface by skimmer.
- Remove suspended solids settled to the bottom then to the sludge holding tank.
- Treated below surface outlet route to digester.
- Retention Time >30 min.
- Remove 90-95% O&G.
- Remove 80-85% TSS.

Anaerobic Treatment (Digester)

- Three nos. of digesters are in series as well as for parallel operation.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

- Anaerobic (without oxygen) biological process that breaks down organic materials and releases biogas.
- Anaerobic digestion has four major steps such as hydrolysis, acidogenesis, acetogenesis and methanogenesis to decompose organic matter.
- The digestion takes place for about 20 days in the mesophilic temperature (30°C-35°C) and reduces 70-80% of COD and BOD.
- Digested Sludge from the bottom can be used as manure.

Aerobic Treatment

- After Anaerobic tank leachate route to Aerobic treatment which involves oxygen-dependent microorganisms to break down organic matter and convert them into carbon dioxide, water, and biomass.
- Diffuser given in the bottom of the tank provides oxygen to the microorganisms and mixes biomass with feed water to consume BOD. Mixed Biomass in aeration tank known as Mixed Liquor Suspended Solid (MLSS).
- MLSS settled down in Secondary Clarifier and again recycled to Aeration tank, excess biomass sent to the sludge holding tank for dewatering through Screw Press. Dewatered Sludge (Cake) used as manure.
- Secondary Clarifier overflow with reduced organic load (90-92%) route to Tertiary Clarifier (like primary clarifier) for further TSS removal.

Chlorine Contact Tank (CCT)

- CCT provides sufficient time for chlorine to effectively disinfect and deactivate pathogens present in the water.
- Sodium Hypo Chloride chemical dosing is given for disinfection.

MGF ACF

- MGF has different layers of Pebbles, Gravels, Silex & Sand.
- ACF having Activated Carbon with bottom support of Pebbles, Gravels, Silex & Sand.
- MGF primarily addresses physical impurities (such as TSS).
- ACF targeting chemical contaminants through adsorption and remove organic compounds, chlorine, volatile organic compounds (VOCs)
- Backwash in 24 hrs. operation or as per differential pressure (0.5 kg/cm²), to remove the particle deposited on bed. Backwash water route to drain pit and then equalization tank.

Reverse Osmosis

- When fresh water and a salt solution are separated by a semi permeable membrane, water will migrate from the freshwater side into the salt solution (i.e., Low concentrate to high concentrate side). This phenomenon is called Osmosis.

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- When a pressure greater than the osmotic pressure is applied to the concentrated solution, water flows from the concentrated to the dilute solution side through semi-permeable membrane.
- RO membrane pore size is 0.001 to 0.0001 micron, used to remove TDS from feed water.

RO permeate water shall be recycled to Water treatment plant and Reject water for Ash quenching, Gas conditioning tower

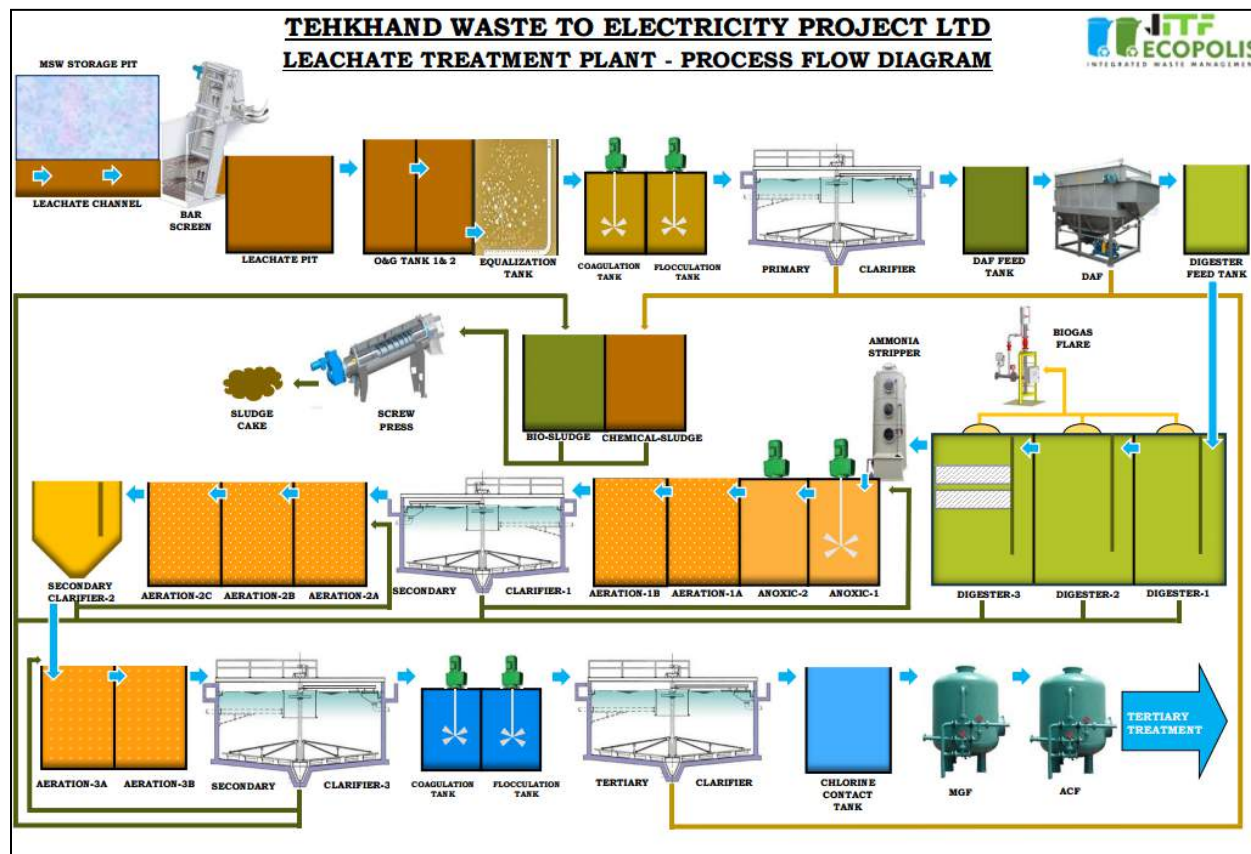


Figure 13. Leachate Treatment Plant PFD

2.8.2 Biogas Plant

Background:

- Green slurry / Leachate generated from the MSW storage pit will be utilized for production of biogas. Treatment Plant utilizes chemical and biological treatment methods to treat approximately 360 KLD of leachate per day. The plant features three anaerobic digesters operating in both series and parallel modes.
- Anaerobic (without oxygen) biological process that breaks down organic materials and releases biogas.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

- The digestion takes about 20 days in the mesophilic temperature (30°C-35°C) and produces approx. 8,000 to 20,000 Nm³ of biogas per day.
- Anaerobic digestion has four major steps: Hydrolysis, Acidogenesis, Acetogenesis & Methanogenesis to decompose the organic matter and produce biogas.
- Digested Sludge from the bottom can be used as manure

Raw Biogas Composition:

S. No.	Parameters	Uom	Raw Biogas
1	Methane	%	60-70
2	Carbon Di-Oxide	%	25-30
3	Hydrogen Sulphide	ppm	<5000
4	Other Gases	%	5

Table 35. Biogas composition

CBG Production:

- Raw biogas will be filtered and cleaned to remove impurities like hydrogen sulphide, moisture, and particulate matter.
- Carbon dioxide and hydrogen sulphide gas will be removed from the biogas using scrubbing and absorption methods.
- The biogas is then enriched to increase the CH₄ concentration, typically to 90-95%. Biogas is enriched by separating methane (CH₄) from other components, primarily carbon dioxide (CO₂), using processes that exploit their different physical or chemical properties. This separation increases the CH₄ concentration to a high purity, making it suitable for use as fuel.
- The scrubbed biogas will be compressed and filled into CBG cylinders or will be supplied to the gas grid through a pipeline.
- The final CBG / Bio-CNG product will meet specified standards for fuel quality, safety, and environmental regulations.

CBG Composition:

IS 16087: 2016 Standard		
S. No.	Characteristic	Requirement

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

1.	Methane percentage (CH ₄), minimum	90.0%
2.	Only Carbon Dioxide percentage (CO ₂), maximum	4%
3.	Carbon Dioxide (CO ₂) + Nitrogen (N ₂) + Oxygen (O ₂) percentage maximum	10%
4.	Oxygen (O ₂) percentage maximum	0.5%
5.	Total sulphur (including H ₂ S) mg/m ³ , maximum	20 mg/m ³
6.	Moisture mg/m ³ , maximum	5 mg/m ³

Table 36. CBG Composition

Source: Environmental Guidelines for Compressed Biogas Plant (CBG)/Bio-CNG Plants by CPCB (March, 2022)

Process Flow Diagram:

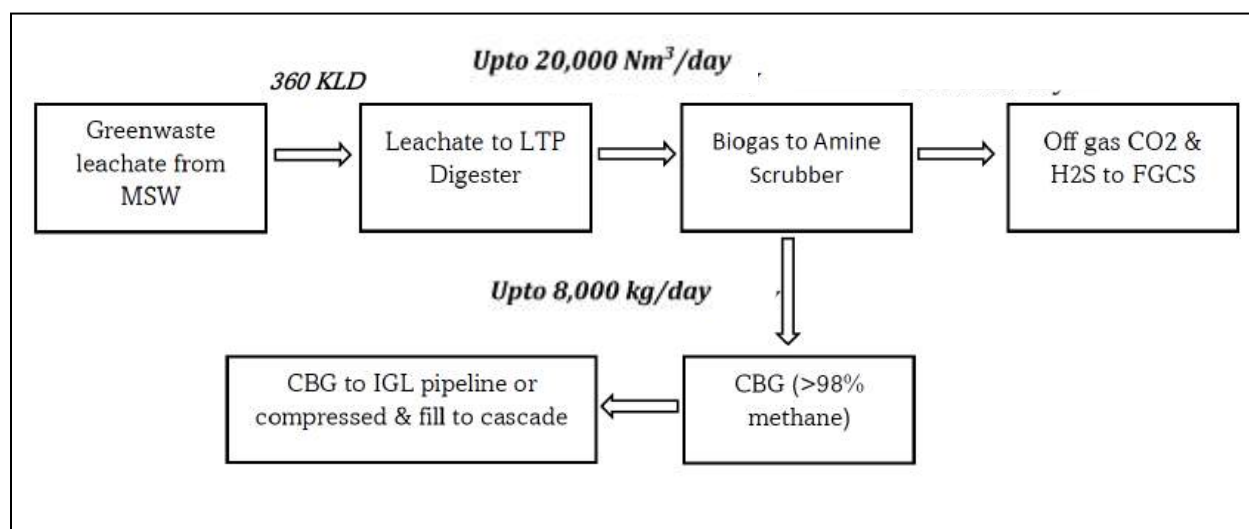


Figure 14. Process Flow Diagram

2.8.3 Process Details of Bio-CNG

Process Details of Bio-CNG:

Below is the process detail for Bio-CNG production from Green Waste.

- The MSW Green Waste Leachate will be fed to one digester for an Anaerobic (without oxygen) biological process that breaks down organic materials and releases biogas.
- Anaerobic digestion has four major steps- Hydrolysis, Acidogenesis, Acetogenesis & Methanogenesis to decompose the organic matter and produce biogas.
- The digestion takes place for about 20 days in the mesophilic temperature (30°C-35°C) and produces up to 20,000 Nm³ biogas per day with leachate & green waste.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

- Biogas generated from digester shall be stored in a gas holder.
- Raw biogas will be filtered and cleaned to remove impurities like hydrogen sulphide, moisture, and particulate matter.
- Carbon di-oxide and Hydrogen sulphide gas will be removed from the biogas using scrubbing and absorption methods.
- The biogas is then enriched to increase the CH₄ concentration, typically to 90-95%.
- The scrubbed biogas will be compressed to high pressure (typically 200-250 bar) and fill into CBG cascades or will be supplied through pipeline.
- The final CBG/Bio-CNG product will be met to specified standards for fuel quality, safety, and environmental regulations.
- Digested Sludge from the bottom can be used as manure.

2.9 Air Emissions

Construction Phase: Dust and Particulate Matter will be generated during the construction and installation phase of the proposed expansion of the existing plant.

Measures to be adopted during Construction Phase:

- Regular water sprinkling to mitigate fugitive emissions at the project site.
- Use of 3 Nos. of Anti-Smog Gun/Fog Cannon for nebulized water spray to control fine dust.
- Transportation of construction material in covered vehicles and proper packing conditions to avoid pollution due to transportation.
- Storing of construction material in covered condition at project site.
- Proper route management of the traffic for smooth ingress and egress of traffic.
- Monitoring of Ambient Air Quality at periodical intervals.
- Continuous Ambient Air Quality Monitoring Station (CAAQMS) already installed.
- Thick Plantation around the plant periphery has been done.
- Strict checking of PUC certificate compliance for all vehicles entering project/plant site
- Plantation of indoor fragrant plants & extensive green belt.

Operation Phase: Sources of emissions are Process, from Boiler stack and operation of DG sets (as backup)

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

2.9.1 Process Stack Emissions & Utility Stack

Table 33. Process Stack Emissions & Utility Stack

Source	Fuel	Ht. from ground (m)	APCS & Stack
Boiler 65 TPH (Exiting)	RDF	60	Lime scrubber and activated carbon injection followed by Bag Filter
Boiler of ≤ 100 TPH (Proposed)	RDF	60	
DG Set (1x750 KVA(Existing))	Diesel	16.5	DG with retrofitted device
DG Set (1x750 KVA(Proposed))	Diesel	16.5	

Table 37.

Note: Though there is an additional stack proposed, only one will be in operation at any given point in time connected to the Boilers 1,2 and 3.

Remedial measures for dust mitigation on roads and other areas where dust will be generated are as follows :

- 3 No. of Anti Smog Gun is available at the site for dust mitigation in vulnerable dusty areas like ash handling points and transfer areas.
- Fixed sprinklers are installed at the site to reduce dust while movement of trucks.
- Manual Sprinkling is also done regularly.
- The entry gates have sensor based wheel washing systems for vehicle cleaning and washing.
- The materials are kept covered using green net.

2.9.2 Fugitive Emission & Odour Control Measures

Existing Measures- from waste handling are captured by maintaining negative pressure (Outside air is allowed to enter the waste shed, however mal-odourous emissions are not allowed to exit into the atmosphere) in the storage area and the odourous emissions like methane, mercaptans, Hydrogen sulphide etc. are burnt in the boiler.

- In order to control odour, fragrant materials are used in the odour control system by using air solution methods.
- Tolerant tree species will be planted which would act as a sink for pollutants and odour.
- Maintaining MSW pit under negative pressure to mitigate escape out the odour from MSW Pit.
- Herbal mist spray for odour control

Proposed Measures- leachate plant fugitive emissions will be channelized to the biogas plant which will recover gasses and after separation of CH₄, CO₂ & H₂S will be sent to Flue Gas Conditioning System , which will further eliminate any odour.

- Carbon dioxide and hydrogen sulphide gas will be removed from the biogas using scrubbing and absorption methods.
- The biogas is then enriched to increase the CH₄ concentration, typically to 90-95%.
- The scrubbed biogas will be compressed to high pressure (typically 200- 250 bar) and filled into CBG cylinders or will be supplied to the gas grid through pipeline.
- The final CBG / Bio-CNG product will meet specified standards for fuel quality, safety, and environmental regulations.

2.10 Water consumption, Wastewater generation & disposal details

Source- Okhla STP

During Construction Phase - Approximately 50 KLD of water will be required during the construction phase which will be supplied by Okhla STP. The waste water generated will be treated in house treatment plant.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Source- Treated water from Okhla STP file No. F-1/DJB/EE(SDW)V/2017/1346 date 03.19.2917. and Fresh Water for Domestic purposes from Delhi Jal. Both treated water and fresh water are supplied through underground pipelines.

During Operation Phase- The water will be used in activities - domestic purpose, Industrial Boiler make-up water, cooling tower, Central monitoring basin.

625 KLD of water will be needed for plant operation which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB).

Details of break up of water consumption is provided below.

Water Management

S. No.	Description	UOM	Existing	Expansion
1	Raw Water from DJB/ STP okhla	KLD	490	625
2	Cooling Tower Make-up & Service Water Feed	KLD	172	215
3	DM water/Boiler Feed	KLD	98	138
4	Boiler Blow down to EQ Tank (Primary Treatment)	KLD	72	104
5	Primary Treatment to Horticulture	KLD	25	25
6	Reject from Secondary Treatment to CMB	KLD	153	161
7	Reject from Tertiary Treatment to CMB	KLD	6	9
8	Cooling Tower Blowdown to CMB	KLD	43	53
9	Drinking/Supply Water for Domestic & Manpower use	KLD	5	7
10	Domestic Wastewater to LTP	KLD	4	6
11	Leachate from MSW Pit to LTP	KLD	240	354
12	Leachate Treatment Plant Capacity	KLD	360	360
13	Sludge/cake from LTP to Incinerator	KLD	4	6
14	LTP Reject water to Slag Extractor	KLD	96	142
15	Reject water to FGCS Gas Cooling, Housekeeping, Wheel-washing system & Others	KLD	220	252

Table 38. Water management

Waste Water Management

State-of-the-art technology is used for minimizing the water requirement in various processes and for the treatment of wastewater. The effluent/rejects coming out of the DM plant and cooling system blow down etc. is brought to the neutralization pit. After neutralization, it is used for the

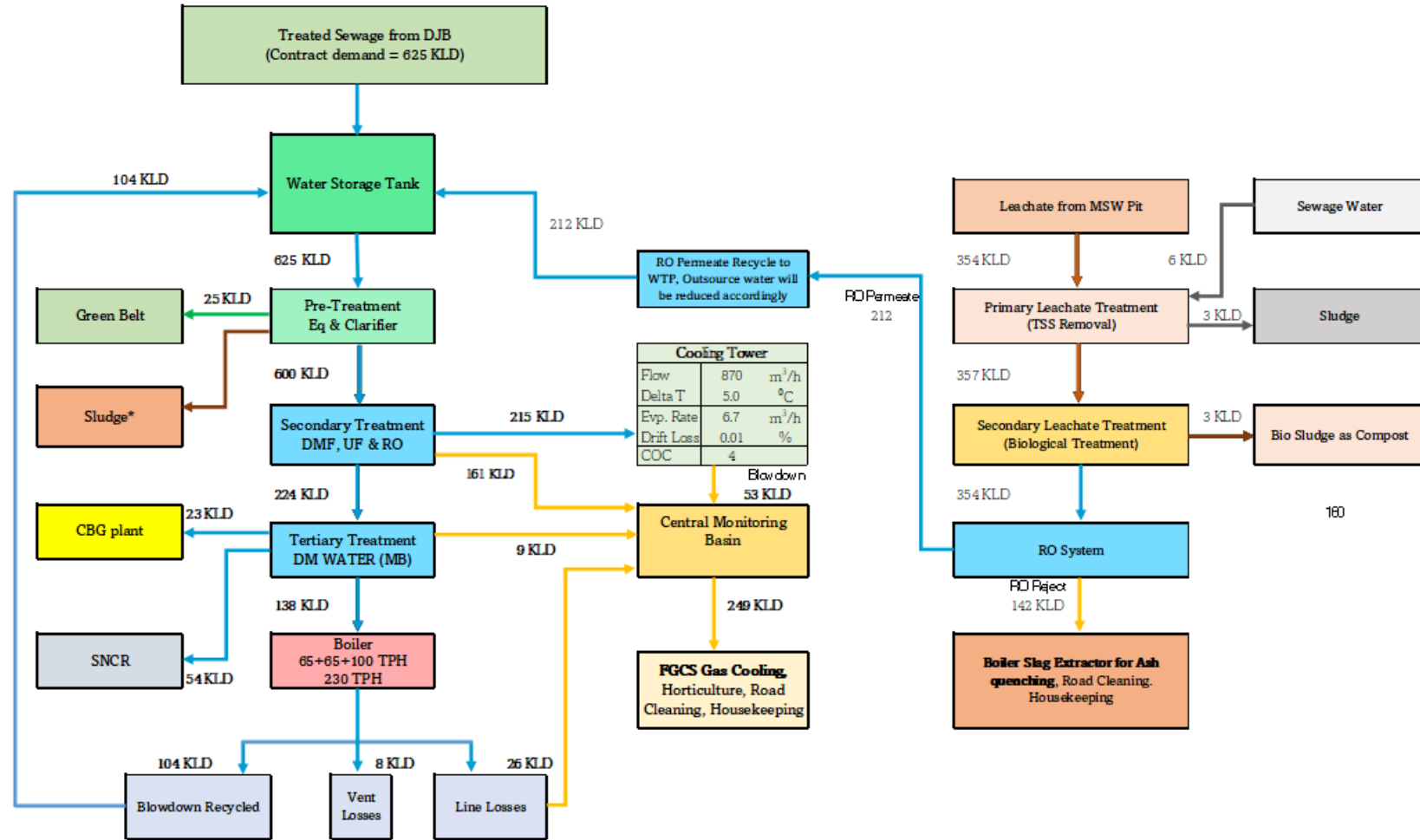
“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

gas conditioning tower of FGCS and service water for floor washing, sprinkling on road and other general purposes. The treated water from Leachate treatment plant is recycled to DM Plant and rejected for quenching of bottom ash.

The existing 244 KLD (240 KLD-leachate + 4 KLD-Sewage) leachate is being treated in a leachate treatment plant of capacity up to 360 KLD. After expansion, it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants. ZLD will be maintained.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Water Balance (After Expansion)



Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Figure 15. Water Balance (After Expansion)

Water Balance (Existing)

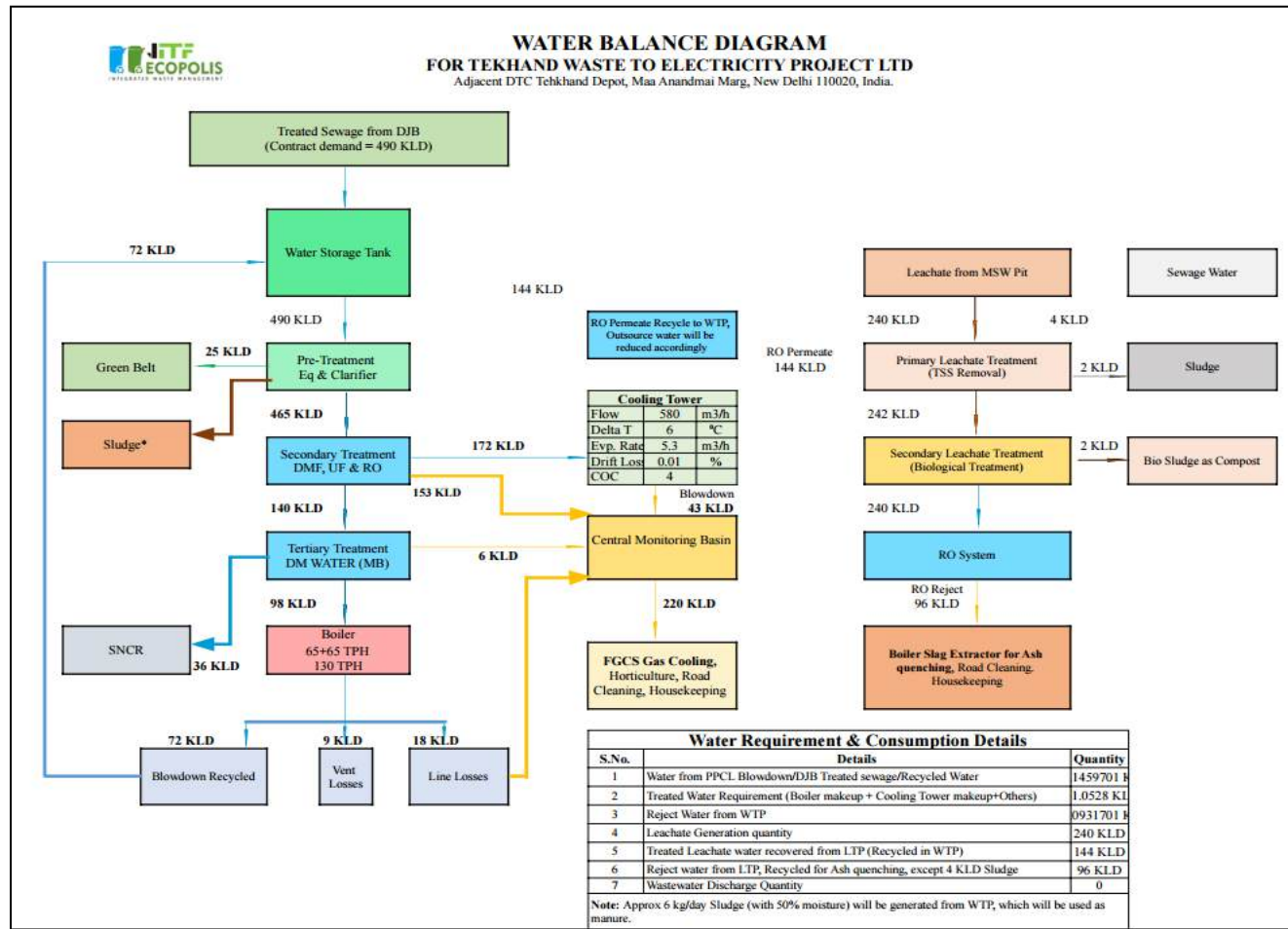


Figure 16. Water Balance (Existing)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

2.10.1 Effluent Wastewater management & Treatment

Philosophy of water management

WasteWater Management

State-of-the-art technology is used for minimizing the water requirement in various processes and for the treatment of wastewater. The effluent/rejects coming out of the DM plant and cooling system blow down etc. is brought to the neutralization pit. After neutralization, it is used for the gas conditioning tower of FGCS and service water for floor washing, sprinkling on road and other general purposes. The treated water from Leachate treatment plant is recycled to DM Plant and rejected for quenching of bottom ash and FGCS Gas Cooling.

The existing 244 KLD (240 KLD-leachate + 4 KLD-Sewage) leachate is being treated in a leachate treatment plant of capacity up to 360 KLD. After expansion, it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants.

The treatment facility for the wastewater generation from the different sources are described as below:-

Wastewater treatment Units (In-house)

Waste Water Treatment units, Particulars	Unit	Capacity	Number
LTP	KLD	360	1
WTP	KLD	625	1

Table 39. Details of Wastewater Treatment Units

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

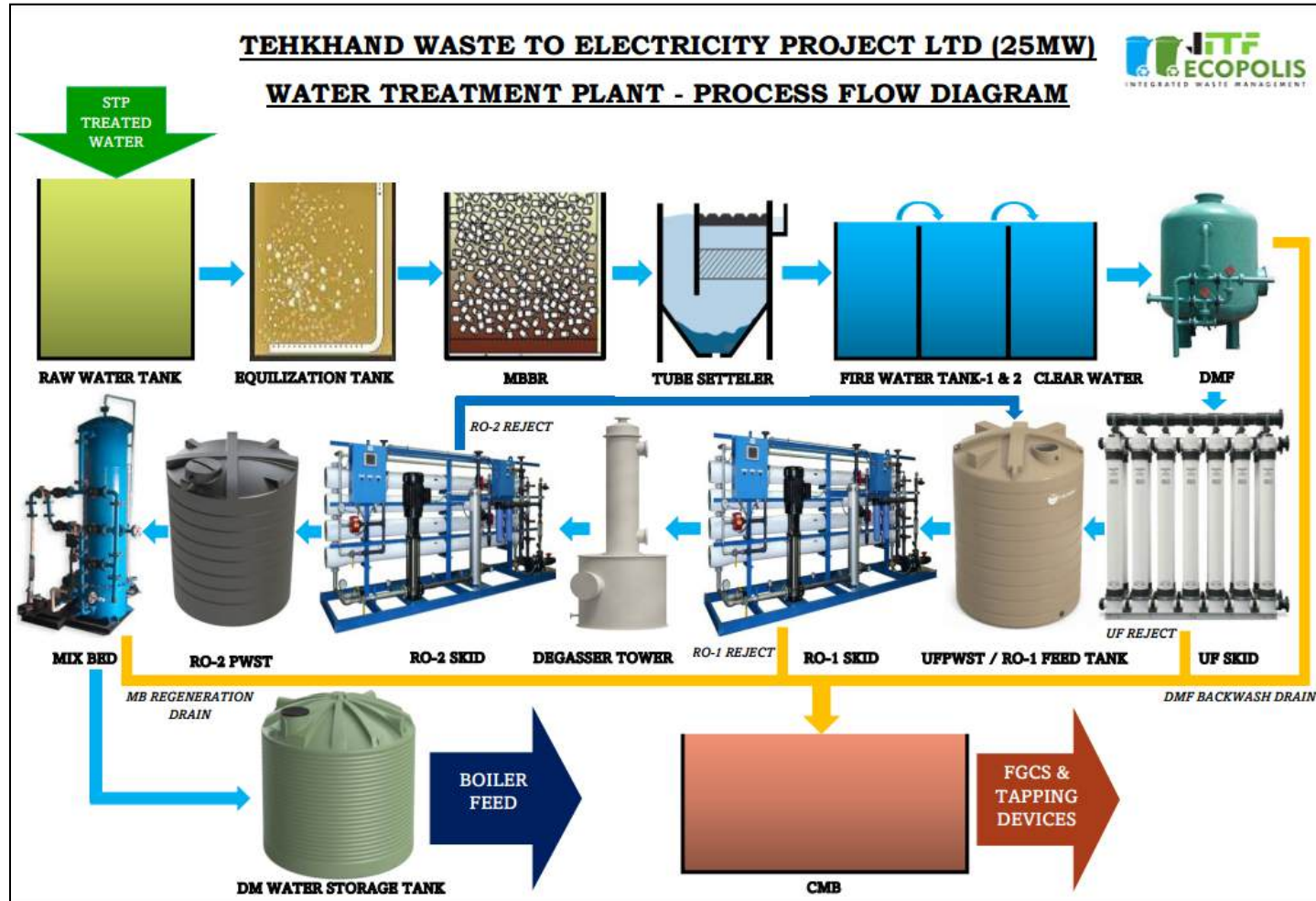


Figure 17. Water Treatment Plant PFD

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

LTP-PFD

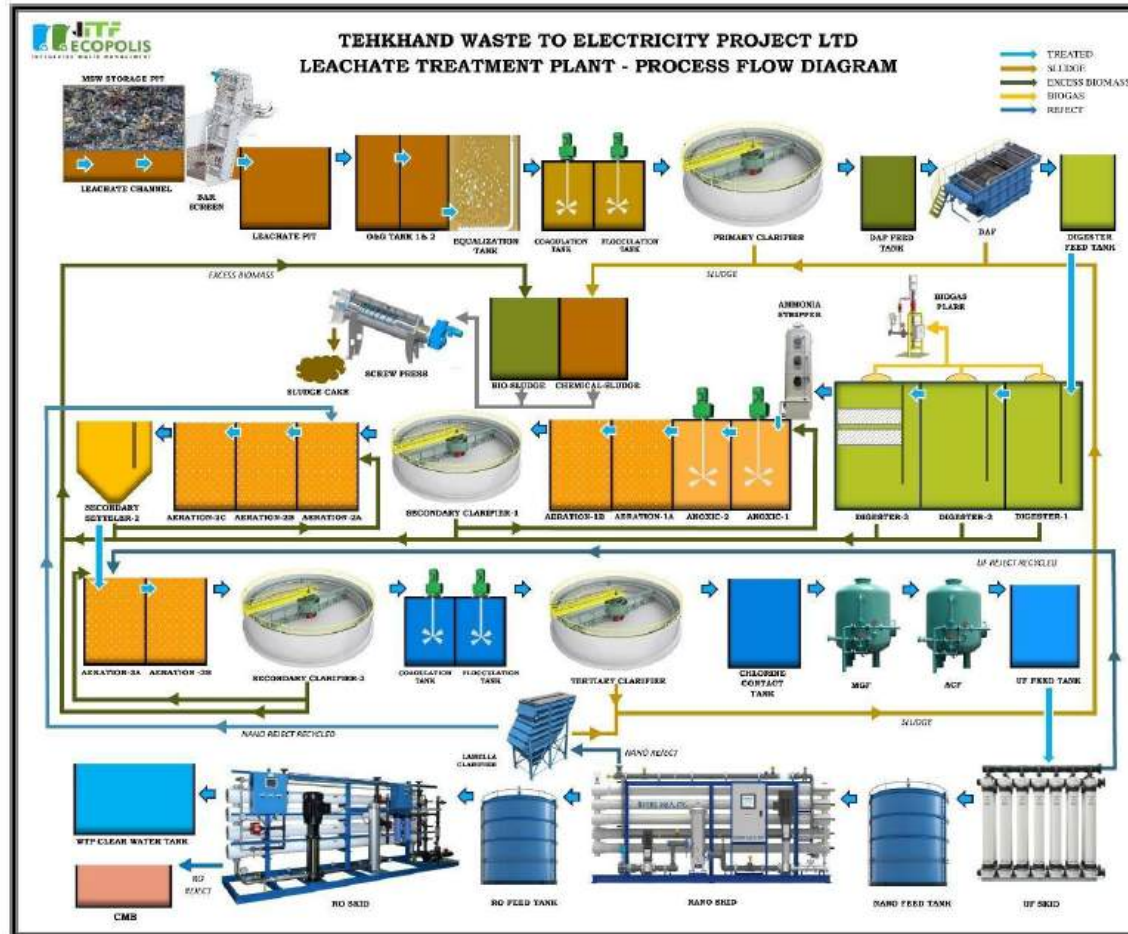


Figure 18. Leachate Treatment Plant

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

Characteristics of waste water & treated water

S. No.	Parameters	Unit	Concentration of Raw Leachate - Existing Unit	Concentration of Treated Leachate -- Existing Unit	Existing Details			After Expansion		
					Flow m ³ /day	Load (Kg/Day) (For Raw effluent)	Load (Kg/Day) (For treated effluent)	Flow m ³ /day -Expansion	Load (Kg/Day) (For Raw effluent)	Load (Kg/Day) (For treated effluent)
1	TSS	mg/l	4462	5.6	240	1070.88	1.344	354	1579.55	1.9824
2	TDS	mg/l	28105	1547	240	6745.2	371.28	354	9949.17	547.638
3	COD	mg/l	78110	20	240	18746.4	4.8	354	27650.94	7.08
4	BOD (3 days)	mg/l	26084	4.1	240	6260.16	0.984	354	9233.74	1.4514

Table 40. Characteristics of waste water & treated water

2.11 Hazardous, Non- Hazardous, Solid waste & other wastes identification, quantification, storage, and disposal

Solid Waste

Combustion of MSW/RDF produces fly ash and bottom ash. The total amount of ash produced by municipal solid waste combustion depends upon the total quantity of residual inerts in the RDF, quantity of inherent ash in the different fuel fractions and the completeness of the combustion of the fuel. Based on the current scenario, the ash content can range from 15 to 25% of the total MSW processed. The quantity of fly ash amounts to about 5-10% of the total ash. Detailed description of bottom ash and fly ash is given below:

- A. **Fly Ash:** It is a fine particulate matter. The chemical composition shows that the major elements are Si, Al, Fe, Mg, Ca, K, Na and Cl. Chloride content and heavy metals is higher in the fly ash. CaO is the most abundant compound that exists in MSW fly ash. The average ash content in the RDF would be 20%.
- B. **Storage & Disposal-** The fly ash shall be collected in silos and most of it will be utilized in brick making marketed in dry form. The fly ash which cannot be utilized / marketed will be disposed of to the designated SLF. The Fly Ash generated from the plant is Supplied to ash brick manufacturers and any unutilized material will be sent to ESLF.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

The objective of the project being waste utilization and disposal, it shall be ensured that rejects arising from pre-processing and processing (inserts, ash, sludge etc.) shall be treated, utilized and disposed off as per statutory standards on a daily basis in the site allocated for the engineered landfill.

C. Inert waste from pre-processing

The inert waste needs to be segregated during the pre-processing of municipal solid waste. Only the inert material or waste from the plant will be sent to the landfills. The inert waste can be effectively used in several ways as inert filling material for low-lying areas & landscaping and/or soil cover for landfill sites. Processed waste can be used for road and embankment construction.

The details of quantity of Waste generated from the plant is mentioned below:

Type of Waste	Unit	Existing	Proposed	Total After Expansion	Disposal Method
Biodegradable waste	Kg/day	10	2.8	12.8	Will be handled in-house Biogas digester
Non-Biodegradable waste	Kg/day	15	4.2	19.2	Will be sent to incinerator/in house -boiler
Battery waste	TPA	0	0.11	0.11	Will be sold to registered recyclers or buy-back
E-waste	TPA	0	0.01	0.01	Will be sold to registered recyclers

Table 41. Inhouse Solid waste generated

Type of Waste	Unit	Existing	Proposed	Total After Expansion	Disposal Method
Recyclable(Ferrous waste)	MT/day	2.5	1.5	4	Will be sold to registered recyclers
Manure /Sludge from digester (from composting)	MT/day	0	2	2	Used as compost/soil conditioner
Bottom Ash	MT/day	230	80	310	Ash Generated is utilized in road subgrade construction and embankment. Any unutilized material will be sent to ESLF.
Fly Ash	MT/day	27	20	47	Supplied to ash brick manufacturers and any unutilized material will be sent to ESLF.
Inert (C& D waste)	MT/day	300	144	444	Used for road construction and any unused material will be sent to ESLF.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Table 42. Other Non Hazardous waste detail

Hazardous waste						
Type of Waste	Category	Unit	Existing	Proposed	Total After Expansion	Disposal Method
Used Oil	5.1	MT/year	4	3	7	Will be sold to registered recyclers
Sludge (WTP)	-	kg/day	6	2	8	Sludge will be filter pressed and sent to incinerator in-boiler
Chemical Sludge (LTP)	-	kg/day	2	1	3	Will be sold to registered recyclers

Table 43. Hazardous waste detail

2.13 Resource Optimization/ Recycling and Reuse Envisaged in the Project

The plant uses the municipal solid waste which has a certain calorific value. Additionally, MSW is segregated through the MRF system to recover recyclable materials. No freshwater will be used for industrial purposes, except for drinking. The project will not use ground water sources to save natural resources. Treated water is supplied by the DJB STP, Okhla through underground pipelines. The existing facility operates on a zero liquid discharge basis, and this concept will be followed for the expansion project.

2.14 Plantation & Green Belt

- Greenbelt covering 33% of the plot area i.e. 2.0142 ha has been developed along the periphery for the existing plant.
- Three tier plantation & width of green belt ranging from 20 -30 m all across the boundary of the project.
- No of trees Required = 5036
- Approx. 6219 number trees (including ornamental & fragrant species) are planted at the site.

S. No.	Common Name	Botanical Name	Quantity
1	Silver Snake	<i>Sansevieria trifasciata</i>	131
2	Firebush	<i>Hamelia</i>	166
3	Gudhal	<i>Hibiscus</i>	174
4	Bougainvillea	<i>Bougainvillea glabra</i>	55
5	Peepal	<i>Ficus religiosa</i>	136
6	China Palm	<i>Livistona chinensis</i>	15
7	Shahtoot	<i>Morus alba.</i>	53
8	Neem	<i>Azadirachta indica</i>	240
9	Ficus	<i>Ficus benamina</i>	561
10	Kanak Champa	<i>Pterospermum acerifolium</i>	204
11	Tekoma	<i>Tecoma stans</i>	217
12	Harshringar	<i>Nyctanthes arbor-tristis</i>	26
13	Papaya	<i>Carica papaya</i>	2
14	Raatrani	<i>Cestrum nocturnum</i>	48
15	Lasoda	<i>Cordia myxa L.</i>	21

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Common Name	Botanical Name	Quantity
16	Papdi	<i>Holoptelea integrifolia</i>	190
17	Jamun	<i>Syzygium cumini</i>	4
18	Pakar/Pilkhan	<i>Ficus virens</i>	95
19	Serissa	<i>Serissa foetida</i>	127
20	Sheesham	<i>Dalbergia sissoo</i>	329
21	Kikar	<i>Vachellia nilotica</i>	162
22	Molshree	<i>Mimusops elengi</i>	85
23	Panda Ficus	<i>Ficus benjamina</i>	247
24	Arjun	<i>Terminalia arjuna</i>	245
25	Chandni	<i>Tabernaemontana divaricata</i>	22
26	Rose	<i>Rosa Rubiginosa.</i>	33
27	Bottle Brush	<i>Callistemon citrinus</i>	77
28	Jatropha	<i>Jatropha curcas</i>	331
29	Kandel	<i>Kandelia candel</i>	85
30	Kachnar	<i>Bauhinia variegata</i>	64
31	Marod phali	<i>Helicteres isora</i>	114
32	Buttonwood	<i>Conocarpus erectus</i>	1349
33	Balam kheera	<i>Kigelia africana</i>	116
34	Amaltas	<i>Cassia Fistula</i>	13
35	Ber	<i>Ziziphus mauritiana</i>	1
36	Chilbal	<i>Holoptelea integrifolia</i>	16
37	Bargad	<i>Ficus benghalensis</i>	9
38	Semal	<i>Bombax</i>	12
39	Gulmohar	<i>Delonix regia.</i>	27
40	Shami	<i>Prosopis cineraria</i>	2
41	Cassia Semia	<i>Senna siamea</i>	44
42	Neemba	-	3
43	Ashok	<i>Saraca asoca</i>	90
44	Bottle Palm	<i>Hyophorbe lagenicaulis</i>	41
45	Khajur	<i>Phoenix dactylifera</i>	23
46	Amla	<i>Emblica officinalis</i>	9
47	Bael	<i>Aegle marmelos</i>	6
48	Fish Palm	<i>Caryota urens</i>	20
49	Alii ficus	<i>Ficus maclellandii</i>	16

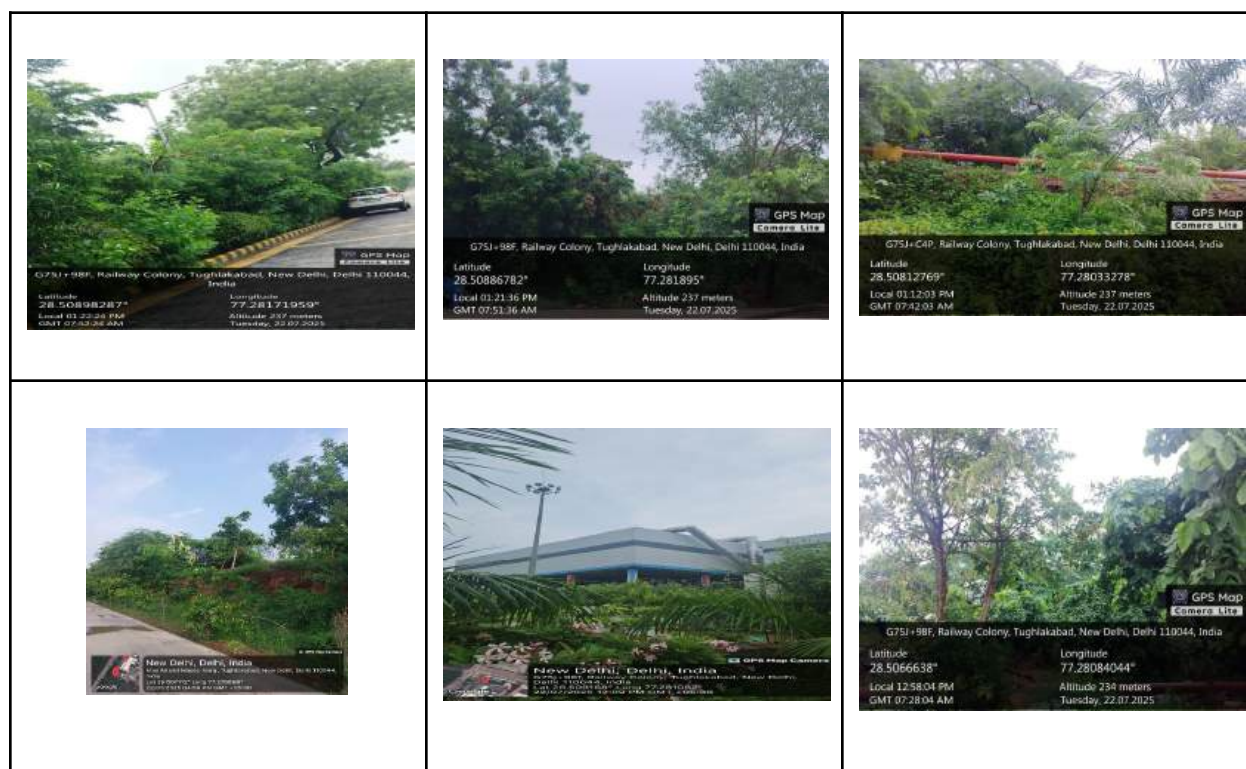
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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Common Name	Botanical Name	Quantity
50	Guava	<i>Psidium guajava</i>	16
51	Anaar	<i>Punica granatum</i>	5
52	Mango	<i>Mangifera indica</i>	8
53	Chukrasia	<i>Chukrasia tabularis</i>	62
54	Kadam	<i>Neolamarckia cadamba</i>	19
55	Imli	<i>Tamarindus Indica</i>	2
56	Guldar	<i>Gliricidia sepium</i>	50
57	Lemon	<i>Citrus limon</i>	1
Total			6219

Table 44. Details of Existing trees

Photographs of the site (Green belt area)



“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

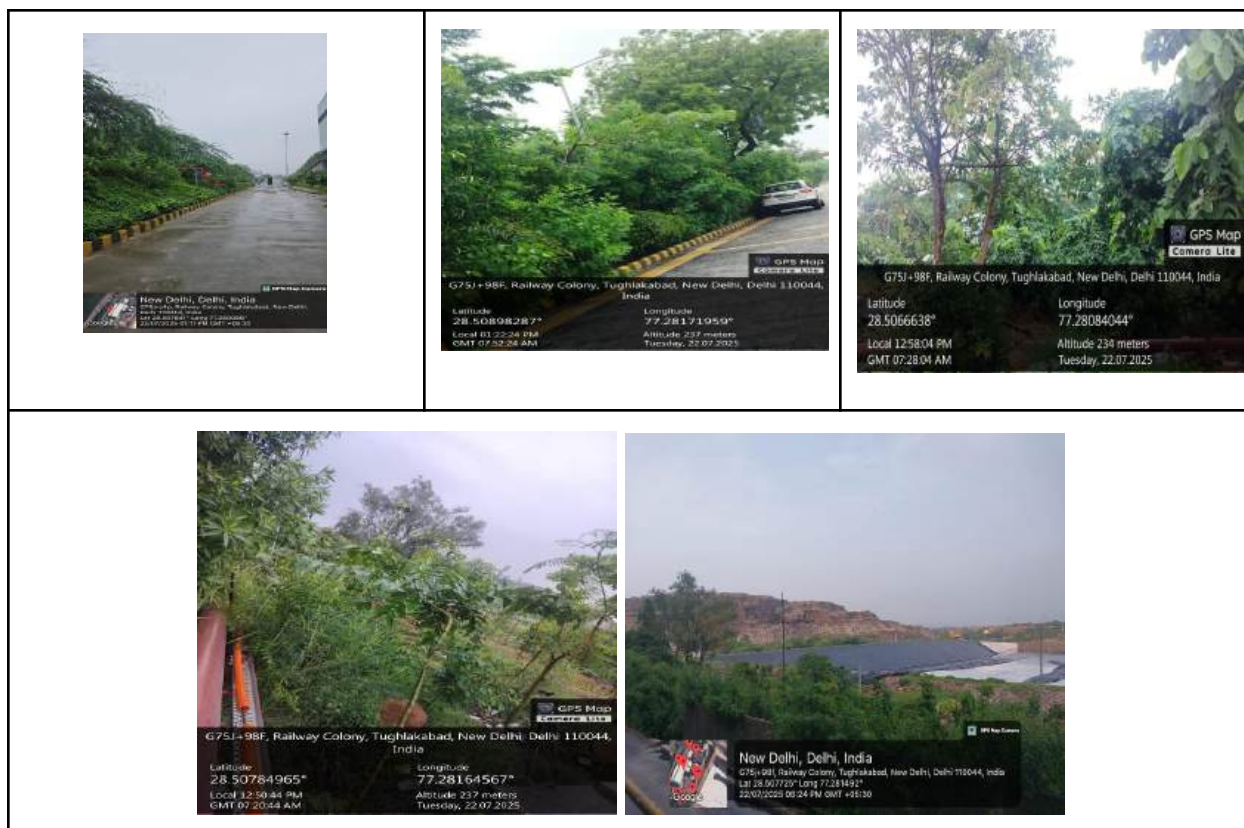


Table 45. Greenbelt Photographs

2.15 Rainwater Harvesting & Collection details & Storm water management plan (Please provide the calculations and details)

Considering the climatic conditions and the scarce surface as well as groundwater availability in the region, state of the art rainwater harvesting systems will be followed for expansion projects by M/s TWEPL. To facilitate rainwater harvesting, collection and storage, the rainwater storage system will be located at an appropriate location on the site keeping in view the slope contours and collection point.

Guidelines issued by the Delhi Jal Board (DJB), if any, will be adhered for finalization of appropriate rainwater harvesting system.

Particulars	Area (in m2)	Runoff coefficient	Maximum average hourly rainfall intensity in metre per hour	Total required capacity of RWH systems in KL
Roof Top Area	6902	0.80	0.025	138

Table 46. Rainwater Harvesting Details

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Total required capacity of RWH systems in KL/hr is 138.

Pits already constructed are 5 Nos.

RWH Pit No.	Locations	Size of Rectangular RWH System (Length x Breadth x Depth in meters)	Capacity (KL)
RWH-1	Near TG Building	5×4×1.5 m	30
RWH-2	In Between TG and ACC	5×4×1.5 m	30
RWH-3	Near SNCR Area	5×4×1.5 m	30
RWH-4	Near Compressor Area	5×4×1.5 m	30
RWH-5	Near DM Plant	5×4×1.5 m	30
		Total Capacity	150 (KL)

Table 47. Rainwater Harvesting specifications

2.16 Harnessing Solar Power

It is planned to implement followings for harnessing solar power at the project site:

- (a) Solar Panels are installed on the roof top area of 3 KW capacity and further ~686 KW capacity of solar panels will be installed
- (b) Lighting of internal roads and general open areas through solar panels.
- (b) Provision of LED bulbs for solar powered areas.

Rooftop Solar (RTS) Power Plant

A rooftop solar power, or rooftop PV, is a photovoltaic (PV) system that has its electricity-generating solar panels mounted on the suitable rooftops. Solar PV modules shall be placed on top of the building's certain roofs to generate the electricity. In this case, using rooftop solar PV shall allow the Waste to Electricity (WtE) plant to first consume the electricity generated from the solar power system, to meet the unit auxiliary demand, and then export the surplus energy into the grid.

The various components of such a system shall include PV panels, module mounting structures, cables, wires, solar inverters, and other electrical accessories, e.g., safety, monitoring, and metering equipment, etc.

- Solar Panels produce carbon free electricity when irradiated with sunlight. Solar panels shall be made of smaller Silicon solar cells. Multiple solar panels shall be strung together to make up a solar array. Solar panels shall be protected by tempered glass and secured within an aluminium /metal frame.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

- Mounting clamps shall consist of aluminium brackets and SS bolts that shall secure solar panels to one another on the roof and on to the rails.
- Racking or rails shall be made of metal and shall lie in a parallel configuration on the roof, level enough for the panels to be evenly mounted.
- Mounts shall attach the rails and the entire array to the surface of the roof.
- DC /AC wiring shall connect between panels and micro or string inverter.
- Micro inverters shall be mounted to the bottom of the panel and convert DC power from the panels into AC power.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

A conceptual diagram is shown below:

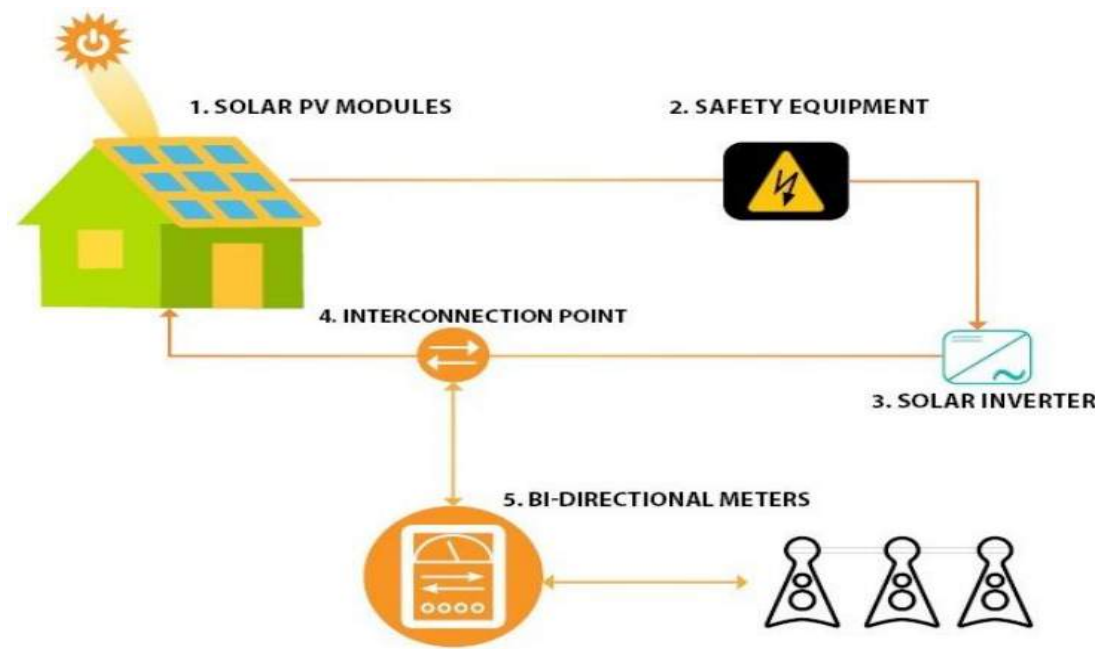


Figure 19. A conceptual diagram

TEHKHAND WASTE TO ELECTRICITY PROJECT LIMITED (TWEPL)

- Total estimated rooftop area, available here in the case of TWEPL, is around 5,000 m². The same, subjected to the usability factor, post the results of shadow and other relevant analysis later, may reduce up to 3,500 m².
- This area could house peak rooftop solar power installation of upto 700 kWp, i.e., roughly 10% of the total unit auxiliary power demand; And may therefore would approximately generate up to 1 MU of clean renewable energy annually.

3. Description of Environment

3.1 Introduction

To cover environmental baseline studies, following aspects have been covered: -

The baseline data is generated through field study within the impact zone (Core Zone and Buffer Zone) for various components of the environment viz. Air, Noise, Soil, Water, Land, Ecology and Socioeconomic. The baseline environmental studies have been done for the **Summer Season (March 2024-May 2024)** by Virat Global lab in a study area of 10 km radius from the project site. While generating the baseline status of the 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 data collection had been done as given below:

- Field Survey and site visit
- Primary monitoring of key environmental parameters like Air, Noise, Soil, Water, Land, Ecology and Socio Economic survey during the pre monsoon season
- Consultation with local people, government departments such as the Forest department, Panchayats etc.
- Literature review on secondary information available for the study area.

3.2 Base Maps of the area

3.2.1 Google Image of the Project Site

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.



Figure 20. Google Image of the Project Site

3.2.2 Topographical map

Topographical Map with 10 km radius is given below:

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

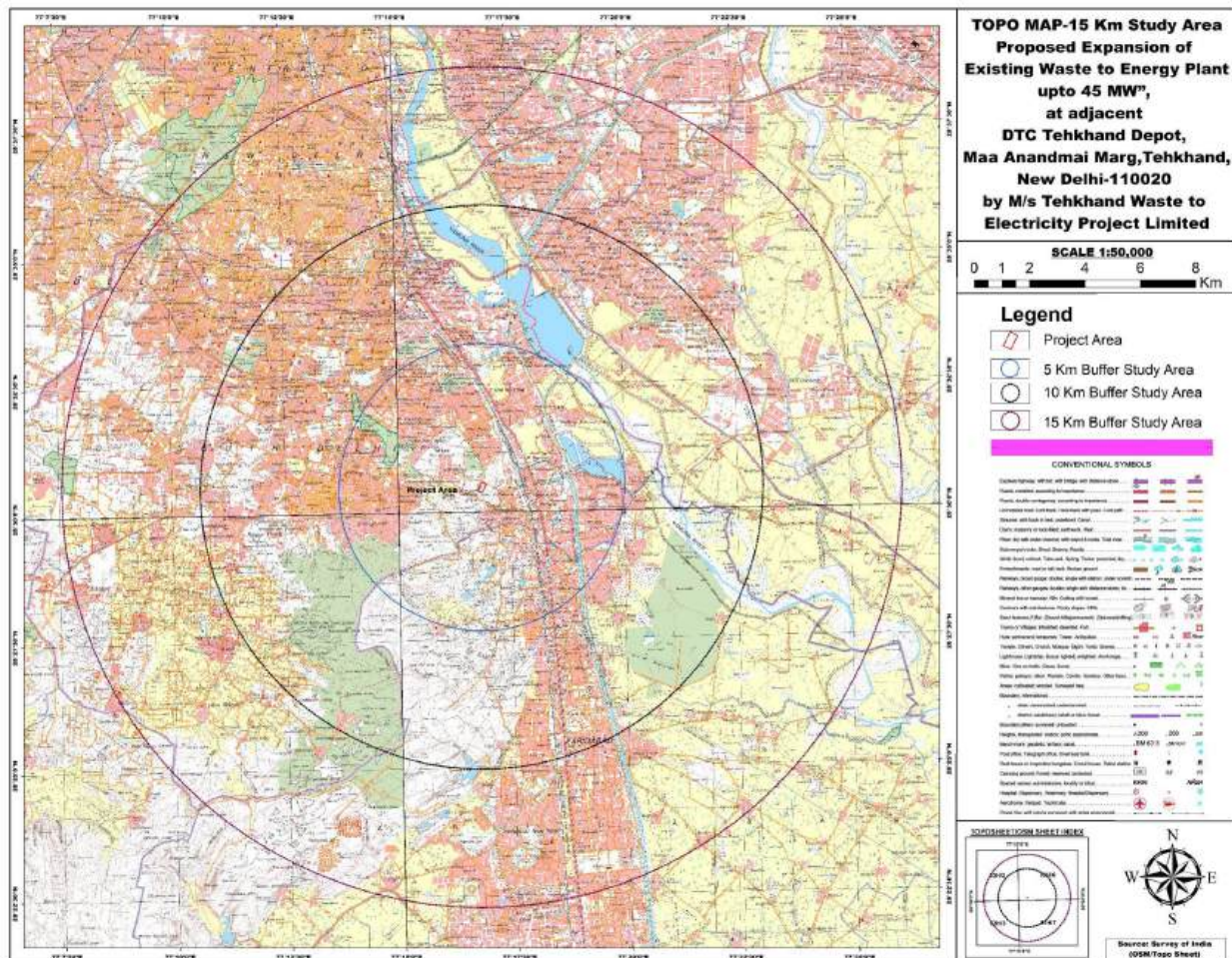


Figure 21. Topographical Map with 10 km radius

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.2.3 DEM map

DEM Map with 10 km radius is given below:

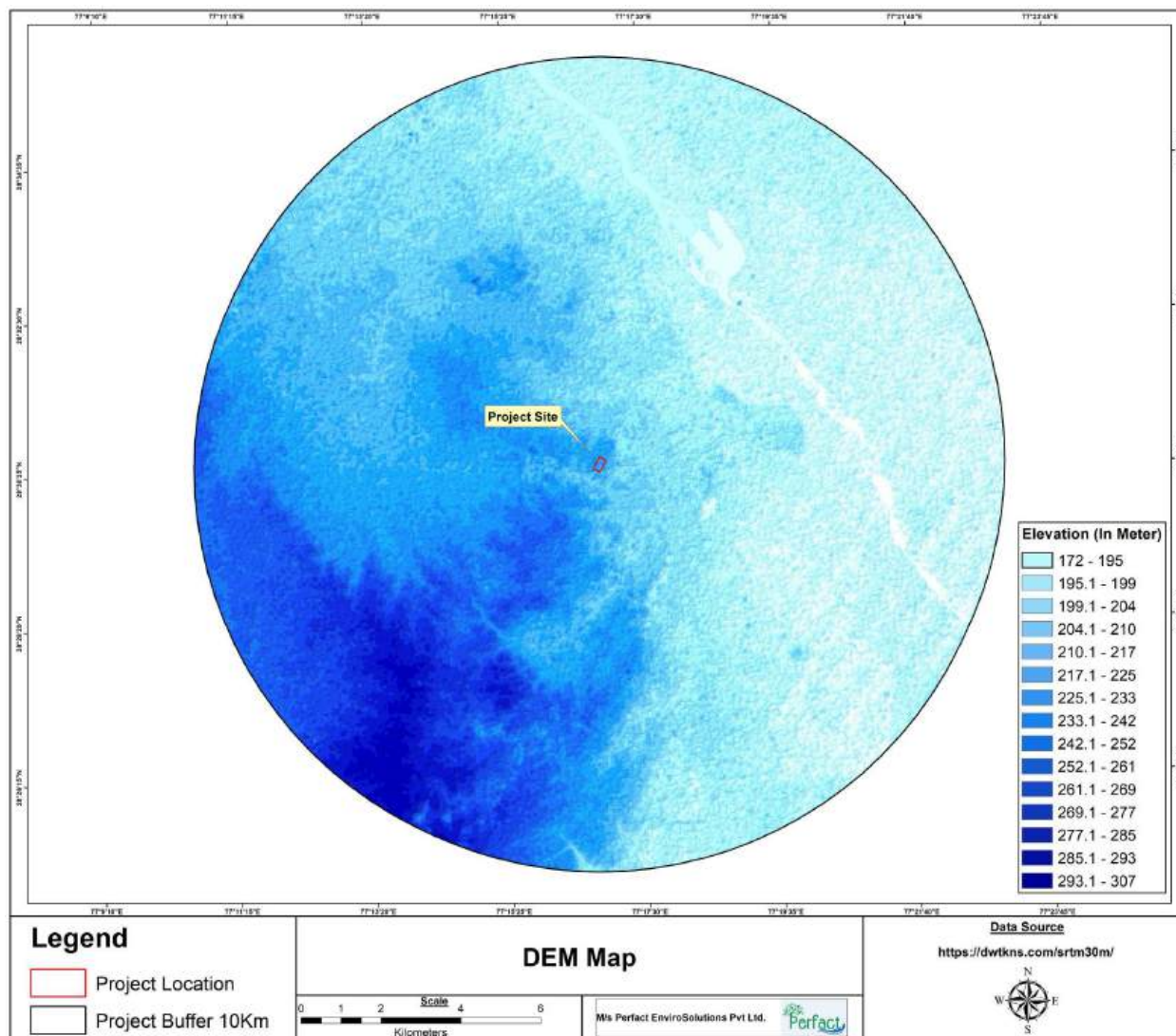


Figure 22. DEM Map with 10 km radius

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.2.4 Village map

Village Map with 10 km radius is given below:

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"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

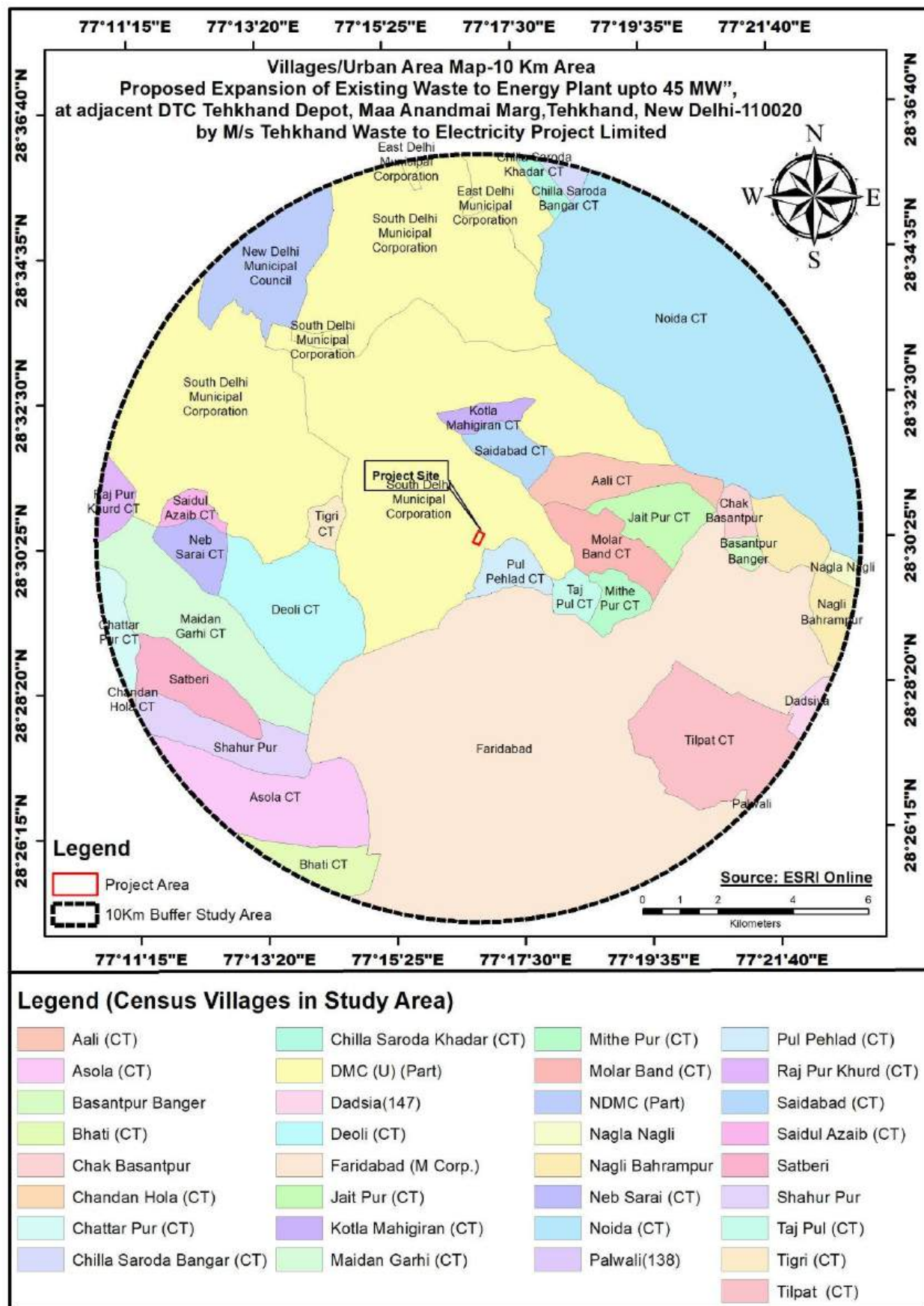


Figure 23. Village Map with 10 km radius

3.3 Methodology of baseline data collection

S.No.	Functional Area	Methodology
1	Micro-Meteorological Data	Site specific Micro-Meteorological Data has been used for the study. The important parameters considered are temperature, relative humidity & wind speed.
2	Ambient Air Quality	The ambient air quality monitoring was done to assess the ambient air quality in one season. The guidelines for selections of ambient air monitoring stations given in IS – 5182 part 14, 2000 were followed.
3	Water Quality	To assess the water quality of the proposed area, Grab, Composite sampling done for water sample collection. Water samples were taken as per the Standard Methods (IS & APHA, 23 rd Edition 2017). Necessary precautions were taken for the preservation of samples. The physical parameters viz. pH, temperature and conductivity were measured at site using a portable water analyser.
4	Ambient Noise Quality	At each station noise level was monitored for 24-hours. For each measurement, dB (A) readings were taken for every 15 minutes for 24 hrs once in a season to get Leq values.
5	Soil Quality	Augur method was used for soil sampling and samples were collected at 15 cm depth after removing the upper crust.
6	Topography, Landform and Land Use	The land use/ land cover map has been generated on a 1:50,000 scale using Satellite imagery, topographical maps, Survey of India and ground truth information.
7	Biological Environment	Primary and secondary data collection has been done by the Ecology and Biodiversity team for the study of flora and fauna in the core and Buffer Zone.
8	Socio Economic Environment	For demography and socioeconomics, block wise data has been collected and used for the assessment of impacts.

Table 48. Methodology of Baseline Data Collection

3.4. Meteorology

3.4.1. Climatic Conditions (As per NASA/POWER Source Native Resolution, MERRA-2 <https://power.larc.nasa.gov/data-access-viewer/>)

The meteorological data was obtained from (Source: NASA/POWER Source Native Resolution, MERRA-2 <https://power.larc.nasa.gov/data-access-viewer/>). The Important parameters considered are temperature, Relative Humidity, Wind Speed, Wind Direction and Rainfall. The meteorological data of last ten years (2015-2024), extracted as Maximum, Minimum and Average values are given below:

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.4.2. Temperature

The Maximum monthly average temperature of the area in ten Years (2015-2024) was recorded as 37.49°C in June 2024, whereas the minimum monthly average temperature of the area was recorded as 12 °C in January 2022.

Year	M max (°C)	Month	Year	M min (°C)
2016	15.48	January	2022	12
2018	19.11	February	2022	15.12
2021	25.58	March	2020	20.82
2022	32.68	April	2023	27.66
2024	36.11	May	2023	30.86
2024	37.49	June	2023	33.07
2019	33.59	July	2023	30.57
2017	30.81	August	2024	28.8
2020	29.77	September	2018	27
2015	26.78	October	2022	23.74
2015	21.71	November	2021	18.02
2016	17.08	December	2019	12.61

Table 49. Temperature Profile

(Source: NASA/POWER Source Native Resolution, MERRA-2 <https://power.larc.nasa.gov/data-access-viewer/>)

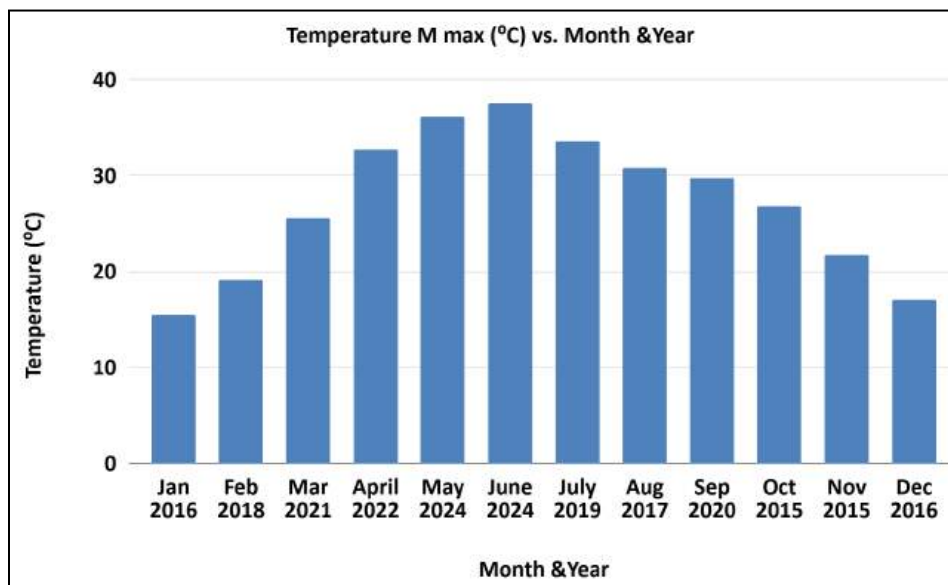


Figure 24. Bar graph showing maximum temperature record over the years

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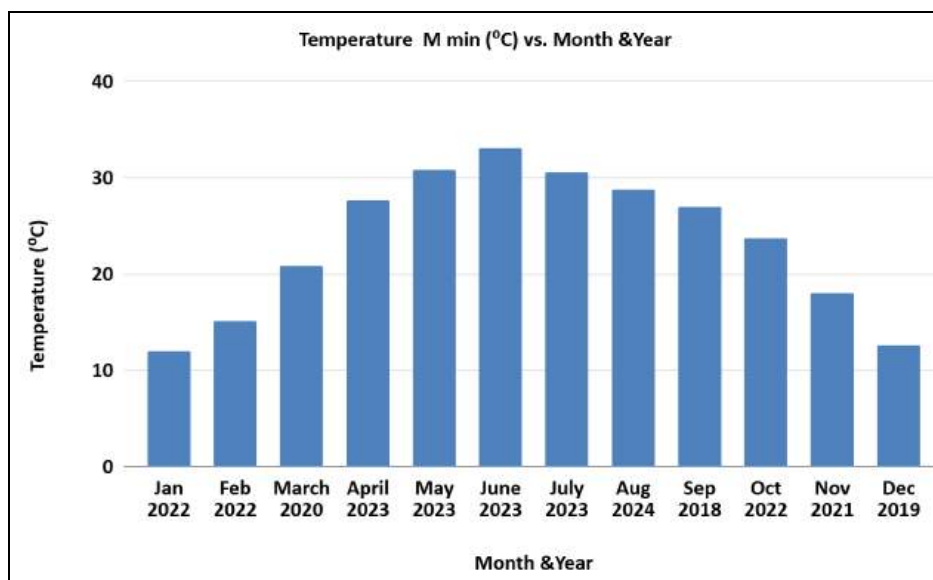


Figure 54. Bar graph showing minimum temperature record over the years

3.4.3. Relative Humidity

From the below data, the Maximum monthly Mean relative humidity was recorded as 86.73 % in September 2021. Minimum monthly Mean relative humidity was recorded as 17.03 % in April 2022. The relative humidity figures show that the area is warm & humid.

Month	Year	M max (%)	Year	M min (%)
January	2022	72.3	2016	29.69
February	2022	60.88	2016	24.7
March	2020	55.76	2018	23.14
April	2015	40.98	2022	17.03
May	2023	38.71	2024	18.45
June	2023	49.62	2019	27.15
July	2023	75.91	2019	56.04
August	2024	84.18	2017	65.38
September	2021	86.73	2015	48.62
October	2021	70.83	2020	34.21
November	2022	60.93	2016	27.03
December	2021	57.91	2016	26.84

Table 50. Relative humidity.

(Source: NASA/POWER Source Native Resolution, MERRA-2 <https://power.larc.nasa.gov/data-access-viewer/>)

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

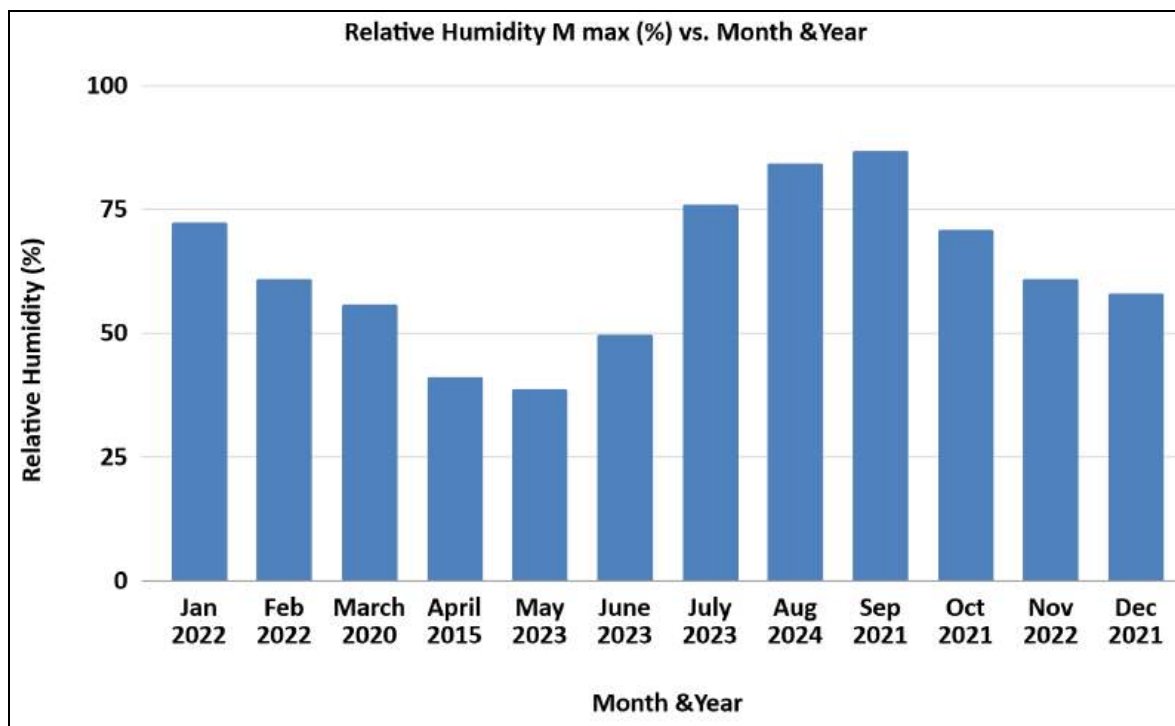


Figure 25. Graphs showing maximum relative humidity

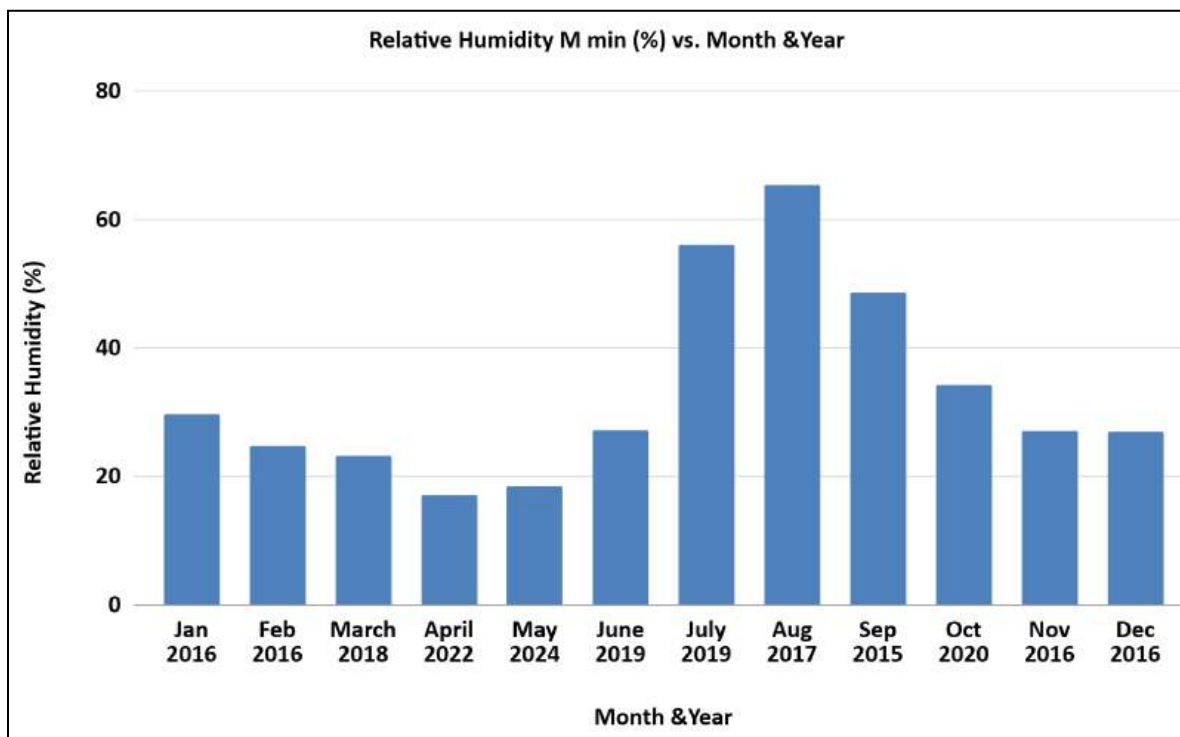


Figure 26. Graphs showing minimum relative humidity

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.4.4. Rainfall

The maximum rainfall was recorded in July (up to 370.14 mm) in 2024. July to September receives maximum rainfall.

Month	Year	M max (mm/h)	Year	M min (mm/h)
January	2022	86.6	2016	0.02
February	2019	23.01	2023	0.00
March	2015	84.4	2022	0.00
April	2015	36.23	2016	0.05
May	2021	107.3	2024	0.43
June	2017	150.39	2019	12.70
July	2021	370.14	2017	119.86
August	2024	263.78	2022	65.10
September	2021	252.02	2020	25.44
October	2022	95.66	2017,2020	0.00
November	2019	14.2	2016	0.00
December	2024	31.6	2016	0.00

Table 51. Rainfall data

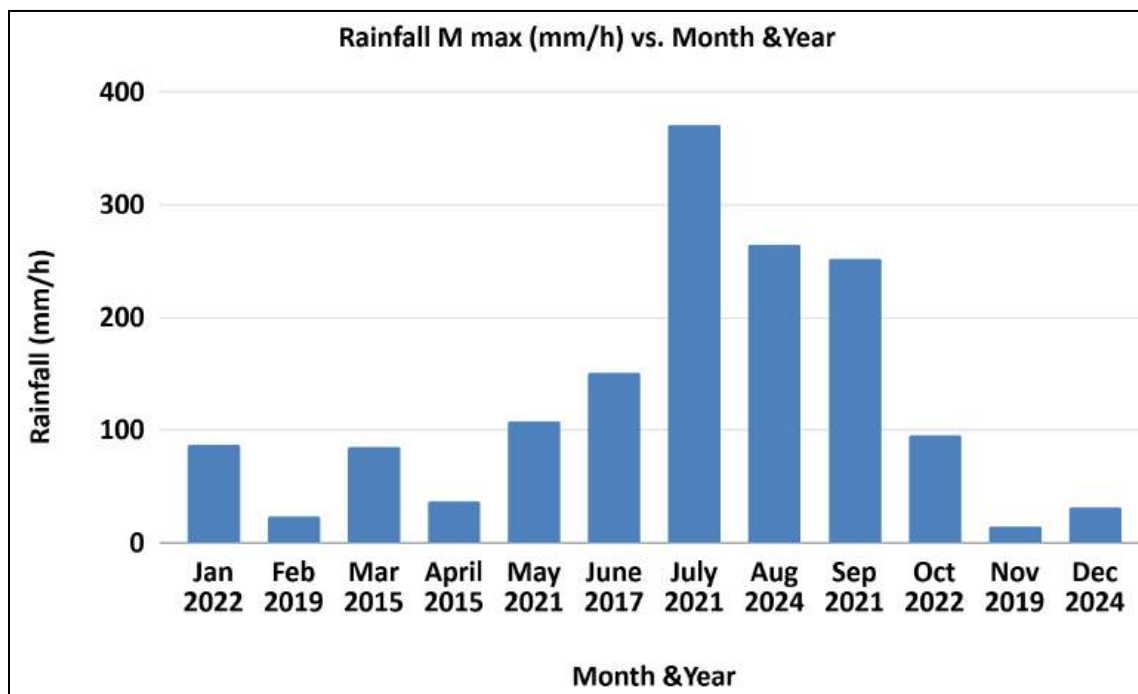


Figure 27. Graph showing maximum rainfall

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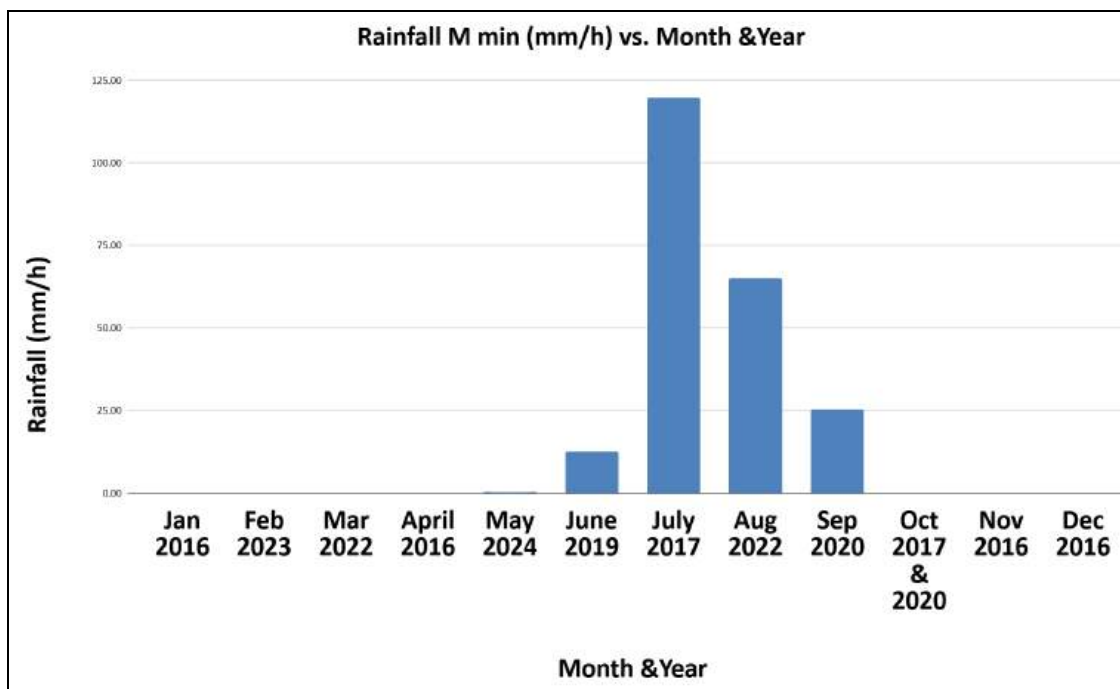


Figure 28. Graph showing maximum wind speed

3.4.5. Wind Speed

Maximum wind speed normally is in June 2024 i.e. 4.25 m/sec and minimum in September 2020 i.e. 2.2 m/sec.

Month	Year	M max (m/sec)	Year	M min (m/sec)
January	2019	2.98	2024	2.11
February	2020	3.26	2021	2.5
March	2021	3.27	2023	2.36
April	2017	3.73	2015	2.59
May	2019	3.73	2018	2.78
June	2024	4.25	2021	2.67
July	2015	3.23	2016	2.32
August	2023	3.2	2021	2.46
September	2021	3.15	2020	2.2
October	2016	2.64	2018	2.08
November	2016	2.85	2023	2.09
December	2020	2.99	2023	2.22

Table 52. Wind speed details

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.4.6. Wind Direction

Month	Year	M max (°C)	Year	M min (°C)
January	2020	347.7	2015	289.5
February	2020	353.2	2022	16.1
March	2023	339.1	2015	285.2
April	2019	330.6	2015	229.7
May	2018	324	2021	22.7
June	2021	325.4	2016	225.1
July	2018	275.4	2022	114.7
August	2024	269.6	2019	87
September	2018	325.4	2022	43.3
October	2023	355.1	2019	3
November	2019	341.3	2023	10.5
December	2023	337.2	2021	0.8

Table 53. Wind Direction

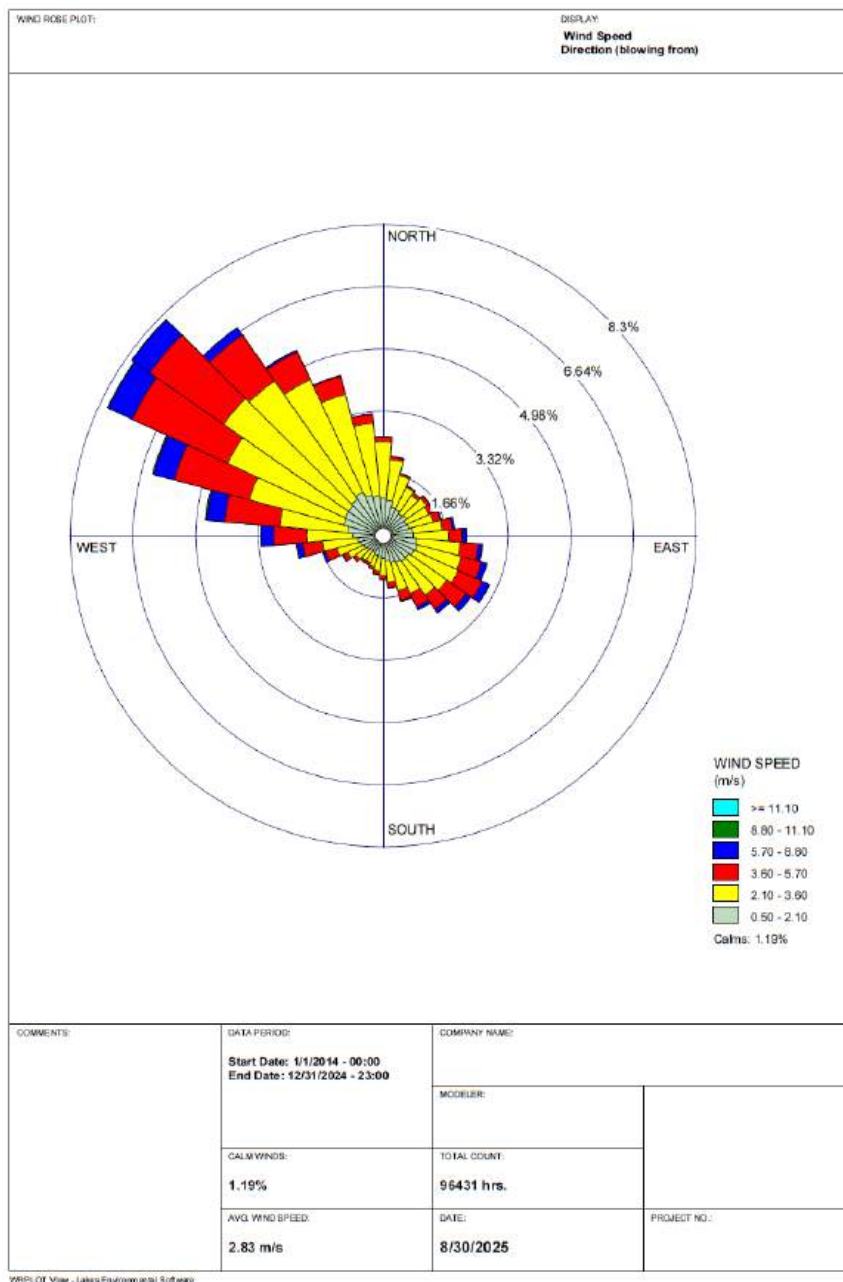
(Source: NASA/POWER Source Native Resolution, MERRA-2 <https://power.larc.nasa.gov/data-access-viewer/>)

The season wise predominant wind directions are given below:

Winter : NW and SE
 Summer : NW and SE
 Post Monsoon : NW and SE

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ANNUAL WIND ROSE DIAGRAM



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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Figure 29. Annual Windrose

WINTER WIND ROSE DIAGRAM

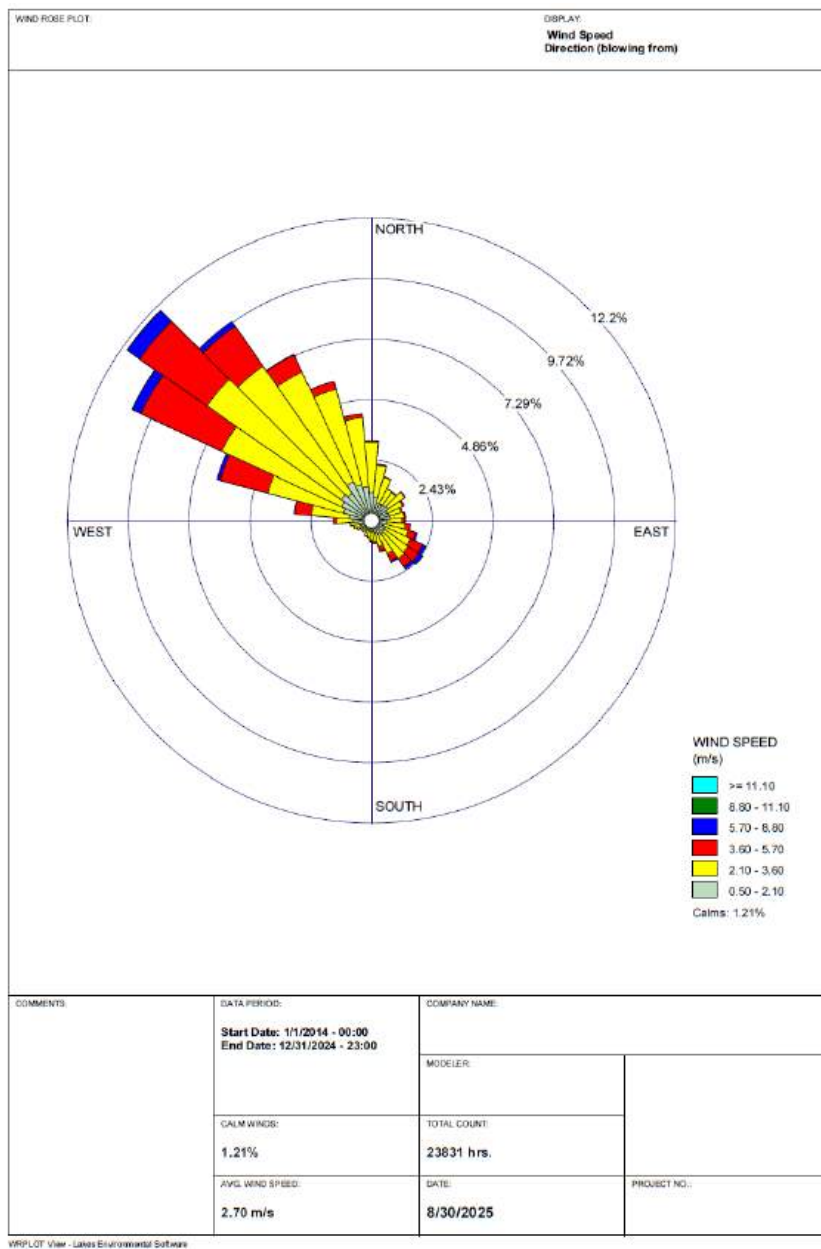


Figure 30. Winter Windrose

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SUMMER WIND ROSE DIAGRAM

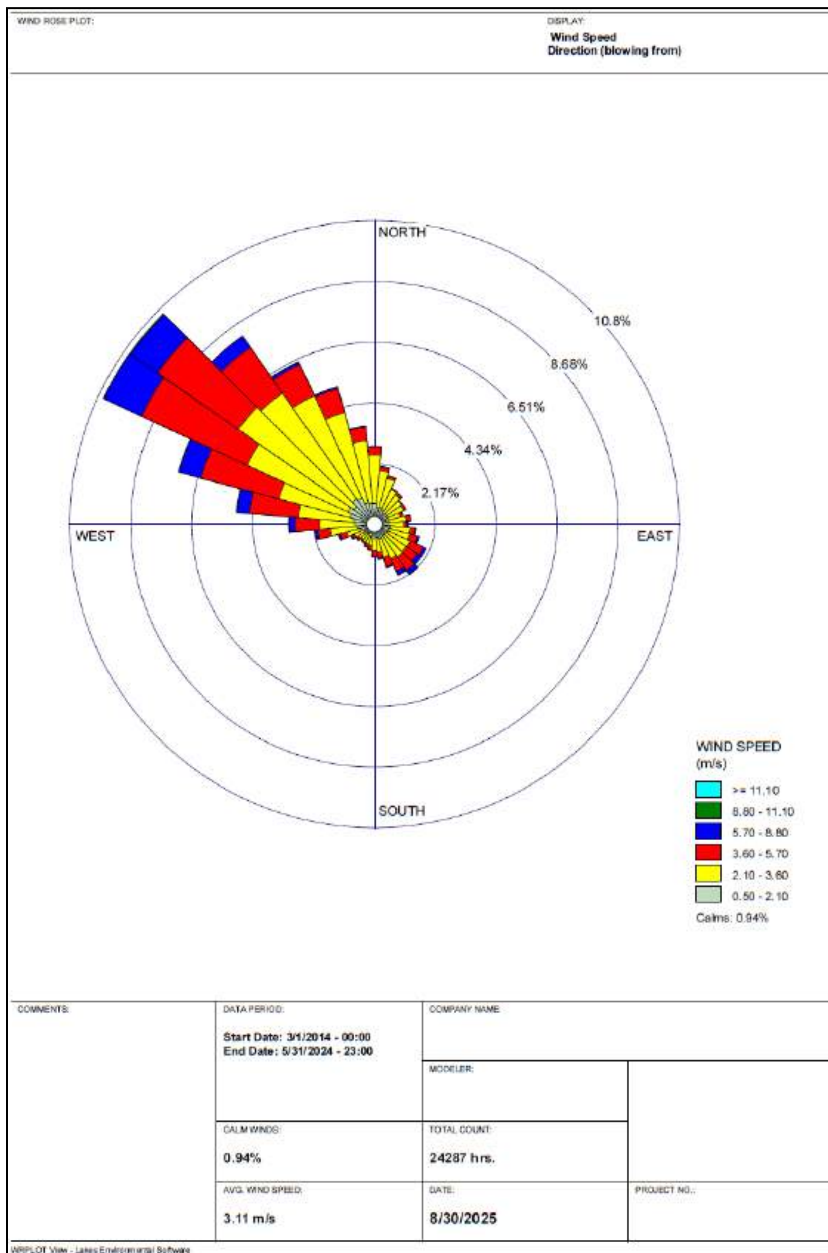


Figure 31. Summer Windrose

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"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

POST MONSOON WIND ROSE DIAGRAM

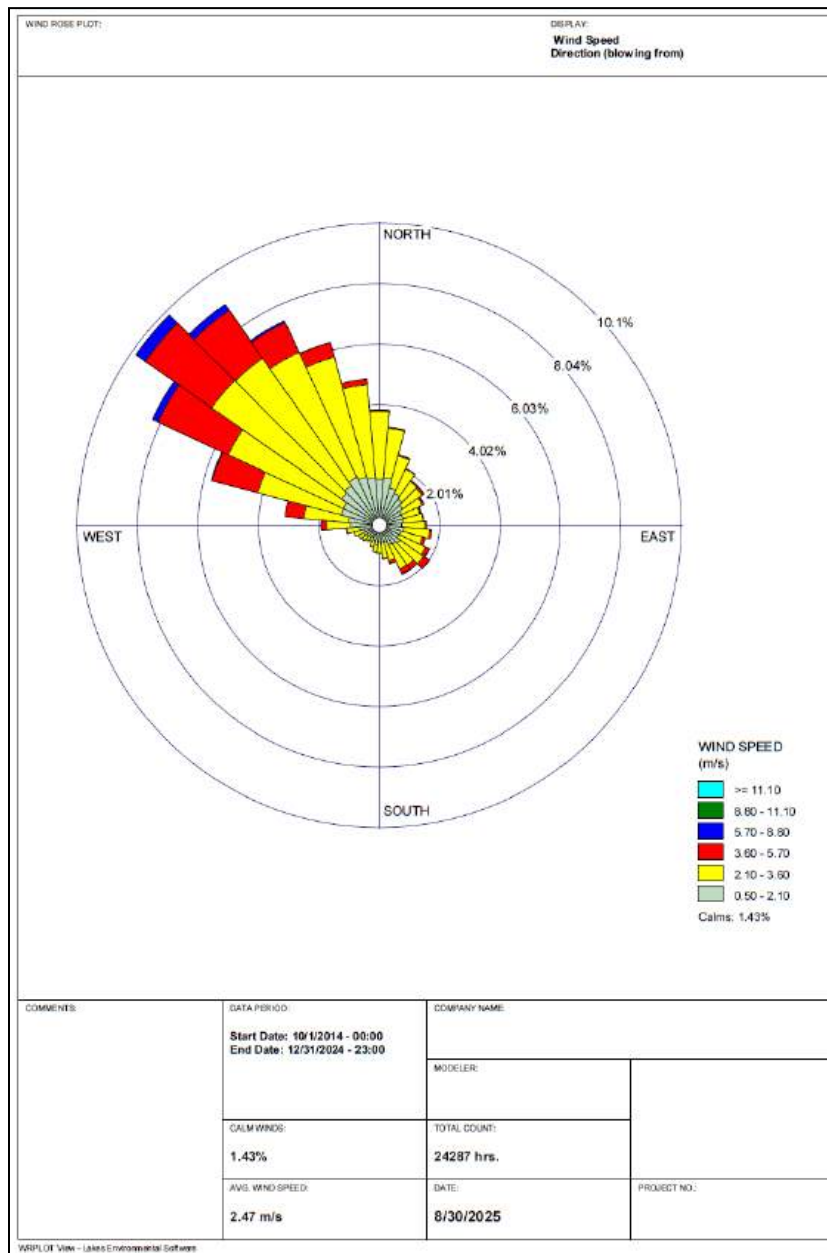


Figure 32. Post Monsoon Windrose

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

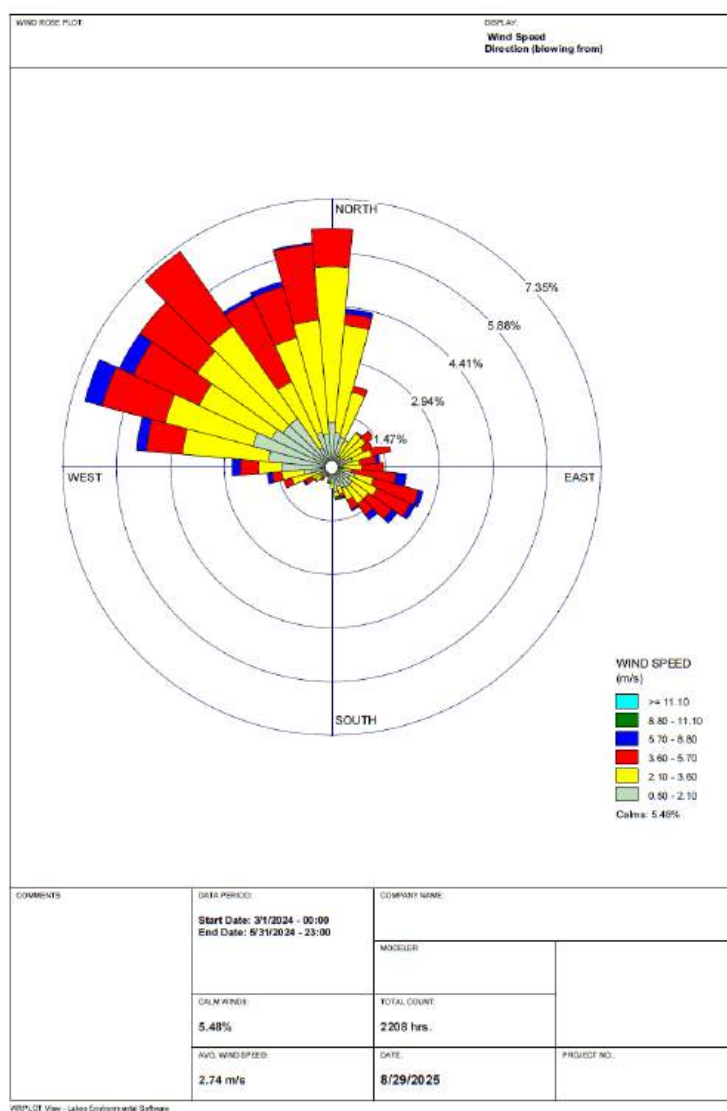
3.5 Micro-Meteorological Data

A weather station was installed near the site for hourly monitoring of temperature, humidity, wind speed & wind direction for the month of March 2024- May 2024. Average data is given below:

Table 55. Micro Meteorological Data

Month	Temperature(oC)			Relative Humidity (%)			Wind speed (m/sec)			Solar Radiation (W/m2)		
	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
March 2024	38.59	13	25	84.15	5.36	23.00	8.94	0.00	2.57	1018.30	0.00	261.15
April 2024	40.71	22	32	41.85	4.43	15.96	10.25	0.01	2.80	1076.95	0.00	299.93
May 2024	46.82	24	37	56.90	4.17	16.64	7.20	0.00	2.89	1076.76	0.00	342.72

Table 54.



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Figure 33. Windrose for Micro Meteorological Data

3.6 Ambient Air Quality

The ambient air quality monitoring was done to assess the ambient air quality. Monitoring was carried out at Twelve stations for the period of March 2024 - May 2024. A comparison between baseline data collected during Dec 2017 to Feb 2018 & March to May 2024 is also provided.

3.6.1 Sampling Station Selection and rationale of pollutant measurement

Selection of sampling stations was done as per IS 5182 (P-14) 2000 and guideline of CPCB NAAQS, 2009.

Criteria for site selections:

The selection of the ambient air quality monitoring sites in the core zone and buffer zone (around the project area) was based on screening the region for such important factors as meteorological conditions, sensitive environmental locations, human settlement and the surrounding geographical features.

- The meteorological features considered were wind speed and direction.
- Environmental sensitivity was considered with regards to the proximity and density of human settlements to the project site and location of such sensitive places as schools and hospitals around the project site.

The desktop study was conducted to critically analyze the above factors using wind rose map, topographical map, and land use map to check for the correct representation of the locations around the project site.

Based on the above factors, the location of Air sampling stations at Twelve stations for the period of March 2024 - May 2024 monitoring season is shown below:

3.6.2. Ambient Air Sampling Locations

Quality assurance during pre sampling and post sampling period:

Prior to conducting sampling and following post sampling protocols, all the performance checks were followed to avoid sampling bias and measurement errors.

- The equipment was checked for any leakage, flow rate calibration, dust free filter holders, appropriate pre-sampling processing of filter papers and their handling.
- The filter papers were desiccated for 24 hours both prior and post sampling to remove any moisture content. These were handled with non-serrated forceps to prevent any wear and tear.
- The filter papers were transported in air- tight zipper bags to prevent any contamination.
- The absorption solutions were transferred in cold boxes to prevent contamination and exposure to sunlight.

Sampling instrument placement: The standard guidelines were followed while placing the sampler at the sampling locations (IS 5182 (Part 14): 2000).

- The sampler was kept at greater than 3 m height to avoid the impact of windblown dust.
- The samplers were maintained at >20 m distance from trees and more than twice the height of the hindrances such as buildings and other structures to ensure unrestricted airflow for sampling.

3.6.3. Sampling Procedure

Respirable Dust Samplers were used to collect samples for PM₁₀ and PM_{2.5} in ambient air at a flow rate of 1.2 m³ /min. Fine Particulate Samplers were used to collect samples for PM_{2.5} in ambient air at a flow rate of 16.67 L/min. The ambient air was sucked through the cyclone and filter paper by a blower. Samples of gases were drawn at a flow rate of 0.5 liters per minute and were analysed in the laboratory.

Monitoring was conducted in respect of the following parameters:

- Particulate Matter (PM₁₀)
- Particulate Matter (PM_{2.5})
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen (NO_x)
- Carbon Monoxide (CO)

This procedure was adopted because there are no short-term variations and low concentration of gaseous pollutants was expected.

3.6.4. Analytical Methods Followed for Ambient Air Quality Monitoring

- **Particulate Matter (PM_{2.5}) (USEPA Quality Assurance HandBook (Vol.II) Part II, Quality Assurance Guideline Document, 2.12):** Particulate Matter (PM_{2.5}) was analyzed by the Gravimetric Method. Particulate matter was collected on the 37 mm diameter glass microfiber Filter Paper. PM_{2.5} value is determined from the values of the volume of air passed through the Ambient Fine Dust Sampler.
- **Particulate Matter (PM₁₀) (IS: 5182 Part 23:2006):** Particulate Matter (PM₁₀) was analyzed by the Gravimetric Method. It was carried out by the Respirable Dust sampler as per IS: 5182(Part 23):2006. Particulate matter was collected on the GF/A Filter Paper. Particles with aerodynamics diameter less than the cut-point of the inlet are collected by the filter. The mass of these particles is determined by the difference in filter weight prior to and after sampling.
- **Sulphur dioxide (SO₂) (IS: 5182; Part – II – 2001):** Sulphur dioxide is absorbed by aspirating a measured air sample through a solution of Potassium or sodium tetrachloromercurate, TCM. This procedure results in the formation of a dichloro sulphite mercurate complex. The Sulphite Ion produced during sampling is reacted with sulphamic acid, formaldehyde

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and pararosaniline to form an azo dye and then determined colorimetrically. To avoid impact from road dust, the equipment was kept at a minimum distance of 50m from paved roads and 100 m from unpaved roads.

- **Nitrogen Oxides (IS: 5182; Part – VI – 2006):** Nitrogen dioxide is collected by bubbling air through a sodium hydroxide- sodium arsenite solution to form a stable solution of sodium Nitrite. The Nitrite Ion produced during sampling is reacted with hydrogen peroxide, Sulphanilamide and NEDA to form an azodye and then determined colorimetrically.
- **Carbon monoxide (CO) (IS:5182; Part -10-1999):** Samples containing Carbon monoxide in the range of 0 to 100 mg/m³ are analyzed on a non-dispersive infrared absorption gas analyser, namely, an electro-optical spectrophotometer with no spectral dispersion component. It may consist of a single or double source of infrared energy and one or more infrared detectors separated by an optical cell or cells to one or more of which the sample flows, whereby the specific spectral absorption of the component of interest is determined.

3.6.5. Ambient Air Quality sampling locations

Monitoring Station	Location	Distance & Direction	Criteria for Selection
AAQMS 1	Project Site	-	-
AAQMS 2	Tughlaqabad	240 m, SW	Archeological Site, Upwind
AAQMS 3	Badarpur Extension	1.60 Km, E	Downwind
AAQMS 4	Okhla Phase-1	1.80 Km, N	Critically Polluted Area/ Industrial Zone, Upwind
AAQMS 5	Badarpur Village	2.04 Km, ESE	Residential Zone
AAQMS 6	Dayal Bagh	2.05 Km, SE	Downwind
AAQMS 7	Okhla Phase-2	2.95 Km, N	Critically Polluted Area/Industrial Zone, Upwind
AAQMS 8	Jasola Vihar	4.42 Km, NNE	Eco Sensitive Zone
AAQMS 9	Sukhdev Vihar	5.30 Km, N	Residential Zone
AAQMS 10	Asola Wildlife Sanctuary	6.15 Km, SW	Wildlife Sanctuary
AAQMS 11	Tilpat Village	7.08 Km, SE	Downwind
AAQMS 12	Shahpur Govardhanpur Bangar	8.54 Km, E	Downwind

Table 55. Ambient air quality sampling location

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.6.6. Ambient Air Sampling Locations on 10 Km Topographical Map

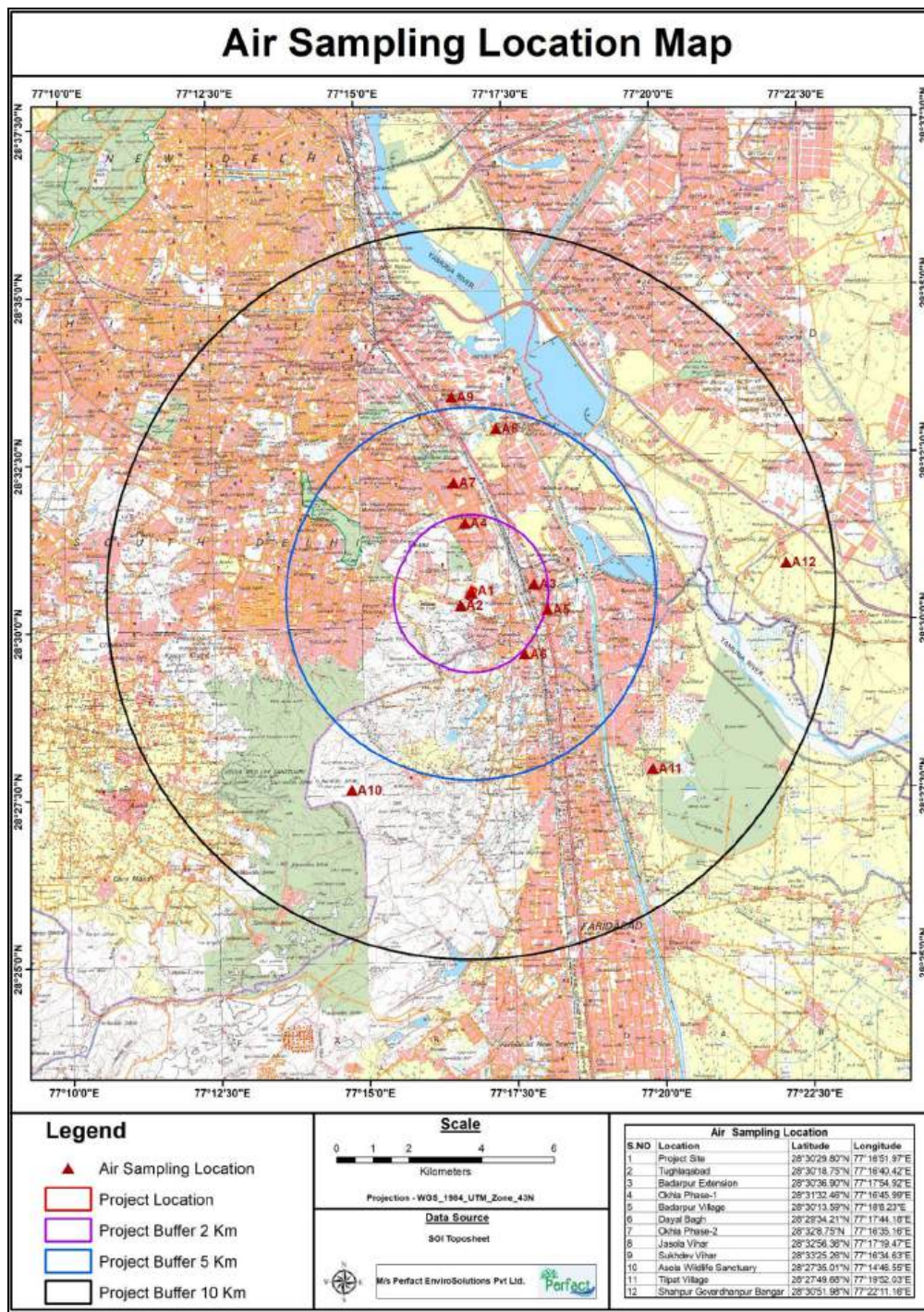


Figure 34. Air Sampling Locations Map

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.6.7. Ambient Air Quality Results

A comparative of Baseline collected in previous EIA i.e. December 2017 to February 2018 (Winter Season) & Current baseline of March to May 2024 (Summer Season) is given below:

Table 57. Ambient Air Quality Results for PM_{2.5} for both baseline seasons

Station Code	Station Name	Distance in km	Direction from Site	PM 2.5 (ug/m ³) -Dec 2017-Feb 2018				PM 2.5 (ug/m ³) - March-May 2024			
				Min	Max	Mean	98th	Min	Max	Mean	98th
AAQMS1	Project Site	0	-	124.4	253.3	176.9	252.1	94	144	121	141
AAQMS2	Tuglakabad Village	240 m	SW	125.4	165.2	144.5	165.2	78	120	101	117
AAQMS3	Badarpur Extension	1.60 km	East	145.2	220.4	179.4	213.8	95	123	112	123
AAQMS4	Okhla Phase-1	1.80 km	North	128.6	169.8	152.2	169.4	92	129	109	126
AAQMS5	Badarpur Village	2.04 km	ESE	104	165.2	133.4	162.2	94	118	109	118
AAQMS6	DayalBagh Colony	2.05 km	SE	95	169	135.7	168.6	96	148	124	144
AAQMS7	Okhla phase-2	2.95 Km	North	112.8	164.8	145.6	164.5	120	141	132	141
AAQMS8	Jasola Vihar	4.42 km	NNE	101.29	164.3	128.3	163.4	107	125	117	125
AAQMS9	Sukhdev Vihar	5.30 Km	North	85.2	130.2	104.5	128.1	97	113	106	113
AAQMS10	Asola Wildlife Sanctuary	6.15 km	SW	132.4	165.4	151.5	164.1	79	93	87	93
AAQMS11	Tilpat Village	7.08 km	SE	125.4	168.4	146.3	166.6	85	99	93	99
AAQMS12	Shahpur Govardhan pur Bangar	8.54 km	East	125.4	175.2	144.1	174.8	76	89	84	89

Table 56.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

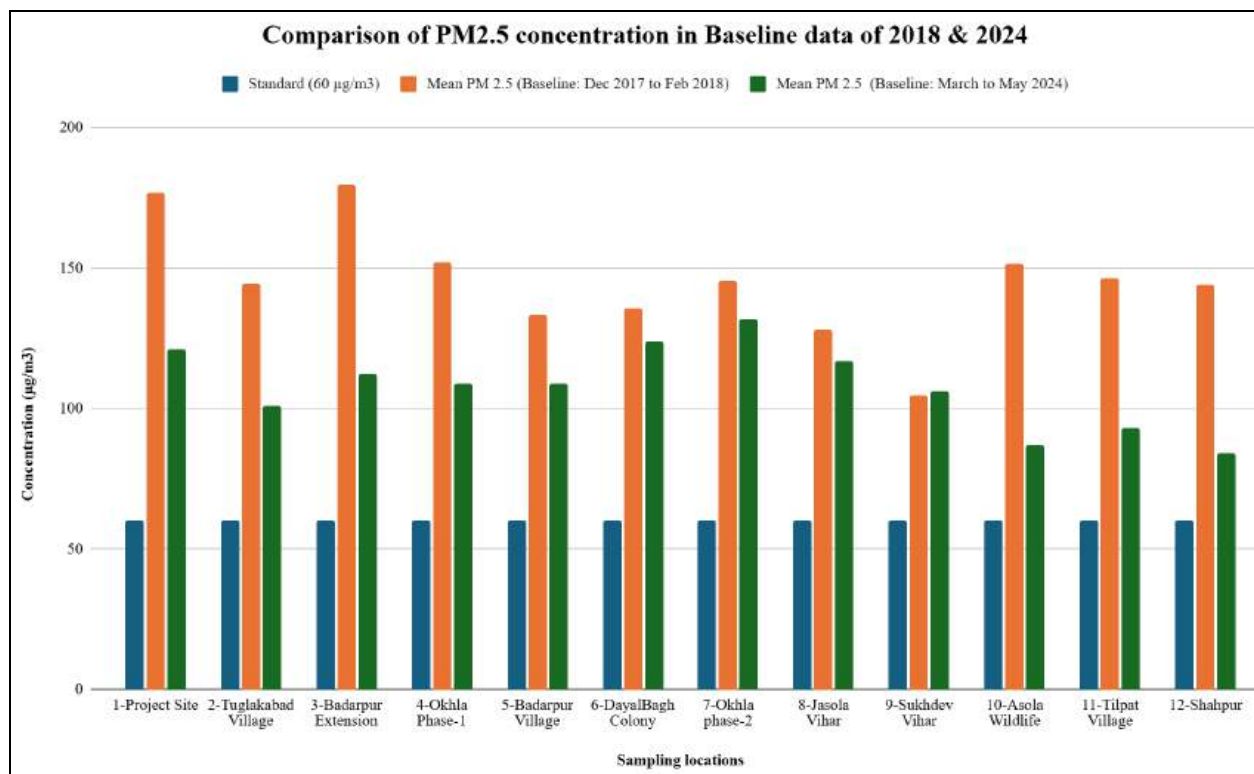


Figure 35. Comparison of PM2.5 concentration in Baseline of 2021 & 2024

Station Code	Station Name	Distance in km	Direction from Site	PM 10 (ug/m³) - Dec 2017- Feb 2018				PM 10 (ug/m³) - March-May 2024			
				Min	Max	Mean	98th	Min	Max	Mean	98th
AAQMS1	Project Site	0	-	334.5	452.4	386.7	445.7	134	206	173	201
AAQMS2	Tuglakabad Village	240 m	SW	294.5	345.5	323.4	344.1	115	176	148	172
AAQMS3	Badarpur Extension	1.60 km	East	212.4	284.5	246.2	275.7	114	148	135	148
AAQMS4	Okhla Phase-1	1.80 km	North	344.7	428.7	391.4	428.6	127	196	165	191
AAQMS5	Badarpur Village	2.04 km	ESE	234.4	286.4	251.1	285.4	111	139	128	139
AAQMS6	DayalBagh Colony	2.05 km	SE	189	374	282.2	368.7	134	205	173	200
AAQMS7	Okhla phase-2	2.95 Km	North	326.2	436.4	380.8	431.6	177	207	194	207
AAQMS8	Jasola Vihar	4.42 km	NNE	285.7	395.4	342.4	388	134	156	147	156
AAQMS9	Sukhdev Vihar	5.30 Km	North	268.5	385.4	327.9	382.3	127	149	139	149

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Station Code	Station Name	Distance in km	Direction from Site	PM 10 (ug/m ³) - Dec 2017- Feb 2018				PM 10 (ug/m ³) - March-May 2024			
				Min	Max	Mean	98th	Min	Max	Mean	98th
AAQMS10	Asola Wildlife	6.15 km	SW	292.6	395.4	339.9	391	99	116	109	116
AAQMS11	Tilpat Village	7.08 km	SE	295.8	395.4	344.7	387.2	121	141	132	141
AAQMS12	Shahpur	8.54 km	East	217.4	395.4	284.6	392.8	95	112	104	112

Table 57. Ambient Air Quality Results for PM10 for both baseline seasons

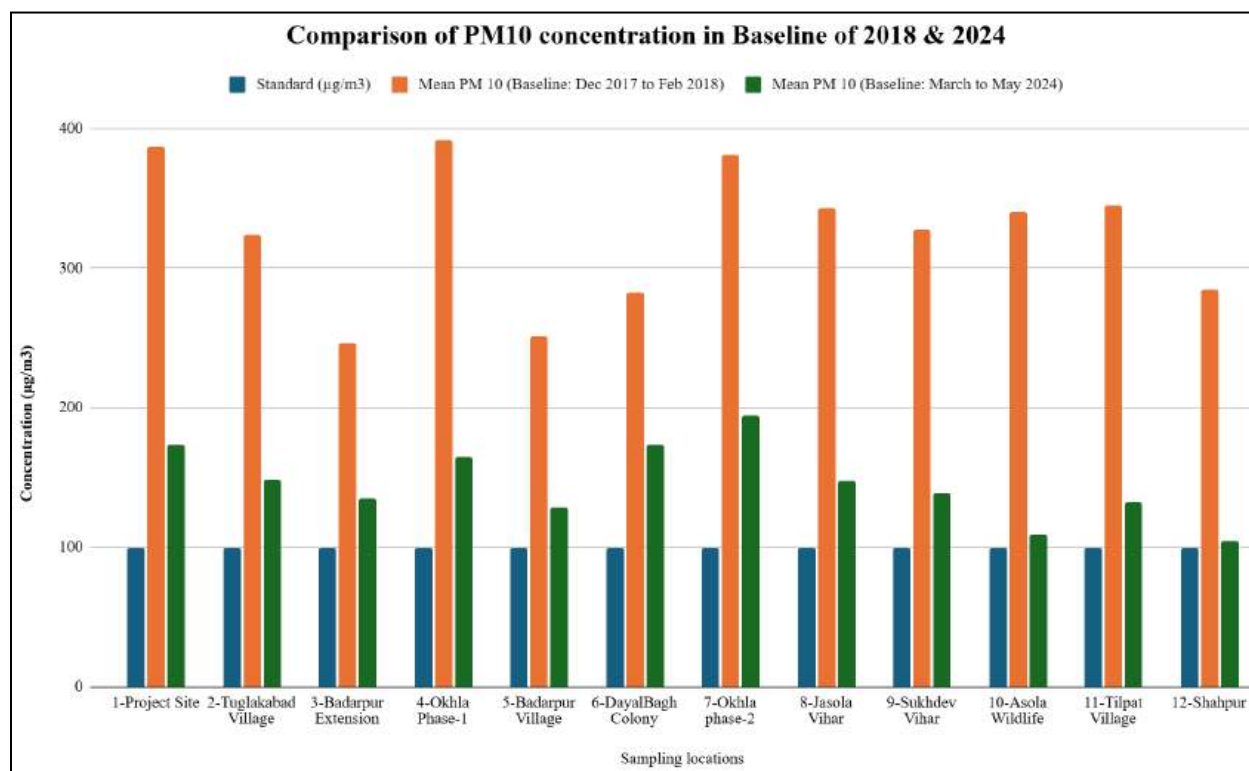


Figure 36. Comparison of PM 10 concentration in Baseline of 2021 & 2024

Station Code	Station Name	Distance in km	Direction from Site	SO ₂ (ug/m ³) - Dec 2017- Feb 2018				SO ₂ (ug/m ³) -March-May 2024			
				Min	Max	Mean	98th	Min	Max	Mean	98th
AAQMS1	Project Site	0	-	13.6	23.4	17.7	23	12	19	15	19
AAQMS2	Tuglakabad Village	240 m	SW	8.2	17.4	11.1	16.5	13	18	15	18
AAQMS3	Badarpur Extension	1.60 km	East	7.4	12.3	9.1	12.2	11	18	14	17
AAQMS4	Okhla	1.80 km	North	12.8	22.5	16.9	22.1	12	18	14	18

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

	Phase-1										
AAQMS5	Badarpur Village	2.04 km	ESE	7.1	12.3	9.8	12.3	12	19	14	18
AAQMS6	DayalBagh Colony	2.05 km	SE	8.3	14.5	10.5	14	11	19	16	19
AAQMS7	Okhla phase-2	2.95 Km	North	6.5	14.8	8.9	13.7	10	16	13	16
AAQMS8	Jasola Vihar	4.42 km	NNE	6.5	11.8	8.5	11.3	16	26	21	26
AAQMS9	Sukhdev Vihar	5.30 Km	North	3.4	9.8	6	9.6	13	21	17	21
AAQMS10	Asola Wildlife	6.15 km	SW	6.4	10.2	8.1	10	15	24	19	24
AAQMS11	Tilpat Village	7.08 km	SE	3.9	10.5	6.8	10.1	12	20	16	20
AAQMS12	Shahpur	8.54 km	East	5.9	9.8	7.5	9.6	10	16	13	16

Table 58. Ambient Air Quality Results for SO₂ for both baseline seasons

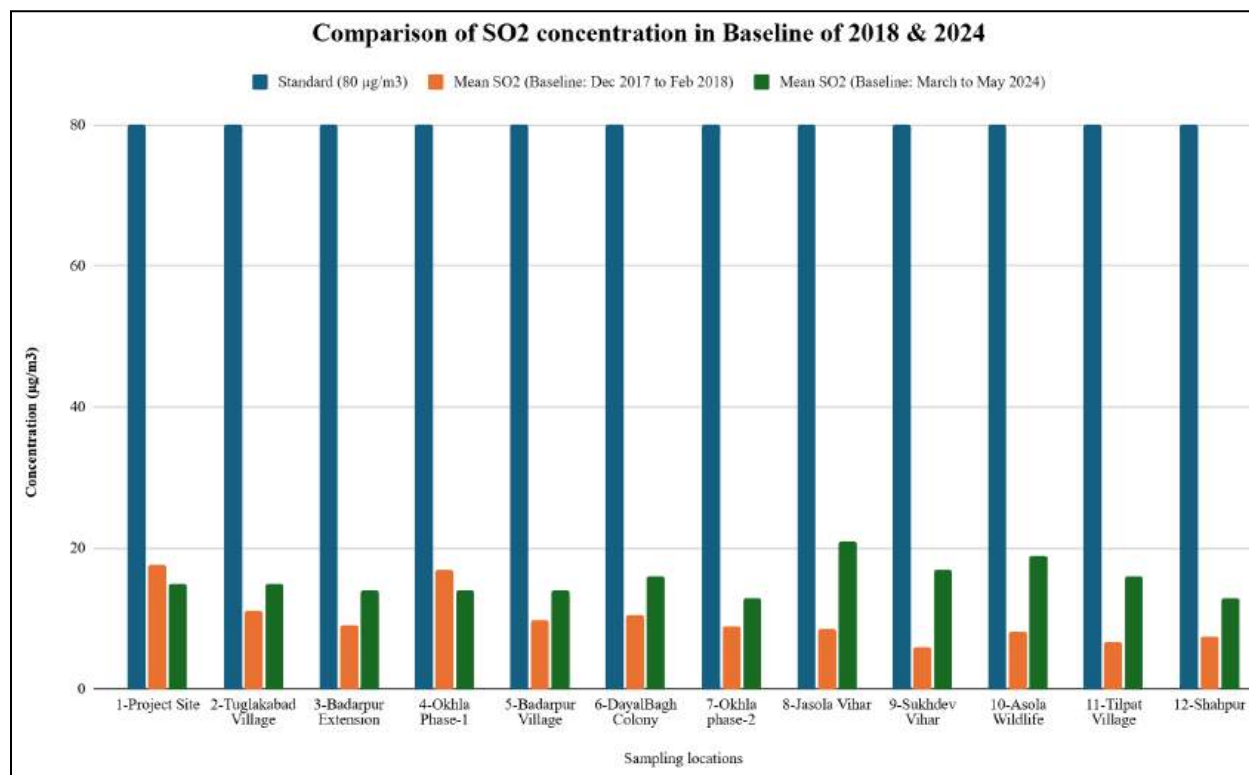


Figure 37. Comparison of SO₂ concentration in Baseline of 2021 & 2024

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Station Code	Station Name	Distance in km	Direction from Site	NO2 (ug/m ³) - Dec 2017- Feb 2018				NO2 (ug/m ³) - March-May 2024			
				Min	Max	Mean	98th	Min	Max	Mean	98th
AAQMS1	Project Site	0	-	43.7	89.1	66.7	88.5	115	165	136	162
AAQMS2	Tuglakabad Village	240 m	SW	23.5	43.5	31.2	41.6	97	150	126	146
AAQMS3	Badarpur Extension	1.60 km	East	26.4	38.6	31.4	37.6	68	89	81	89
AAQMS4	Okhla Phase-1	1.80 km	North	40.6	89.6	64.7	87.4	109	157	130	154
AAQMS5	Badarpur Village	2.04 km	ESE	15.8	31.4	23.1	31.3	82	103	95	103
AAQMS6	DayalBagh Colony	2.05 km	SE	23.2	41.1	30.8	39.6	99	177	142	176
AAQMS7	Okhla phase-2	2.95 Km	North	19.6	40.2	30.4	39.4	106	124	116	124
AAQMS8	Jasola Vihar	4.42 km	NNE	24.5	36.8	30.6	36.8	100	117	110	117
AAQMS9	Sukhdev Vihar	5.30 Km	North	16.8	34.8	26.3	34.5	82	96	90	96
AAQMS10	Asola Wildlife	6.15 km	SW	24.8	45.8	35.1	45.7	65	77	72	77
AAQMS11	Tilpat Village	7.08 km	SE	24.2	42.1	32.6	40.6	74	86	81	86
AAQMS12	Shahpur	8.54 km	East	17.9	36.5	26.7	36.1	55	65	61	65

Table 59. Ambient Air Quality Results for NO2 for both baseline seasons

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

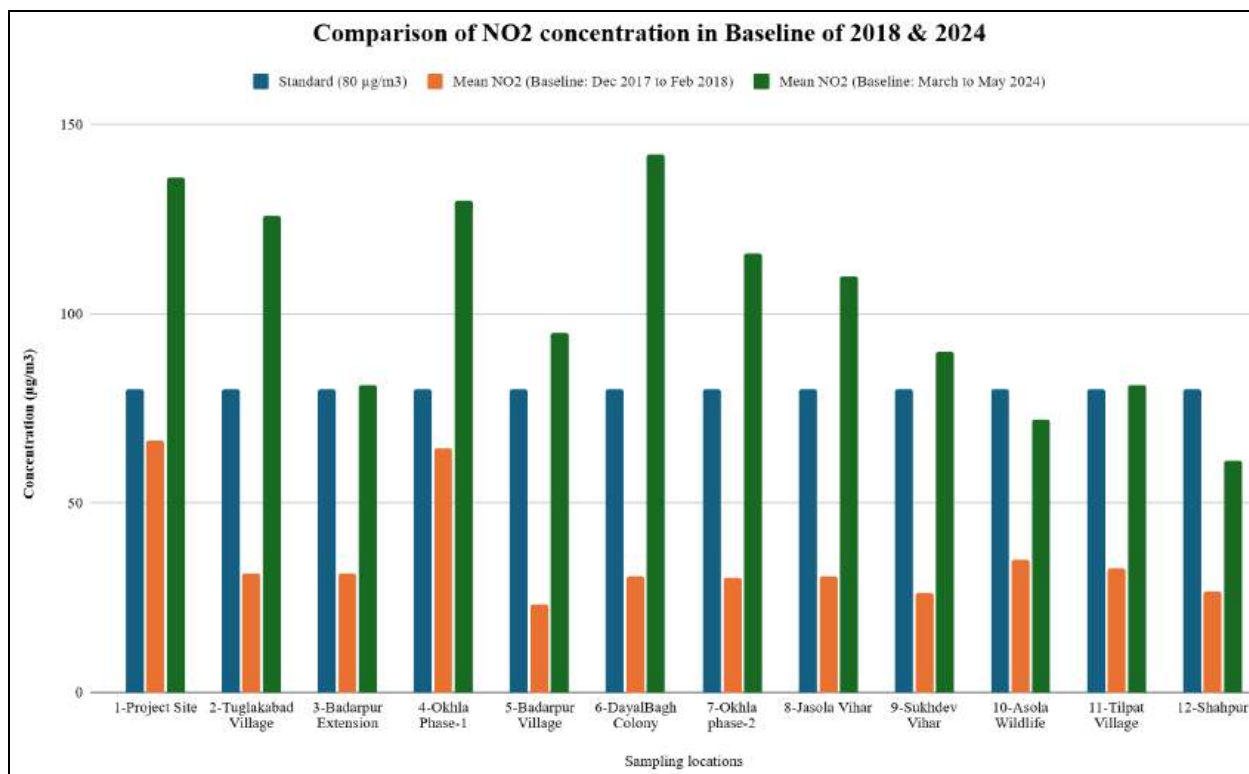


Figure 38. Comparison of NO₂ concentration in Baseline of 2021 & 2024

Station Code	Station Name	Distance in km	Direction from Site	CO (mg/m ³) - Dec 2017-Feb 2018				CO (mg/m ³) -March-May 2024			
				Min	Max	Mean	98th	Min	Max	Mean	98th
AAQMS1	Project Site	0	-	1.33	2.55	1.99	2.49	0.59	0.94	0.76	0.93
AAQMS2	Tuglakabad Village	240 m	SW	0.82	1.21	0.94	1.17	0.59	0.94	0.76	0.89
AAQMS3	Badarpur Extension	1.60 km	East	1.87	3.20	2.44	3.10	0.52	0.85	0.72	0.84
AAQMS4	Okhla Phase-1	1.80 km	North	1.50	2.65	2.06	2.60	0.49	0.89	0.69	0.88
AAQMS5	Badarpur Village	2.04 km	ESE	1.68	2.66	2.11	2.61	0.58	0.86	0.73	0.85
AAQMS6	DayalBagh Colony	2.05 km	SE	0.87	1.36	1.05	1.35	0.55	0.86	0.66	0.81
AAQMS7	Okhla	2.95 Km	North	0.76	3.58	2.31	3.38	0.54	0.83	0.7	0.82

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

	phase-2										
AAQMS8	Jasola Vihar	4.42 km	NNE	0.95	1.38	1.25	1.37	0.49	0.75	0.63	0.74
AAQMS9	Sukhdev Vihar	5.30 Km	North	0.88	1.32	1.08	1.32	0.6	0.93	0.79	0.92
AAQMS10	Asola Wildlife	6.15 km	SW	0.87	2.47	1.54	2.42	0.51	0.78	0.66	0.77
AAQMS11	Tilpat Village	7.08 km	SE	0.85	1.26	0.99	1.25	0.41	0.63	0.53	0.62
AAQMS12	Shahpur	8.54 km	East	0.79	1.65	1.16	1.60	0.43	0.66	0.56	0.66

Table 60. Ambient Air Quality Results for CO for both baseline seasons

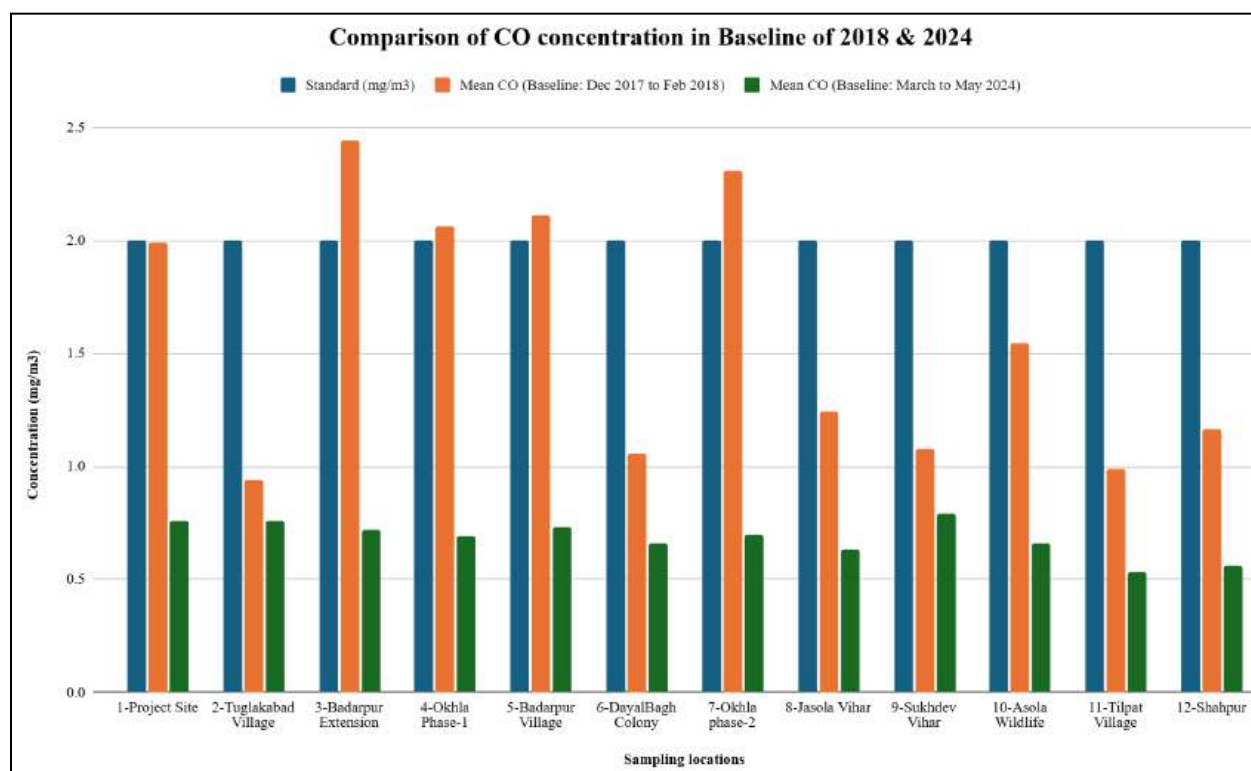


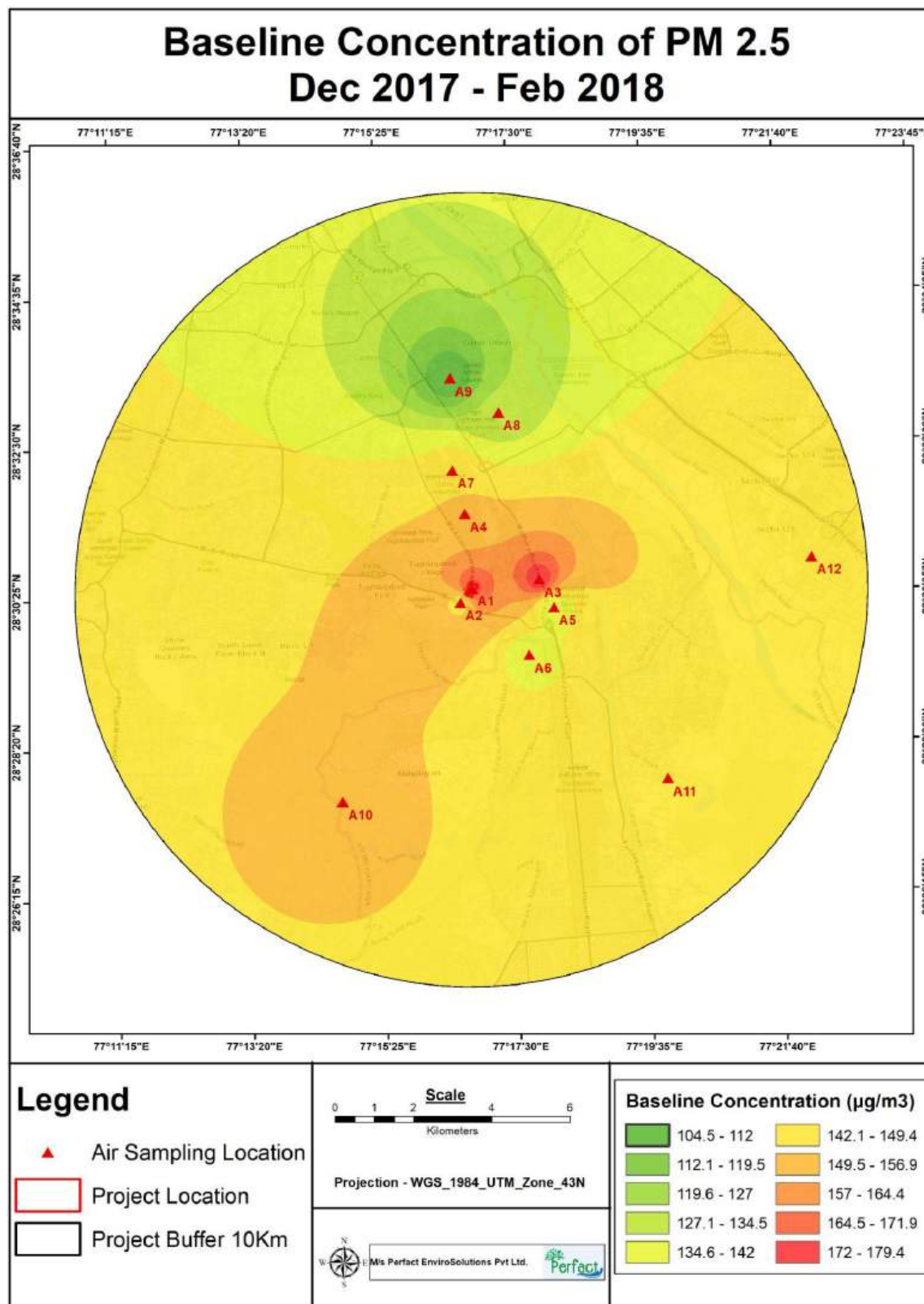
Figure 39. Comparison of CO concentration in Baseline of 2021 & 2024

3.6.8. Inverse Distance Weighted (IDW) Interpolation

The IDW technique computes an average value for unsampled locations where sampling was not possible using values from nearby weighted locations. Below are the maps showing the concentration within the 4 km radius to the project site.

The IDW interpolation has been done for the buffer zone by which the concentration of the ambient air parameters are plotted with respect to the baseline known concentration. The maximum concentration range in the Buffer areas for all the parameters are given below based on IDW Maps.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.



Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Figure 40. Baseline Concentration of PM 2.5 (Dec 2017- Feb 2018)

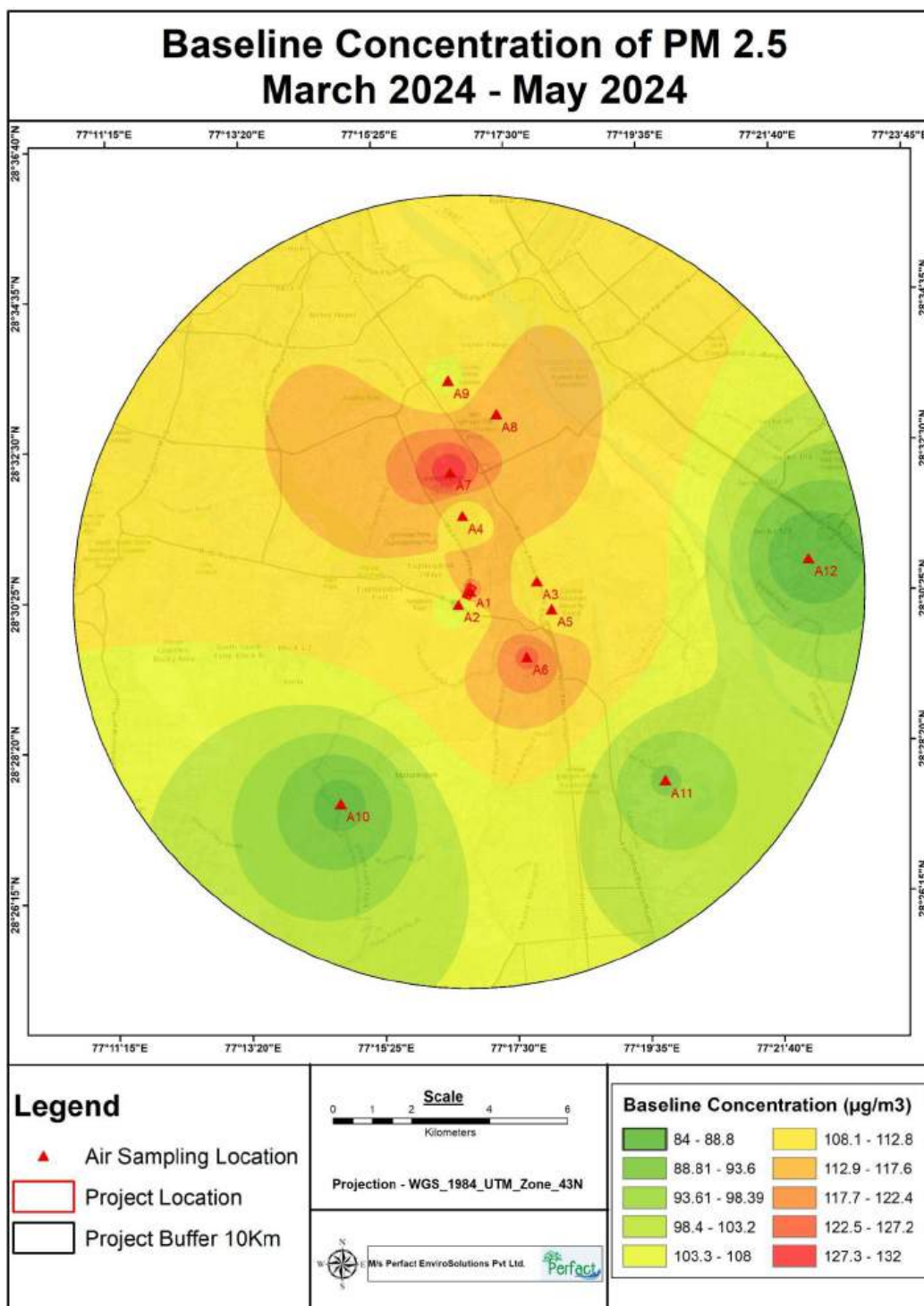


Figure 41. Baseline Concentration of PM 2.5 (March 2024- May 2024)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

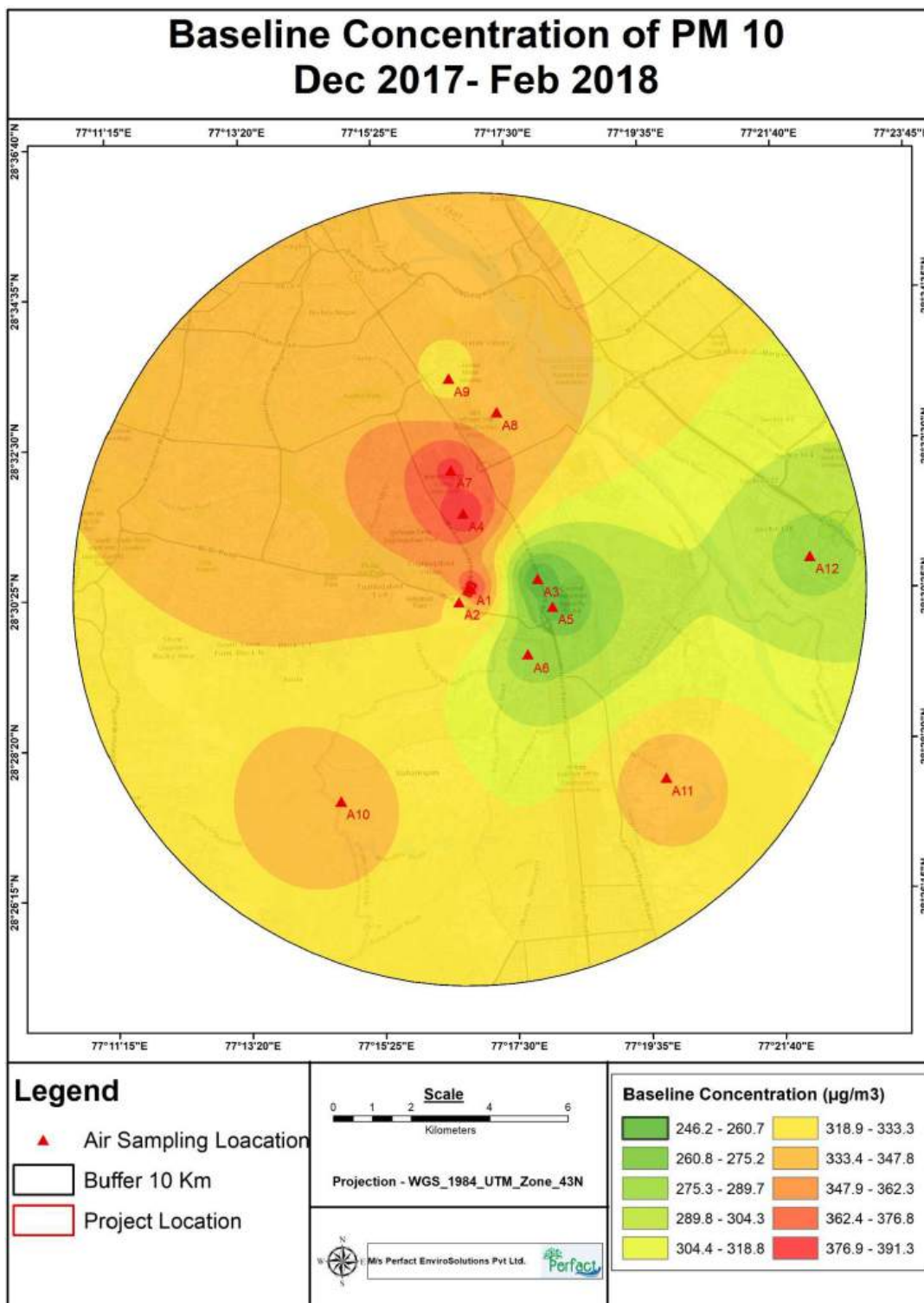


Figure 42. Baseline Concentration of PM 10 (Dec 2017- Feb 2018)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

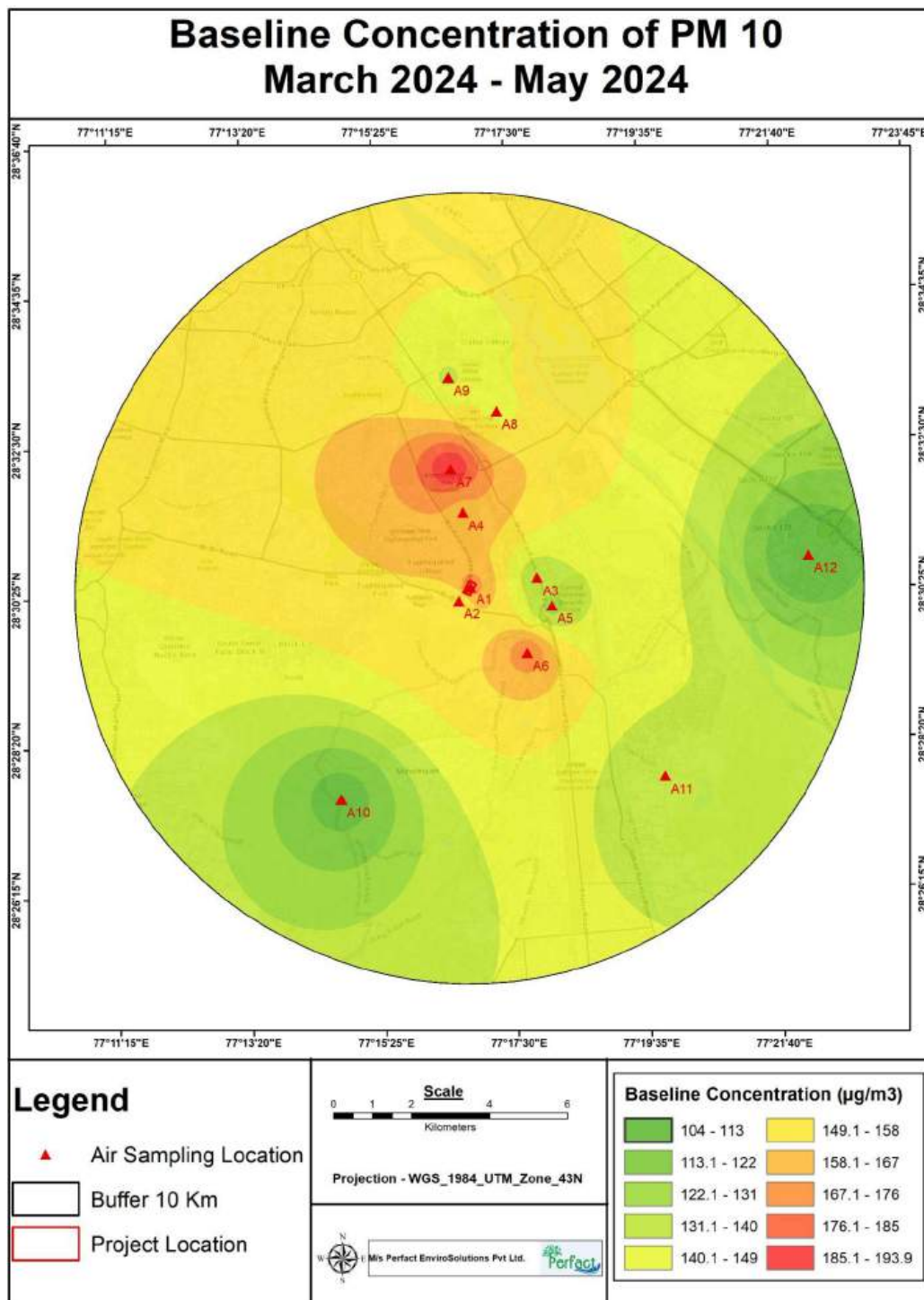


Figure 43. Baseline Concentration of PM 10 (March 2024- May 2024)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

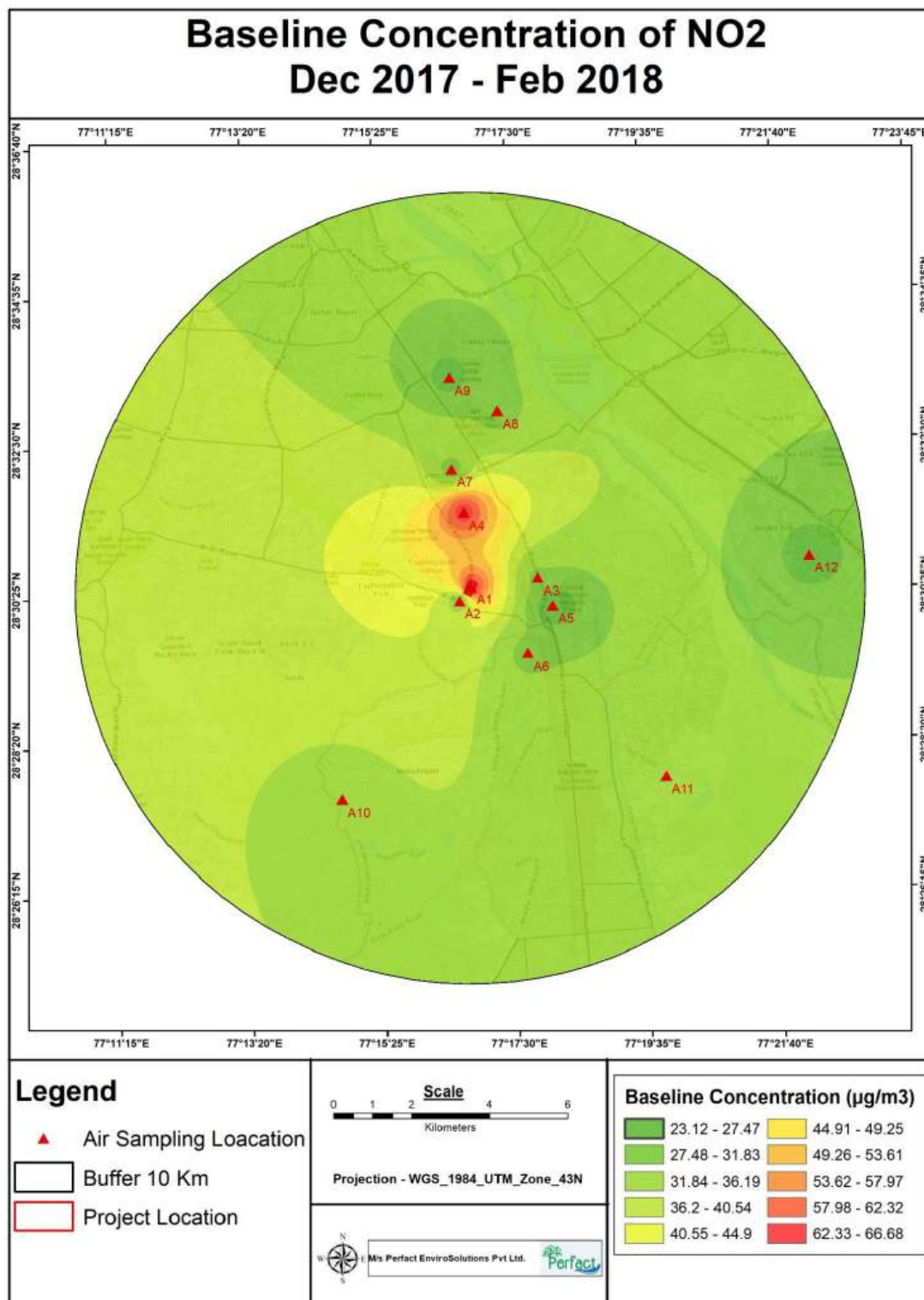


Figure 44. Baseline Concentration of NO₂ (Dec 2017- Feb 2018)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

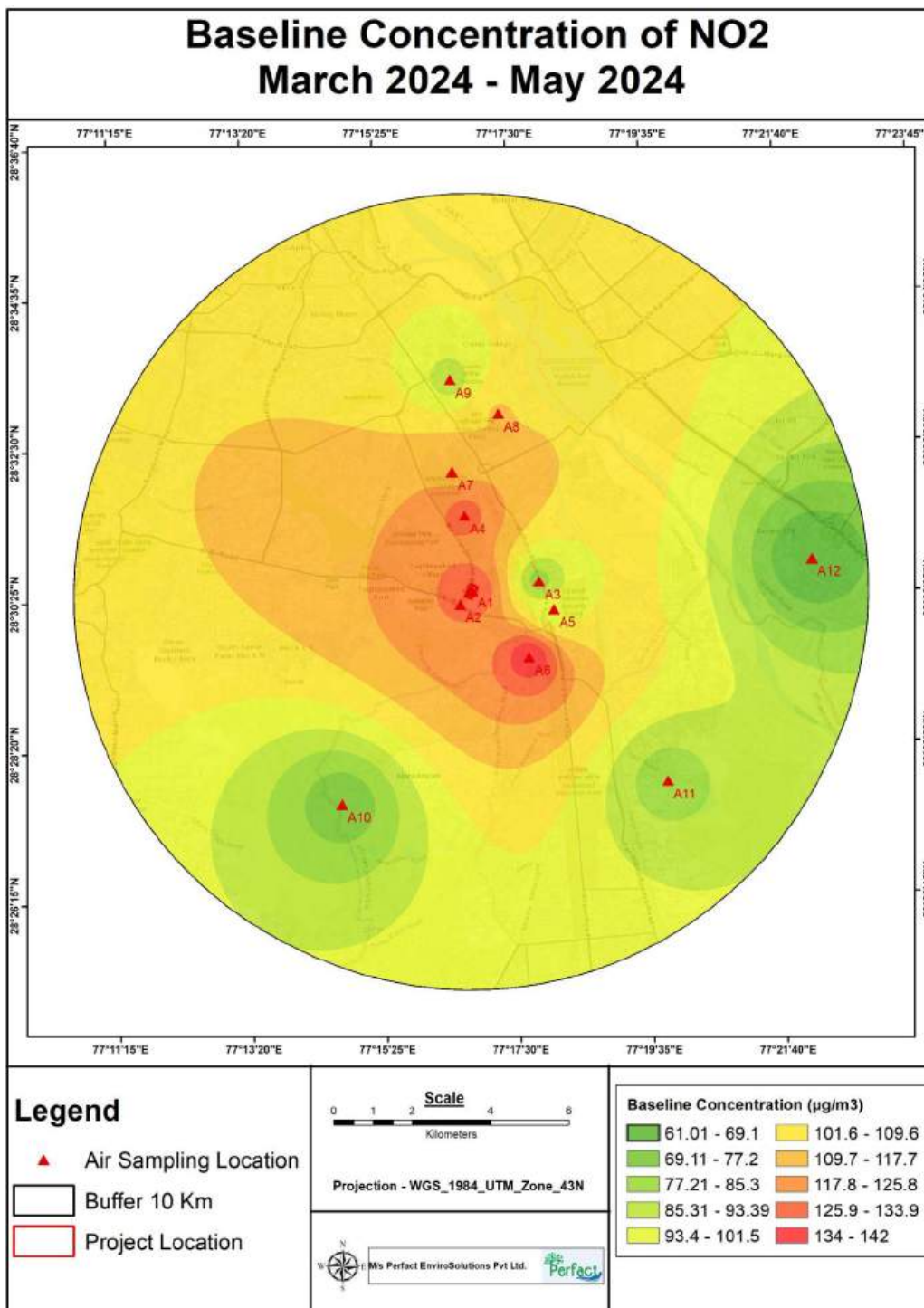


Figure 45. Baseline Concentration of NO₂ (March 2024- May 2024)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

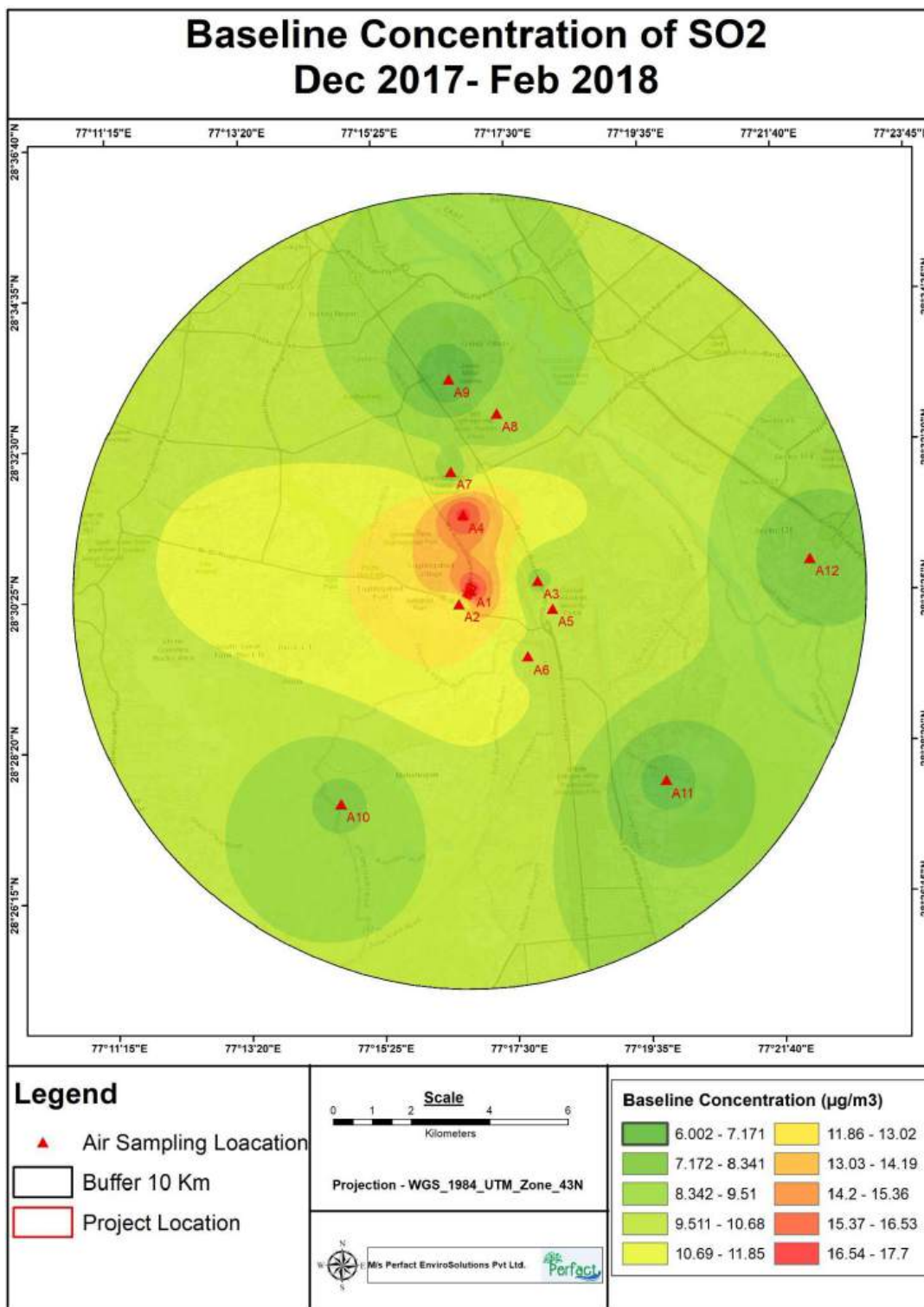


Figure 46. Baseline Concentration of SO₂ (Dec 2017- Feb 2018)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

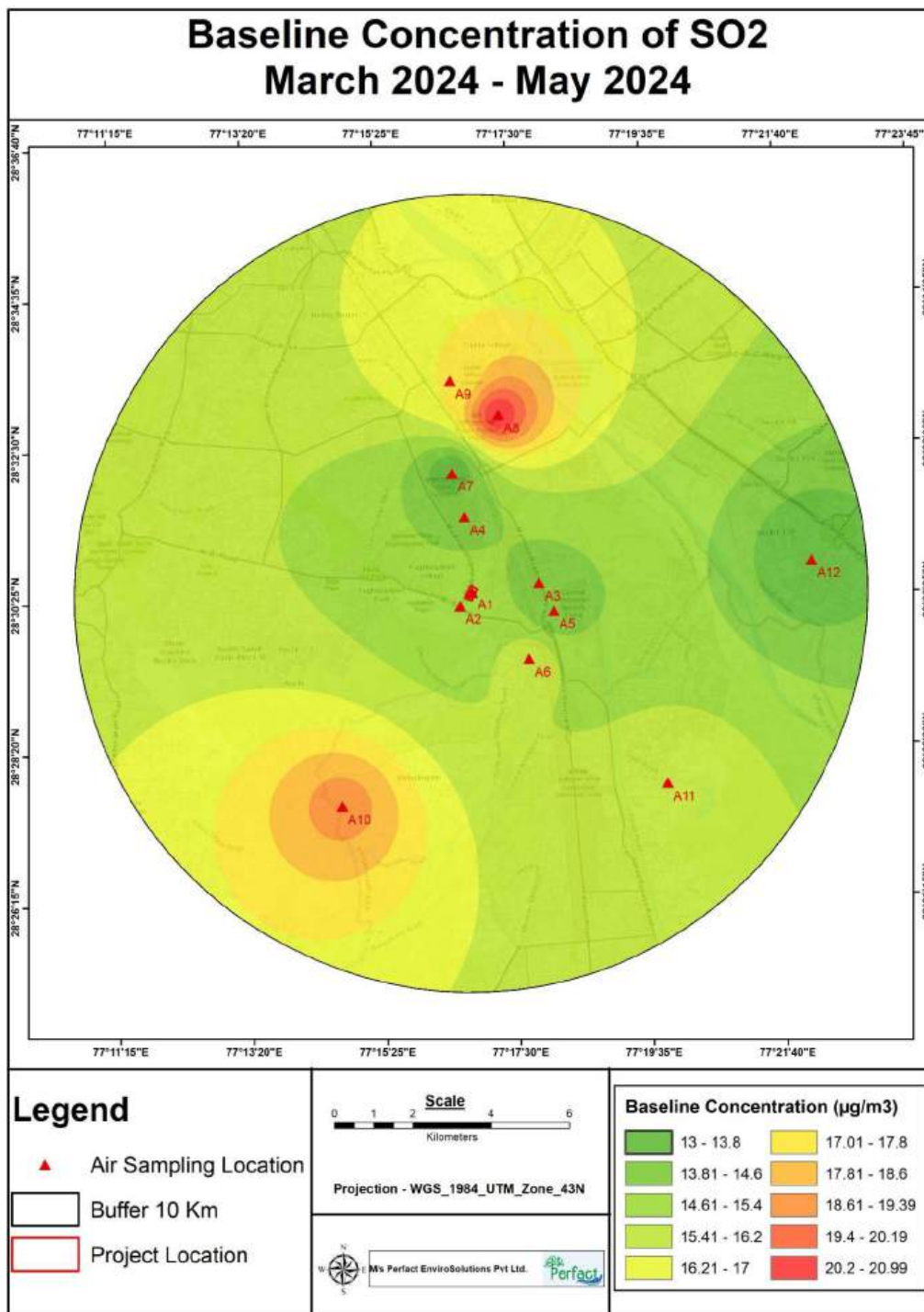


Figure 47. Baseline Concentration of SO₂ (March 2024- May 2024)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

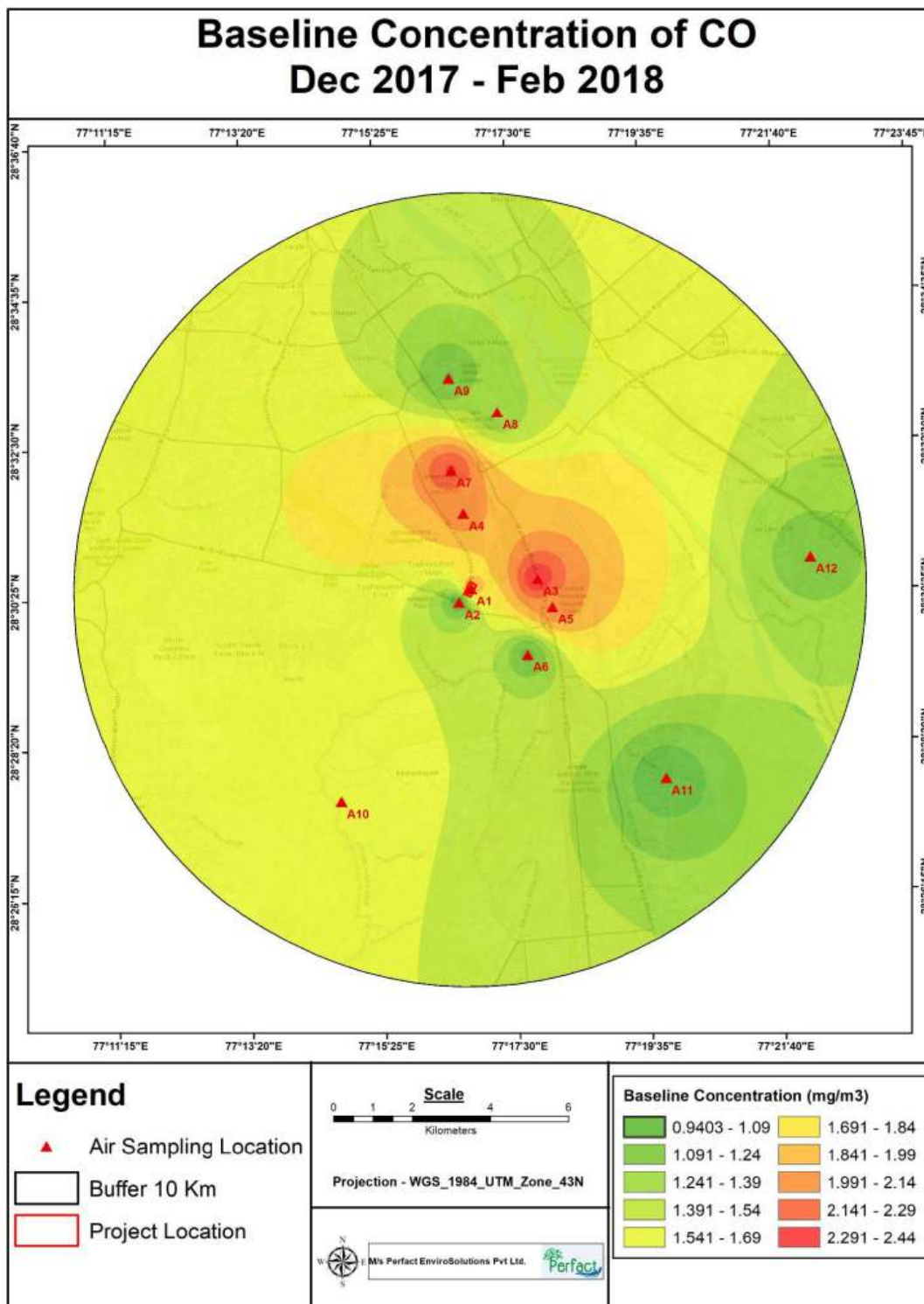


Figure 48. Baseline Concentration of CO (Dec 2017- Feb 2018)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

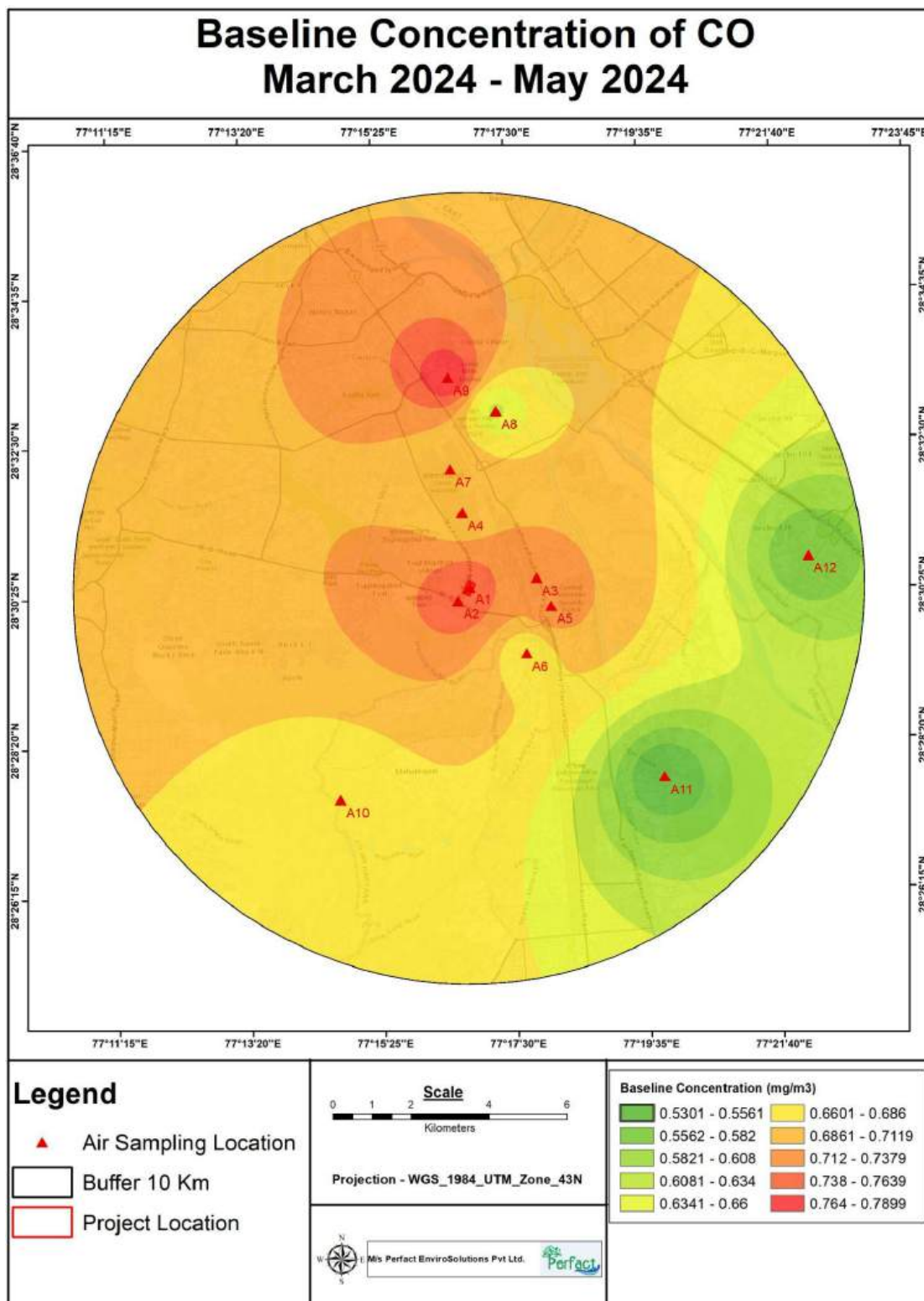


Figure 49. Baseline Concentration of CO (March 2024- May 2024)

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Parameters	PM ₁₀ (ug/m ³)	PM _{2.5} (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	CO (mg/m ³)
Maximum Concentration in buffer zone	436.4	220.4	22.5	89.6	3.58

Table 61. Ambient Air Result (Dec 2017-Feb 2018)

Parameters	PM ₁₀ (ug/m ³)	PM _{2.5} (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	CO (mg/m ³)
Maximum Concentration in buffer zone	207	148	26	177	0.94

Table 62. Ambient Air Result (March 2024-May 2024)

Thus it can be concluded from the above results that all the parameters are within the range of the NAAQS.

3.6.9 Air Quality Index

As per CPCB guidelines, the worst sub index in a location is the AQI of that region (Source: <https://cpcb.nic.in/National-Air-Quality-Index/>). The results show that PM10 has the worst/highest sub index over all the sampling sites. Therefore, the PM10 has been considered for calculating the overall AQI. The table given below shows the Air Quality Index (AQI) range & category:

AQI RANGE	AQI CATEGORY	AQI RANGE	AQI CATEGORY
Good (0-50)	Minimal Impact	Poor (201-300)	Breathing discomfort to people on prolonged exposure
Satisfactory (51-100)	Minor breathing discomfort to sensitive people	Very Poor (301-400)	Respiratory illness to the people on prolonged exposure
Moderate (101-200)	Breathing discomfort to the people with lung, heart disease, children and older adults	Severe (>401)	Respiratory effects even on healthy people

(Computed using: CPCB, AQI CALCULATOR)

Figure 50. AQI Range with category

Sampling Station	Highest Sub-index Parameter	AQI Value	AQI Range
A1	PM10	346	Very poor
A2	PM2.5	319	Very poor
A3	PM2.5	346	Very poor
A4	PM10	352	Very poor
A5	PM2.5	310	Very poor

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

A6	PM2.5	312	Very poor
A7	PM10	339	Very poor
A8	PM2.5	306	Very poor
A9	PM10	278	Poor
A10	PM2.5	324	Very poor
A11	PM10	320	Very poor
A12	PM2.5	319	Very poor

Table 63. AQI Range for baseline season December 2017 to February 2018

Sampling Station	Highest Sub-index Parameter	AQI Value	AQI Range
A1	PM2.5	301	Very poor
A2	PM2.5	237	Poor
A3	PM2.5	273	Poor
A4	PM2.5	263	Poor
A5	PM2.5	263	Poor
A6	PM2.5	303	Very poor
A7	PM2.5	309	Very poor
A8	PM2.5	290	Poor
A9	PM2.5	253	Poor
A10	PM2.5	190	Moderate
A11	PM2.5	210	Poor
A12	PM2.5	180	Moderate

Table 64. AQI Range for baseline season December 2017 to February 2018

3.6.10 Data Interpretation

The ambient air quality results for December 2017 - February 2018 are summarized in the above tables.

Core zone 2018: The mean value of PM₁₀ at core zone location is 386.7 µg/m³ & PM_{2.5} is 176.9 µg/m³, SO₂ is 17.7 µg/m³, NO₂ is 66.7 µg/m³ & CO is 1.99 mg/m³.

Buffer zone 2018: The mean value of PM₁₀ in buffer zone locations ranges from (246.2-391.4 µg/m³) & PM_{2.5} ranges from (104.5 - 179.4 µg/m³), SO₂ ranges from (6-16.9 µg/m³), NO₂ ranges from (23.1- 64.7 µg/m³), CO ranges from (0.94 - 2.44 mg/m³),

Conclusion 2018: The data shows that all the parameters in the core are within the Standards except PM2.5 & PM10 which are higher than the National Ambient Air Quality Standards (2009 CPCB) & In buffer zone all parameters are within the the National Ambient Air Quality Standards (2009 CPCB) except PM2.5 & PM10 which are higher. As per the Air Quality Index by CPCB, the air quality of the Buffer zone is found to be Very poor during the sampling period from December 2017 to February 2018.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

During the winter season in north India, there is accumulation of pollutants, especially particulate matter (PM_{2.5} and PM₁₀), near the surface. The low wind speeds also contribute to the stagnant conditions, further exacerbating the problem. Other contributors for increased PM can be stubble burning in nearby states and vehicular pollution

The ambient air quality results for March 2024 - May 2024 are summarized in the above tables.

Core zone 2024: The mean value of PM₁₀ at core zone is 173 µg/m³ & PM_{2.5} is 121 µg/m³, SO₂ is 15 µg/m³, NO₂ is 136 µg/m³ and CO is 0.76 mg/m³.

Buffer zone 2024: The mean value of PM₁₀ in buffer zone locations ranges from 104-194 µg/m³ & PM_{2.5} ranges from 84 - 132 µg/m³, SO₂ ranges from 13-21 µg/m³, NO₂ ranges from 61- 142 µg/m³, CO ranges from 0.53 - 0.79 mg/m³.

Conclusion 2024: The data shows that all the parameters in the core are within Standards (2009 CPCB) except PM_{2.5}, PM₁₀ & NO₂ which are slightly higher than the National Ambient Air Quality Standards (2009 CPCB) & in buffer zone all parameters are within the the Standards (2009 CPCB) except PM_{2.5}, PM₁₀ & NO₂ are slightly higher than the National Ambient Air Quality Standards (2009 CPCB). As per the Air Quality Index by CPCB, the air quality of the Buffer zone ranges from Moderate to Very poor during the sampling period from March to May 2024.

The major contributors to the increased PM & NO₂ are vehicular pollution, The proximity of CPA-Okhla industrial Area at 0.6 Km from the project site.

3.7 Noise Level

3.7.1 Methodology

Continuous, temporal and spatial variations occur in ambient noise levels depending on the type of surrounding activities. The impact of noise on the health of an individual depends on the physical dose of noise level, frequency, intermittency etc. and human factors (age, health status, type of activity, occupational exposure). The impact due to noise undergoes seasonal variations except some directional changes depending upon the predominant wind direction.

3.7.2 Ambient Noise Sampling Station

Criteria for site selection:

The baseline study of noise levels in the study area of 5 km has been carried out by selecting the noise monitoring locations based on the following criteria:

The site selection for noise quality monitoring were selected following the CPCB guidelines

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

1. As per CPCB guidelines, the sites of an area for noise quality monitoring were selected such that it meets the land use pattern e.g. Commercial, Residential, Industrial, and silent zone. Silence zone is defined as an area comprising not less than 100 m around hospitals, educational institutions and courts. As per the site location, the type of location that was selected: industrial location, roads, and residential area lies within the core and buffer area.
2. The presence of Noise sensitive receptors (environmental and ecological) in the vicinity of the project site were selected for noise quality monitoring. These included schools, hospitals, old age homes, religious places, etc.
3. Proximity of the noise generating source to the human settlements
4. The major source of noise in the site surrounding the area is increased urbanisation, vehicular movement at day time and ambient base noise at night. The impacts from these sources are expected to be captured in the levels of noise measured in the site-specific background noise monitoring study.

Based on the above factors, overall 12 stations were selected (1 Onsite, Okhla Phase-1, Dayal Bagh, Tughlaqabad, Badarpur Village, Badarpur Extension, Okhla Phase-2, Asola Wildlife Sanctuary, Asola Wildlife Sanctuary, Sukhdev Vihar, Tilpat Village and Shahpur Govardhanpur Bangar to assess the noise level of the proposed area.

Quality Assurance:

The noise level meter was calibrated immediately prior to and following each measurement event to check for the accuracy of measurement using an acoustic calibrator.

Monitoring Station	Location	Distance & Direction	Criteria for Selection	Type of Project area/study area	Environmental Significance
NQ 1	Project Site	-	-	Industrial Area	Existing ambient noise quality at core zone
NQ 2	Tughlaqabad	240 m, SW	Archeological Site, Upwind	Residential Area	Existing noise quality at Buffer Zone
NQ 3	Badarpur Extension	1.60 Km, E	Downwind	Industrial Area	
NQ 4	Okhla Phase-1	1.80 Km, N	Critically Polluted Area/Industrial Zone, Upwind	Industrial Area	
NQ 5	Badarpur Village	2.04 Km, ESE	Residential Zone	Residential Area	
NQ 6	Dayal Bagh	2.05 Km, SE	Downwind	Residential Area	
NQ 7	Okhla Phase-2	2.95 Km, N	Critically Polluted Area/Industrial Zone, Upwind	Industrial Area	
NQ 8	Jasola Vihar	4.42 Km, NNE	Eco Sensitive Zone	Residential Area	
NQ 9	Sukhdev Vihar	5.30 Km, N	Residential Zone	Residential Area	

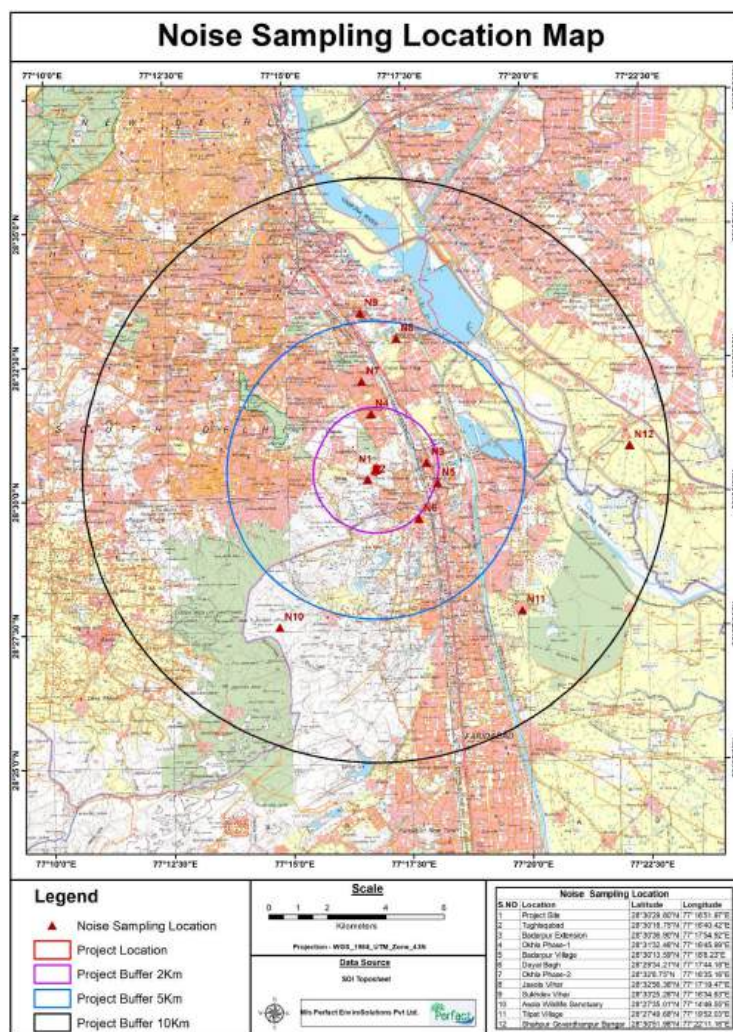
“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Monitoring Station	Location	Distance & Direction	Criteria for Selection	Type of Project area/study area	Environmental Significance
NQ 10	Asola Wildlife Sanctuary	6.15 Km, SW	Wildlife Sanctuary	Silence	
NQ 11	Tilpat Village	7.08 Km, SE	Downwind	Residential Area	
NQ 12	Shahpur Govardhanpur Bangar	8.54 Km, E	Downwind	Residential Area	

Table 65. Ambient Noise sampling location

(Source of Standards: CPCB standards for Noise Pollution (Regulation & control) Rules, Laboratory: M/s Aseries Envirotek India Pvt Ltd.

Noise sampling location map



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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Figure 51. Noise Sampling Location Map

3.7.3 Results and Discussion

A comparative of Baseline collected in previous EIA i.e. December 2017 to February 2018 (Winter Season) & Current baseline of March to May 2024 (Summer Season) is given below:

Noise		Standards of Noise Level			Measured Noise Level db(A)	
S.No.	Location	Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
1	Project Site	Industrial	75	70	57.11	50.40
2	Okhla Phase 01	Industrial	75	70	61.93	55.27
3	Dayal Bagh	Residential	55	45	60.29	51.31
4	Tughlakabad	Residential	55	45	57.26	51.52
5	Badarpur Village	Residential	55	45	60.96	52.40
6	Badarpur	Industrial	75	70	60.96	54.16
7	Okhla Phase 02	Industrial	75	70	65.8	53.91
8	Asola wildlife sanctuary	Silence	50	40	55.43	46.41
9	Jasola Vihar	Residential	55	45	59.14	51.90
10	Sukhdev Vihar	Residential	55	45	61.52	53.18
11	Tilpat Village	Residential	55	45	59.28	52.73
12	Shahpur Govardhanpur Bangar	Residential	55	45	55.49	51.62

Table 66. Ambient Noise result for December 2017 to February 2018

Noise		Standards of Noise Level			Measured Noise Level db(A)	
S.No.	Location	Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
1	Project Site	Industrial	75	70	66.2	60.2
2	Tughlakabad	Residential	55	45	52.4	45.8
3	Badarpur Extension	Industrial	75	70	64.5	57.9
4	Okhla Phase 01	Industrial	75	70	62.1	59.4
5	Badarpur Village	Residential	55	45	50.6	46.5
6	Dayal Bagh	Residential	55	45	53.3	46.2
7	Okhla Phase 02	Industrial	75	70	63.7	56.7
8	Jasola Vihar	Residential	55	45	49.3	43.1

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	Noise	Standards of Noise Level			Measured Noise Level db(A)	
S.No.	Location	Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
9	Sukhdev Vihar	Residential	55	45	47.1	42.1
10	Asola wildlife sanctuary	Silence	50	40	42.3	38.4
11	Tilpat Village	Residential	55	45	46.3	41.8
12	Shahpur Govardhanpur Bangar	Residential	55	45	47.6	42.6

Table 67. Ambient Noise result for March to May 2024

(Source of Standards: CPCB standards for Noise Pollution (Regulation & control) Rules, Laboratory: (M/s Aseries Envirotek India Pvt Ltd.)

The Ambient Noise Quality results (December 2017 to February 2018) are summarized above. The results are discussed below:

Core Zone (Industrial area): N1, : The ambient noise level during day time at the project site is 57.11 dB (A) which is within the day time standard limit of industrial area ~ 75 dB (A). During night the noise level at the project site is 50.40 dB (A) which is also within the night time standard limit of industrial area ~ 70 dB (A).

Buffer Zone:

N2: The ambient daytime noise level at **Okhla Phase 01** is 61.93 dB (A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 (A). During night the noise level was recorded at 55.27 dB (A) which is also within the noise standard limit of ~ 70 dB (A).

N3: The ambient daytime noise level at **Dayal Bagh** is 60.29 dB (A) which is higher than the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded as 51.31 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A).

N4: The ambient daytime noise level at **Tughlakabad** is 57.26 dB (A) which is slightly higher than the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded as 51.52 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A).

N5: The ambient day-time noise level at **Badarpur Village** is 60.96 dB (A) which is higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 52.40 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A).

N6: The ambient day-time noise level at **Badarpur** is 60.96 dB(A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded 54.16 dB (A) which is also within the night-time noise standard limit of ~ 70 dB (A).

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N7: The ambient day-time noise level at **Okhla Phase 02** is 65.80 dB (A) which is within the day time noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded at 53.91 dB (A) which is within the night-time noise standard limit of ~ 70 dB (A).

N8: The ambient day-time noise level at **Asola wildlife sanctuary** is 55.43 dB (A) which is higher than the day time noise standard limit of the **Silence Area** of ~ 50 dB (A). During night the noise level was recorded at 46.41 dB (A) which is slightly higher than the night-time noise standard limit of ~ 40 dB (A).

N9: The ambient daytime noise level at **Jasola Vihar** is 59.14 dB (A) which is slightly higher than the daytime noise standard limit of the **Residential area** of ~ 55 dB (A). During night the noise level was recorded as 51.90 dB (A) which is higher than the night-time noise standard limit of **residential area** ~ 45 dB (A).

N10: The ambient daytime noise level at **Sukhdev Vihar** is 61.52 dB (A) which is higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 53.18 dB (A) which is higher than the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N11: The ambient daytime noise level at **Tilpat Village** is 59.28 dB (A) which is slightly higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 52.73 dB (A) which is higher than the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N12: The ambient daytime noise level at **Shahpur Govardhanpur Bangar** is 55.49 dB (A) which is slightly higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 51.62 dB (A) which is higher than the night-time noise standard limit of **Residential area** ~ 45 dB (A).

Reason for Increased Noise Levels: The increased noise levels are due to nearby residential and commercial areas Also due to increased heavy vehicular movement during night.

The Ambient Noise Quality results (March to May 2024) are summarized above. The results are discussed below:

Core Zone (Industrial area): N1, : The ambient noise level during day time at the proposed project site is 66.2 dB (A) which is within the day time standard limit of industrial area ~ 75 dB (A). During night the noise level at the project site is 60.2 dB (A) which is also within the night time standard limit of industrial area ~ 70 dB (A).

Buffer Zone:

N2: The ambient daytime noise level at **Tughlakabad** is 52.4 dB (A) which is within the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded 45.8 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A).

N3: The ambient day-time noise level at **Badarpur Extension** is 64.5 dB(A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded 57.9 dB (A) which is also within the night-time noise standard limit of ~ 70 dB (A).

N4: The ambient daytime noise level at **Okhla Phase 01** is 62.1 dB (A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 (A). During night the noise level was recorded 59.4 dB (A) which is also within the noise standard limit of ~ 70 dB (A).

N5: The ambient day-time noise level at **Badarpur Village** is 50.6 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 46.5 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A).

N6: The ambient daytime noise level at **Dayal Bagh** is 53.3 dB (A) which is within the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded 46.2 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A).

N7: The ambient day-time noise level at **Okhla Phase 02** is 63.7 dB (A) which is within the day time noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded at 56.7 dB (A) which is within the night-time noise standard limit of ~ 70 dB (A).

N8: The ambient daytime noise level at **Jasola Vihar** is 49.3 dB (A) which is within the daytime noise standard limit of the **Residential area** of ~ 55 dB (A). During night the noise level was recorded 43.1 dB (A) which is within the night-time noise standard limit of **residential area**~ 45 dB (A).

N9: The ambient daytime noise level at **Sukhdev Vihar** is 47.1 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 42.1 dB (A) which is within the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N10: The ambient day-time noise level at **Asola wildlife sanctuary** is 42.3 dB (A) which is within the daytime noise standard limit of the **silence Area** of ~ 50 dB (A). During night the noise level was recorded at 38.4 dB (A) which is within the night-time noise standard limit of ~ 40 dB (A).

N11: The ambient daytime noise level at **Tilpat Village** is 46.3 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was

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recorded at 41.8 dB (A) which is within the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N12: The ambient daytime noise level at **Shahpur Govardhanpur Bangar** is 47.6 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 42.6 dB (A) which is within the night-time noise standard limit of **Residential area** ~ 45 dB (A).

Reason for Increased Noise Levels: The increased noise levels are due to nearby residential and commercial areas also due to increased heavy vehicular movement during night.

3.8 Geology and Geo-Hydrology

The objective of this study is to establish the baseline from a hydrological, hydrogeological, and geological perspective of the area corresponding to the Project. Subsequently, to assess the impact of the proposed activity and to suggest proper mitigation measures.

3.8.1 Climate & Rainfall

The area is characterized by extreme dryness, with intensely hot summers and cold winters. Only during the southwest monsoon months-July, August, and September-does moist oceanic air penetrate inland, bringing increased humidity, cloud cover, and precipitation.

- Climatically, the year can be broadly divided into three distinct seasons: winter, summer, and the monsoon (rainy) season. The winter season begins in mid-November, when both daytime and nighttime temperatures decrease significantly. January is the coldest month, with daily temperatures ranging from 21.3°C (maximum) to 7.3°C (minimum). Occasionally, during the passage of western disturbances across northern India, minimum temperatures may fall close to the freezing point.
- Temperatures start rising sharply from mid-March onwards, with May and June being the hottest months. While daytime temperatures peak in May, nights are relatively warmer in June. From April onwards, the region experiences strong, hot winds locally known as “loo,” which make weather conditions particularly harsh. During May and June, maximum temperatures may reach as high as 46–47°C.
- The area receives an average annual rainfall of about 615 mm, of which nearly 81% occurs during the monsoon months of July to September. The remaining precipitation is contributed by winter showers and occasional thunderstorms in the pre- and post-monsoon periods. The average annual relative humidity is around 78.5%, though humidity levels vary significantly across the seasons. The air remains predominantly dry for most of the year, with humidity peaking during the monsoon months. April and May are

the driest periods, with relative humidity levels of about 30% in the mornings and less than 20% in the afternoons.

Source: CGWB Report of National Capital Territory, Delhi 2022-2023(September-2023)

3.8.3 Topography

Core zone

Topographically, the proposed site area is mildly undulating. According to the KML file, the minimum elevation of the project site is 249 m AMSL in the east of the site, whereas the maximum elevation in the south and west is 260 m AMSL.

Buffer zone

The buffer area is a combination of undulating as well as flat topography. As per the KML file, the maximum elevation towards the SW near the periphery is 327 m AMSL, whereas the minimum elevation towards the ESE near the periphery of the site is 203 m AMSL.

3.8.4 Geology

Geologically, the entire study area can be characterized by the Alluvium and Rock formation. The rock formations exposed in the National Capital Territory of Delhi are mainly quartzite interbedded with thin bands of micaceous schist. These Proterozoic age rocks occur along the ridge, extending from Harchandpur (Haryana) in the South to Wazirabad (Delhi) in the North. Quaternary sediments consisting of alluvium deposits directly overlie the Proterozoic rocks. The Geological Survey of India has revealed three Stratigraphic horizons and three distinct lithostratigraphic units of NCT Delhi. The highest of these is the erosional surface forming the top of denudational hills. The second surface is the Older Alluvial plain, and the third is the depositional Younger Alluvial plain (Yamuna). All three lithostratigraphic units corresponding to them have changed due to widespread and uncontrolled urban activity over the period.

Alluvium Deposits

In area, exposures of the oldest lithostratigraphic unit. The Quaternary deposits in the form of aeolian and alluvial deposits. In the East of the ridge, the thickness of unconsolidated sediments gradually increases away from the ridge, with the maximum reported thickness being 170 m. In the Southwestern, Western, and Northern parts of the area, the thickness of sediments is more than 300 m. In the Chhattarpur basin, the maximum thickness of sediments is 116 m. The aeolian deposits of South Delhi are mainly loam, silty loam, and sandy loam. The bedrock is overlain by these deposits. Older alluvial deposits consist mostly of interbedded, lenticular, and inter-fingering

deposits of clay, silt, and sand along with kankar. These deposits are overlain by the newer alluvium, which occurs mostly in the flood plains of the river Yamuna.

Hard Rock Formation

Quartzite is one of the most physically durable and chemically resistant rocks found in the area. The suites of quartzite and associated mica schist /phyllite bands of the Delhi system have undergone multiple folding and different phases of metamorphism. When the mountain ranges are worn down by weathering and erosion, less-resistant and less-durable rocks are destroyed, but the quartzite remains. Therefore, Delhi Quartzite is often the rock found as linear ridges and ranges covering their flanks as a litter of scree. One of the research studies on weathering of Proterozoic quartzite in the semi-arid conditions around Delhi suggested that Quartzite, being a resistant rock, dissolution of a small amount of pyrite, by moving water produced a sulphate-bearing acidic solution and ferrous iron, which reacted with alumino-silicate minerals and quartz, respectively, and has made the Delhi Quartzite porous and subsequently friable.

The coupled weathering mechanism, from the core outward and also proceeding initially from fractures towards the inside, produced weathering rinds and subsequent physical erosion of loose sand, produced during rind development in the outermost zones, has given rise to features like tors, spheroids, gullies, cavities, and small-scale caves on these quartzites.

Thus, the terrain has acquired ruggedness in semi-arid conditions. In one of the studies of GSI, it is reported that three generations of folding in the rocks of Delhi. The fold axes of first-generation folds follow the trend of the main ridge, i.e., NNE-SSW. The second-generation folds trending NE-SW are observed at Tughlaqabad - Mehrauli area, and third third-generation fold trending NW-SE is observed at Anand Parbat. The rocks are highly jointed, and two sets of conjugate vertical to sub-vertical joints have been reported. The stratigraphic succession of the area is as given in Table 1.

Source: CGWB Report of National Capital Territory, Delhi 2022-2023(September-2023)

Formation	Stage	Lithology
Alluvium	Newer Alluvium	Unconsolidated, inter-bedded lenses of sand, silt, gravel, and clay confined to narrow flood plains of the Yamuna River and Aeolian deposit of South Delhi.
	Older Alluvium	Unconsolidated thickness varies up to 300m. Inter-bedded, inter-fingering deposits of sand, clay, and kankar, poor to moderately sorted.
Delhi Super Group	Alwar Quartzite	Well stratified, thick-bedded, brown to buff colour, hard and compact, intruded locally by pegmatite and quartz veins inter-bedded with mica schist.

Table 68. Stratigraphic Succession of Area

Source: CGWB Report of National Capital Territory, Delhi 2022-2023 (September-2023)

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3.8.5 Seismicity

As per the Seismic Zonation Map of India, the project site falls within Seismic Zone IV, which is classified as a high-risk zone in terms of seismic activity. Recent records indicate two minor earthquakes in the vicinity of the project area: one of magnitude 2.3, reported near Madanpur Khadar on 08 June 2025, approximately 3.57 km northeast of the site; and another of magnitude 2.2, recorded near Sangam Vihar on 24 February 2025, at a distance of about 5.17 km west-southwest of the site. The seismicity map is shown in Fig No. 2.

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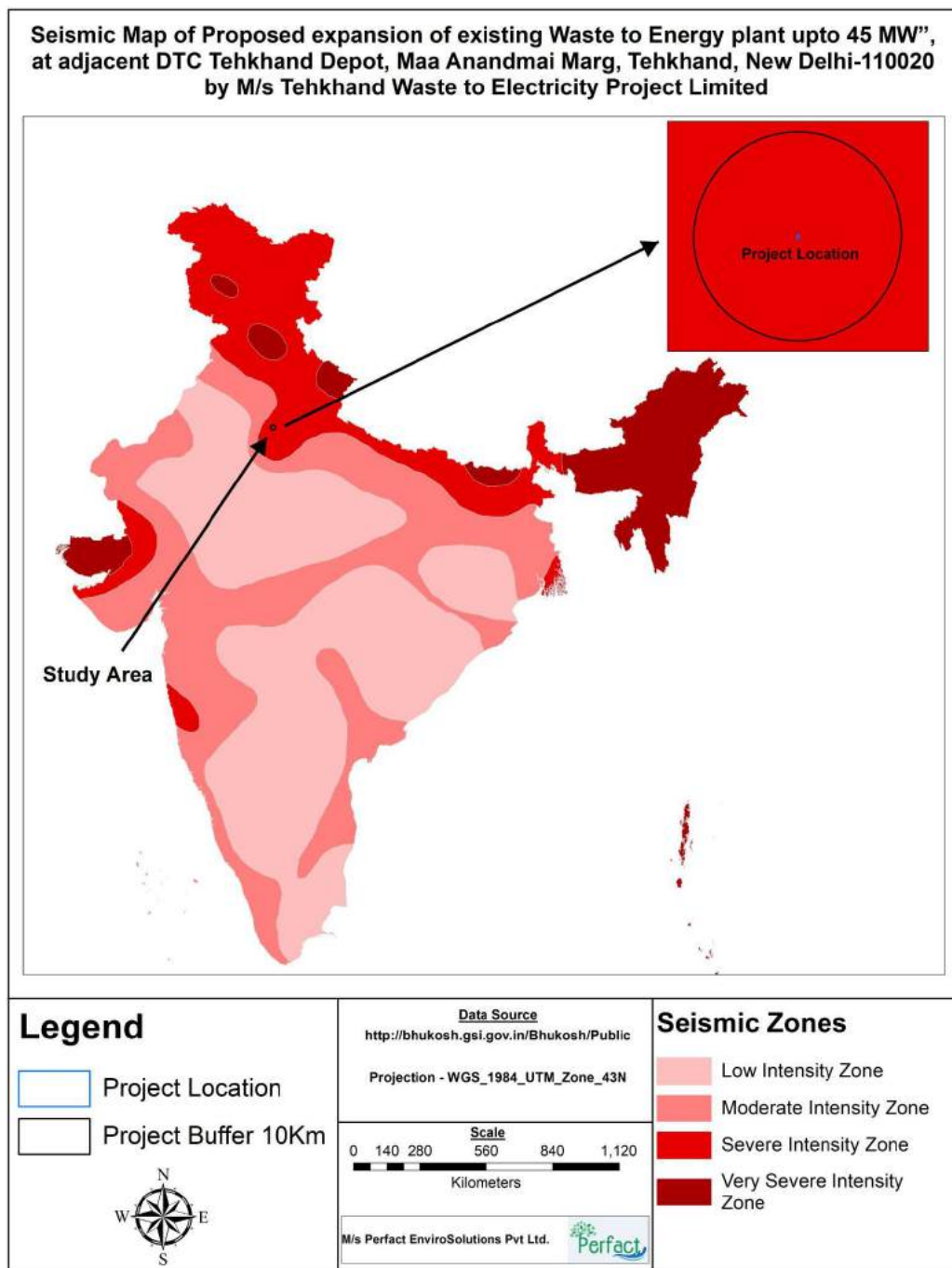


Figure 52. Seismic Map

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3.8.6 Hydrology

Drainage

Core Zone

During the rainy season ephemeral water of the core zone flows eastward.

Buffer Zone

- The area's major River is the Yamuna River, which flows from north to east-southeast with a distance of about 4.98 km northeast of the site.
- The Hindon cut is situated at about 6.90 Km northeast of the site. The confluence of the Yamuna River and Hindon Cut is at about 6.79 km northeast of the site.
- The Agra canal passes through the buffer area at about 2.86 Km northeast of the site.
- The buffer zone comprises various water bodies such as the River, ponds, Canal, Drains, Lake, Nala, etc.
- The area has dendritic drainage patterns, having first to third-order streams.

The drainages are shown in Figure No. 3.

Water Bodies - The complete list of water bodies given in the Environment Sensitivity in table no.

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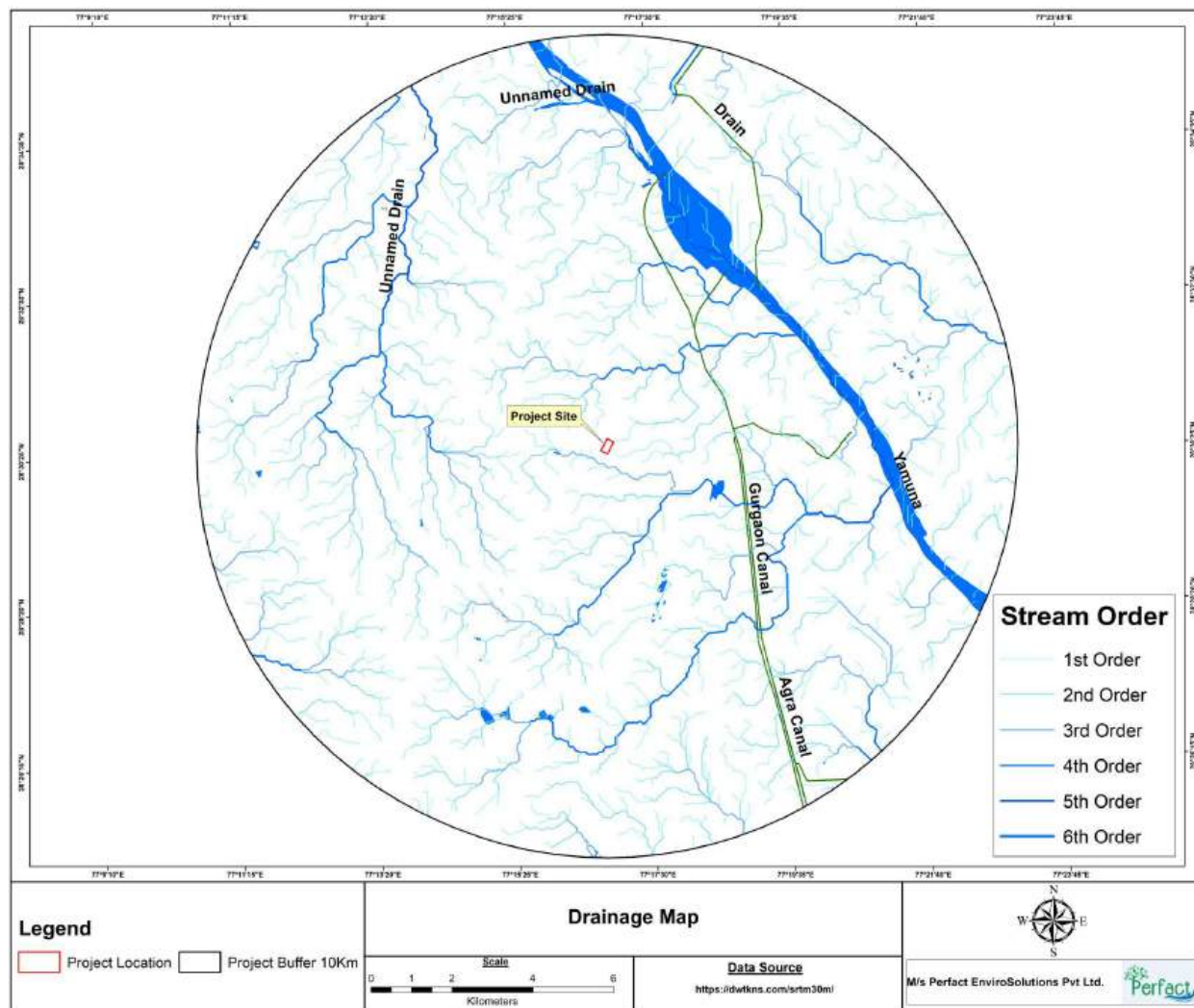


Figure 53. Drainage map

Flood History

The area has been experiencing floods of various magnitudes in the past due to floods in the Yamuna River (4.98 km NE). The River Yamuna crossed its danger level (fixed at 204.83m) 25 times during the last 33 years. Since 1900, it has experienced nine major floods in the years 1924, 1947, 1976, 1978, 1988, 1995, 1999, 2005, and 2010 when the peak level of the Yamuna River was more than a meter or above. During the floods of September 1995, the Yamuna River crossed the danger level of 206.93 m (2.66 m above the danger level) at the Hindon Cut at about 8.26 km north of the site. The second record peak of (HFL) 208.20 m was on 27 October 2010, and the third record peak on 13/07/2023 is 208.66 m AMSL.

Source: <https://www.greaternoidaauthority.in/files/pdfs/mprepfn300316c.pdf>

- The highest flood level of the Yamuna River within the vicinity is 208.66 meters above mean sea level (AMSL), located approximately 4.98 kilometers northeast of the project site. In contrast, the project site itself has a minimum elevation of 249 meters AMSL. This elevation difference, coupled with the considerable distance from the river, indicates that the project site is situated at a higher and safer level from the flood.

Source: CWC

Geohydrology

- As per the CGWB Report, groundwater in the area occurs under unconfined, confined, and semi-confined aquifers. The movement of groundwater within subsurface aquifer systems is influenced by topography, geology, climate, and the water-bearing and water-yielding properties of subsoils and rocks in the zones of aeration and saturation. The thickness of the fresh water zone varies between 30 and 85 m below ground level (BGL). In locations such as Gadaipur, Bhatti, and Munirka, the fresh water aquifers are underlain by hard rock formations, primarily Delhi Quartzite. In parts of the Southeast District, particularly around Madanpur Khadar, the thickness of the freshwater zone is relatively limited.
- The pre-monsoon and post-monsoon water levels vary from 10.00 m BGL to 5 m BGL in the shallow water table (southeast district).

Source: CGWB Report of National Capital Territory, Delhi 2022-2023 (September-2023)

Hydraulic gradient: Geo-Hydrologically the quartzite ridge enters the area of the Southeast part and expands into rocky tableland towards the Eastern part, formally disappearing below the Yamuna alluvium. The land surface on the Eastern side of the ridge slopes towards the river Yamuna with a general gradient of about 3.5 metre per kilometre. The Yamuna river, flowing in an east-southeast direction in the eastern part. It has an average gradient of about 1 to 6000 from North to east-southeast.

Source: *Engineering Geology of Delhi: An Overview* V. Gupta*, H.G. Poulost and S.G. Reidt

As per CGWB Report, the Hydraulic Conductivity (K) recorded by Hvorslev Method and Bouwer & Rice Method is 1.69 m/day and 1.31 m/day respectively at Khanpur which is 5.45 km west of the site. The average Hydraulic Conductivity (K) is about 1.50 m/day.

Source: *Aquifer Mapping And Groundwater Management Plan Of Nct Delhi 2016*

Infiltration: In the project area, rainfall infiltrates into the subsurface soil and underlying rock formations. A portion of the water is retained within the shallow soil layer, while a significant share percolates deeper to recharge the groundwater system. Some water is also stored within the rock matrix. The estimated infiltration rate in the vicinity of the project site is approximately 11–15 mm/h.

Source: Aquifer Mapping and management plan delhi Nct, India 2016

Aquifers

As per CGWB Report, in alluvial areas, the number of sand zones constituting individual local aquifers is grouped into major one main aquifer system and piezometers have been installed accordingly. Three distinct potential aquifer groups within the depth of 450 m below ground level, identified and grouped on basis of various hydrogeological mapping and groundwater exploration, are as follows:

1. Aquifer Group I - Down to 65 m below ground level(Un-confined)
2. Aquifer Group II -Between 65 to 200 m below ground level (Confined/Semi-Confined)
3. Aquifer Group III - Between 200 to >300 m below ground Level(Confined)

The Separate piezometers are installed, tapping the two aquifer groups, the first one in the phreatic zone deep enough to accommodate long term fluctuation (i.e. up to 65 m deep) and the other one tapping the middle parts of the aquifer groups II, lying between 65 to 200 m. The Aquifer group III is not being monitored at present.

Similarly, the hard rock of the area is being monitored through piezometric nests, which are installed in a single borehole tapping the weathered and fractured aquifers combined. Generally, the depth of the well goes up to 80 m BGL, but in some cases, it goes up to 140 m BGL. Besides piezometers, many numbers of dug wells, tapping phreatic aquifer zones are included in the monitoring network.

Source: CGWB Report of National Capital Territory, Delhi 2022-2023 (September-2023)

Groundwater Development

The project site falls under the Kalka ji tehsil of the southeast district, and the buffer area falls under the Sarita Vihar and Defence colony of southeast, Hauz Khas and Saket of south, and Chanakyapuri tehsils of the New Delhi district. As per the CGWB report, the project site falls under the critical category with the stage of groundwater development at about 95.60%. The following table shows the Assessment units of Groundwater developments.

Assessment unit Tehsil	Total annual Groundwater recharge (Ham)	Annual Extractable Groundwater Resource (Ham)	Total Extraction (Ham)	Net Annual Ground Water Availability for future use (ham)	Stage of Groundwater Development (in %)	Category
Kalka Ji	1017.57	915.81	875.52	40.28	95.60	Critical
Sarita Vihar	631.72	568.55	567.97	0.58	99.90	Critical
Defence colony	976.72	879.05	864.77	14.26	98.38	Critical

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Assessment unit Tehsil	Total annual Groundwater recharge (Ham)	Annual Extractable Groundwater Resource (Ham)	Total Extraction (Ham)	Net Annual Ground Water Availability for future use (ham)	Stage of Groundwater Development (in %)	Category
Hauz Khas	1080.59	972.53	970.77	01.75	99.82	Critical
Saket	2167.82	1951.04	2269.33	00.00	116.31	Over exploited
Chanakya Puri	594.80	535.32	703.67	00.00	131.45	Over exploited

Table 69. Stage of Groundwater developments

Source: Cgwb Report Of National Capital Territory, Delhi 2023-2024

3.9 Water Quality

3.9.1 Sampling Station

To assess the water quality of the proposed area, the following 12 stations (6 groundwater & 6 surface water) were selected for the month of March 2024 - May 2024. A comparison between baseline data collected during Dec 2017 to Feb 2018 & March to May 2024 is also provided. Location of Water sampling stations is described below:

3.9.2 Ground-water Locations

Monitoring Station	Location	Distance & Direction	Environmental Significance
GW1	Near Project Site	-	Existing Ground water quality Buffer Zone
GW2	Existing landfill site	300 m, N	
GW3	Okhla Phase-1	1 Km, NW	
GW4	Tughlakabad Village	1.2 Km, NW	
GW5	Badarpur Village	1.2 Km, N	
GW6	Shahpur Govardhanpur Bangar	8.25 Km, E	

Table 70. Ground water sampling Location 2017 to February 2018

3.9.3 Surface water monitoring locations

Table 72. Surface water sampling location 2017 to February 2018

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Monitoring Station	Location	Distance & Direction	Environmental Significance
SW1	Nallah Up Stream	70 m, SE	Existing Ground water quality Buffer Zone
SW2	Nallah Down Stream	120 m, E	
SW3	Nallah Center	140 m, S	
SW4	Canal (Near Molarband)	3 Km, E	
SW5	Bhuriya Nallah (Near DLF)	5.5 Km, SE	
SW6	Yamuna River	6.19 Km, E	

Table 71.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.9.4 Groundwater and surface water quality sampling map

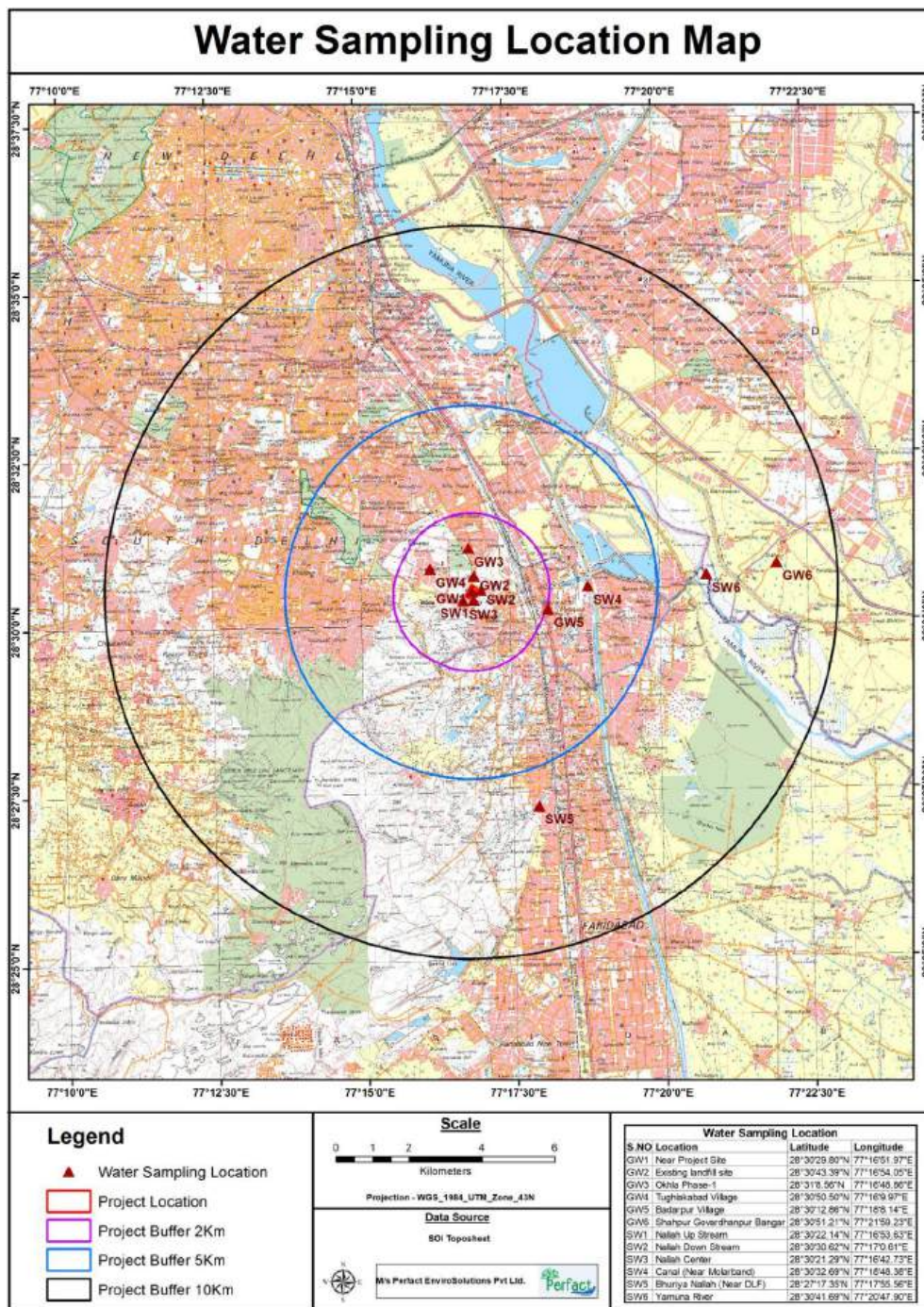


Figure 54. Ground & Surface Water Sampling Location Map

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

3.9.5 Criteria of Selection of Sampling Locations

Quality assurance for sampling

- Water samples were taken as per the Standard Methods (IS & APHA, 23rd Edition 2017).
- Prior to sampling, all the materials (sampling equipment, water collection bottles, storage boxes) were thoroughly cleaned and sterilized in the laboratory.
- Precautions were taken to prevent any contamination while handling the sample bottles, i.e. neither the bottle lip nor the interior surface were touched during sampling.
- Before collecting the sample, the water bottle was rinsed three times by shaking it followed by the water being discarded downstream.
- In the monitoring site, samples were collected upstream with water flowing directly towards the sample collector to avoid any human-caused contamination.
- The samples were collected thrice from each spot and were stored in a cold box. The samples were transported between laboratory and sampling sites within these cold boxes.

3.9.6 Sampling Frequency and Sampling Techniques

As per the standard practice, grab sampling was done for 06 locations, Composite sampling was done for Surface Water locations as per the Standard Methods (IS & APHA, 23rd Edition 2017).

Necessary precautions were taken for preservation of samples.

- The physical parameters viz. pH, temperature and conductivity were measured at site using a portable water analyzer.
- Quality assurance during sample analysis:
- The collected samples were transferred to the laboratory and analyzed for the selected water quality parameters.
- All samples were analyzed according to the methods described in the American Public Health Association Standard Method for Water and Wastewater Analysis
- All the chemicals used in the analysis were of analytical grade. Double deionized water (Milli-Q system, Millipore) water was used for analysis purposes throughout the study.
- Both the glassware and the sample containers used for the analysis were thoroughly cleaned and rinsed with double distilled water before analysis.

As evident from the sampling locations for water quality assessment, it represented surface and groundwater.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.9.7 Comparison between the Ground Water Quality Results of Baseline season (March 2024-May 2024) and (December 2017-February 2018)

Location			As per IS 10500: 2012) Acceptable Limit	As per IS 10500: 2012) Permissible Limit	GW 1- Near Project Site		GW 2 - Existing Landfill Site		GW 3 - Okhla Phase I		GW 4 - Tughlakabad Village		GW 5 - Badarpur Village		GW 6 - Shahpur Govardhanpur Bangar	
S. No.	Parameter	Unit			Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024
1	Colour	Hazen	5.00	15.00	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2	Odour	-	Agreeable													
3	Taste	-			-	Agreeable	-	Agreeable	-	Agreeable		Agreeable	-	Agreeable		Agreeable
4	Temperature	°C	Not Specified		27	25.60	28	25.30	26	26.10	28	24.50	27	26.80	28	24.80
5	pH	-	6.5-8.5	No relaxation	6.99	7.61	7.45	7.59	6.87	7.46	6.74	7.56	7.12	7.29	7.4	7.52
6	Conductivity	µmhos/cm	Not Specified		1212	847	1692	872	970	830	825	712	1345	687	1132	932
7	Alkalinity as CaCO ₃	mg/l	200	600	280	284	600	312	320	276	190	245	280	198	240	292
8	Total Dissolved Solids	mg/l	500	2000	746	551	1044	567	600	540	536	463	842	447	702	606
9	Total Hardness as CaCO ₃	mg/l	200	600	540	329	680	383	412	316	324	310	560	278	460	376
10	Calcium as Ca	mg/l	75	200	140	73.6	150	99.2	80	79.2	80	74.4	160	71.6	80	88.0
11	Magnesium as Mg	mg/l	30.0	100.0	46.17	35.2	74.11 5	32.8	51.516	28.6	30.132	30.1	38.88	24.0	63.18	37.9
12	Chloride as Cl	mg/l	250	1000	180	126	160	112	98	112	124	84	240	168	174	143

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Location			As per IS 10500: 2012) Acceptable Limit	As per IS 10500: 2012) Permissible Limit	GW 1- Near Project Site		GW 2 - Existing Landfill Site		GW 3 - Okhla Phase I		GW 4 - Tughlakabad Village		GW 5 - Badarpur Village		GW 6 - Shahpur Govardhanpur Bangar	
S. No.	Parameter	Unit			Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024
13	Phosphate as PO4	mg/l	Not Specified		-	0.70	<0.05	0.54		0.66		0.88	-	0.26	-	0.84
14	Nitrate as NO3	mg/l	45.0	No relaxation	1.6	7.5	2.8	9.6	3.8	9.4	2.1	7.2	2.4	6.4	2.7	7.5
15	Sulphate as SO4	mg/l	200.0	400.0	70.1	62	56.2	49	42.2	48	48.1	54	56.5	44	74.8	53
16	Fluoride as F	mg/l	1.00	1.50	0.89	0.40	0.74	0.34	0.84	0.30	0.95	0.24	0.98	0.39	0.91	0.48
17	Zinc as Zn	mg/l	5.0	15.0	0.36	<0.001	0.62	<0.001	0.49	<0.001	0.58	<0.001	0.74	<0.001	0.25	<0.001
18	Arsenic as As	mg/l	0.010	0.1	<0.01											
19	Lead as Pb	mg/l	0.010	No relaxation	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001
20	Iron	mg/l	1.00	No relaxation	0.28	<0.001	0.27	<0.001	0.16	<0.001	0.16	<0.001	0.15	<0.001	0.14	<0.001
21	Nickel	mg/l	0.020	No relaxation	0.13	<0.01	0.16	<0.01	0.13	<0.01	0.11	<0.01	0.14	<0.01	0.14	<0.01
22	Copper	mg/l	0.050	1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
23	Chromium	mg/l	0.050	No relaxation	0.01	<0.05	0.02	<0.05	0.02	<0.05	0.03	<0.05	0.03	<0.05	0.03	<0.05
24	Cadmium	mg/l	0.003	No relaxation	<0.002	<0.001	<0.002	<0.001	<0.002	<0.001	<0.002	<0.001	<0.002	<0.001	<0.002	<0.001
25	Sodium as Na	mg/l	Not Specified		25.4	40	84.2	31	-	42		26	-	29	-	43
26	Potassium as K	mg/l	Not Specified		10.2	14	24.5	5	12.2	16	14.6	8	13.2	9	14.2	14
27	Total Coliform	MPN/ 100ml	Absent	-	Absent	<2	Absent	<2	Absent	<2	Absent	<2	Absent	<2	Absent	<2

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Location			As per IS 10500: 2012) Acceptable Limit	As per IS 10500: 2012) Permissible Limit	GW 1- Near Project Site		GW 2 - Existing Landfill Site		GW 3 - Okhla Phase I		GW 4 - Tughlakabad Village		GW 5 - Badarpur Village		GW 6 - Shahpur Govardhanpur Bangar	
S. No.	Parameter	Unit			Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024	Dec 2017- Feb 2018	March to May 2024
28	Faecal Coliform	MPN/ 100ml	-	-	Absent	<2	Absent	<2	Absent	<2	Absent	<2	Absent	<2	Absent	<2

Table 72. Ground Water Quality Results of Baseline season (March 2024-May 2024) and (December 2017-February 2018)

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3.9.8 Ground Water Quality Result Interpretation

Interpretation of Baseline data of December 2017 to February 2018

The water quality of the buffer zone shows that

- The Total Dissolved Solids (TDS) of the sampling locations ranges from 536 mg/l to 1044 mg/l. TDS of all sampling locations are within permissible limits.
- The Total Hardness of the sampling locations ranges from 324 mg/l to 680 mg/l. The hardness of all sampling locations are within permissible limits. Except GW 2 location.
- The Alkalinity of the sampling locations ranges from 190 mg/l to 600 mg/l. All sampling locations are within permissible limits.
- The Calcium Concentration of the sampling locations ranges from 80 mg/l to 160 mg/l. The Calcium levels of all sampling locations are within permissible limits.
- The Chloride Concentration of all the sampling locations ranges from 98 mg/l and 240 mg/l. The Chloride levels of all locations are within permissible limits.

Interpretation of Baseline data of March to May 2024

The water quality of the buffer zone shows that:

- The Total Dissolved Solids (TDS) of the sampling locations ranges from 447 mg/l to 606 mg/l. The TDS of all the sampling locations are within permissible limits.
- The Total Hardness of the sampling locations ranges from 278 mg/l to 383 mg/l. The hardness of all sampling locations are within permissible limits.
- The Alkalinity of the sampling locations ranges from 198 mg/l to 312 mg/l. All sampling locations except Badarpur village are within permissible limits.
- The Calcium Concentration of the sampling locations ranges from 71.6 mg/l to 99.2 mg/l. The Calcium of all sampling locations are within permissible limits.
- The Chloride Concentration of all the sampling locations ranges from 84 mg/l to 168 mg/l. The Chloride levels all locations are within permissible limits.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

3.9.9 Surface Water Quality Results

December 2017 to February 2018

S. No.	Parameter	Unit	SW1 (Nallah UP Stream)	SW2 (Nallah Down Stream)	SW3 (Nallah Centre)	SW4 (Canal Near Molarband)	SW5 (Bhuriya Nallah Near DLF Industrial Area)	SW6 (Yamuna River)
1	Turbidity	NTU	8	12	14	12	10	9
2	pH		7.89	7.56	7.29	7.57	7.47	7.5
3	Total Hardness (as CaCO ₃)	mg/l	252	244	256	248	278	252
4	Iron (as Fe)	mg/l	0.89	0.59	0.85	0.64	0.57	0.47
5	Chlorides (as Cl)	mg/l	196	202	185	136.6	142.2	160.3
6	Fluoride (as F)	mg/l	0.86	0.95	0.79	0.87	0.59	0.64
7	TDS	mg/l	1004	1087	1147	843	755	704
8	Calcium (as Ca ²⁺)	mg/l	56	49.6	64	45.4	41.2	52.8
9	Magnesium (as Mg ²⁺)	mg/l	27.216	29.16	23.328	5.6133	9.5256	6.8769
10	Copper (as Cu)	mg/l	0.01	0.02	0.01	0.01	0.01	0.01
11	Sulphate (as SO ₄)	mg/l	124	172	175	54.4	47.5	60.1
12	Nitrate (as NO ₃)	mg/l	1.5	1.1	1.2	1.4	1.2	2.1
13	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	0.001	0.001	0.001	0.001	0.001	0.001
14	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Selenium (as Se)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
18	Cyanide (as CN)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
19	Lead (as Pb)	mg/l	0.08	0.11	0.09	0.06	0.07	0.08

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"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Parameter	Unit	SW1 (Nallah UP Stream)	SW2 (Nallah Down Stream)	SW3 (Nallah Centre)	SW4 (Canal Near Molarband)	SW5 (Bhuriya Nallah Near DLF Industrial Area)	SW6 (Yamuna River)
20	Zinc (as Zn)	mg/l	0.45	0.52	0.62	0.52	0.47	0.49
21	Chromium (as Cr+6)	mg/l	0.01	0.02	0.03	0.02	0.03	0.01
22	Alkalinity (as CaCO ₃)	mg/l	436	420	480	396	342	256
23	Sodium	mg/l	245	256	286	188	190	156
24	Potassium	mg/l	39	46	34	45	32	28.5
25	Conductivity	µmhos/ cm	1625	1824	1789	1345	1284	1201
26	TSS	mg/l	32.2	44.6	78.2	45.5	41.2	27.5
27	Total Phosphorus (as PO ₄)	mg/l	13.85	15.4	14.2	3.9	7.12	4.72
28	Oil & Grease	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
29	Dissolved Oxygen	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	3.6
30	Silica (as Si)	mg/l	12.66	15.42	14.2	7.6	11.04	3.9
31	COD	mg/l	348	372	475	342	240.5	212.5
32	BOD	mg/l	224	242	288	120	102	92.4
33	Total Cr	mg/l	0.11	0.14	0.16	0.14	0.12	0.11
34	Nickel	mg/l	0.08	0.12	0.11	0.14	0.12	0.13
35	Total Coliform	MPN/1 00 ml	348000	70000	221000	542000	94000	84000

Table 73. Surface water Quality Results of Baseline season(December 2017-February 2018)

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg,
New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

March to May 2024

Locations			SW1- Nallah Up stream	SW 2- Nallah Down stream	SW3- Nallah Center	SW 4- Canal (Near Molarband)	SW 5- Bhuriya Nallah (Near DLF)	SW 6- Yamuna River
S. No.	Parameter	Units						
1	Colour	Hazen Units	<5					
2	Odour	-	Agreeable					
3	Taste	-	Not Done					
4	pH	-	7.62	7.56	7.26	7.45	7.85	7.92
5	Temperature	°C	23.6	24.8	26.5	25.3	25.7	26.3
6	Turbidity	NTU	6.0	10.0	12.0	8.0	10.0	9.0
7	Conductivity	µmhos/ cm	1393	1346	1355	1168	1313	987
8	Alkalinity as CaCO ₃	mg/l	416	432	359	320	393	267
9	Total Dissolved Solids	mg/l	905	875	880	759	853	642
10	Total Suspended Solids	mg/l	19.4	16.5	20.7	23.4	22.5	13.5
11	Total Hardness as CaCO ₃	mg/l	238	232	284	261	300	237
12	Calcium as CaCO ₃	mg/l	142	140	182	135	132	144
13	Magnesium as CaCO ₃	mg/l	96.0	92.0	102.0	99.0	90.0	93.0
14	Chloride as Cl	mg/l	165	156	195	163	167	152
15	Total Phosphorus	mg/l	9.20	8.40	6.70	8.40	9.40	5.30
16	Nitrate as NO ₃	mg/l	10.3	11.5	9.8	12.7	11.3	8.9
17	Sulphate as SO ₄	mg/l	79	71	93	62	61	55
18	Fluoride as F	mg/l	0.83	0.80	0.67	0.82	0.58	0.49
19	Ammonical Nitrogen	mg/l	9.3	8.4	6.9	8.4	7.3	6.3
20	Arsenic as As	mg/l	<0.01					
21	Lead as Pb	mg/l	<0.01					
22	Zinc as Zn, Max	mg/l	0.36	0.35	0.32	0.32	0.32	0.32
23	Iron	mg/l	<0.5					
24	Nickel	mg/l	<0.5					
25	Copper	mg/l	<0.001					
26	Chromium	mg/l	<0.001					
27	Cadmium	mg/l	<0.001					
28	Sodium as Na	mg/l	185	168	145	130	146	92

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Locations			SW1- Nallah Up stream	SW 2- Nallah Down stream	SW3- Nallah Center	SW 4- Canal (Near Molarband)	SW 5- Bhuriya Nallah (Near DLF)	SW 6- Yamuna River
S. No.	Parameter	Units						
29	Potassium as K	mg/l	63	60	56	48	63	43
30	Dissolved Oxygen	mg/l	<2					4.1
31	BOD	mg/l	13.5	11.3	10.5	10.5	10.5	10.5
32	COD	mg/l	320	359	416	290	216	196
33	Total Coliform	MPN/ 100ml	256000	68000	190000	124000	84000	68000
34	Faecal Coliform	MPN/ 100ml	153600	40800	114000	94400	50400	40800

Table 74. Surface water Quality Results of Baseline season (March 2024-May 2024)

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	pH between 6.5 and 8.5 Dissolved Oxygen 6 mg/l or more Biochemical Oxygen Demand 5 days 20 °C 2 mg/l or less
Outdoor bathing (Organised)	B	pH between 6.5 and 8.5 Dissolved Oxygen 5 mg/l or more Biochemical Oxygen Demand 5 days 20 °C 3 mg/l or less
Drinking water source after conventional treatment and disinfection	C	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more Biochemical Oxygen Demand 5 days 20 °C 3 mg/l or less
Propagation of Wildlife and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4 mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Boron Max. 2 mg/l

Table 75. Surface Water Designated Best Use by CPCB

3.9.10 Data Interpretation

Interpretation of Baseline data of December 2017 to February 2018

Surface water samples were collected from 06 locations namely Nallah Up stream, Nallah Down stream, Nallah Center, Canal (Near Molarband), Bhuriya Nallah (Near DLF industrial area) and Yamuna River.

As per the samples collected and analyzed the pH ranges from 7.29 to 7.89 and Electrical conductivity ranges from 1201 µmhos/cm to 1824 µmhos/cm. This shows that the surface water

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

quality of all the sampling locations can be placed in class “E” of Surface Water Designated Best Use by CPCB.

Interpretation of Baseline data of March to May 2024

Surface water samples were collected from 06 locations namely Nallah Up stream, Nallah Down stream, Nallah Center, Canal (Near Molarband), Bhuriya Nallah (Near DLF) and Yamuna River.

As per the samples collected and analyzed the pH ranges from 7.26 to 7.92 and Electrical conductivity ranges from 987 $\mu\text{mhos/cm}$ to 1393 $\mu\text{mhos/cm}$. This shows that the surface water quality of all the sampling locations can be placed in class “E” of Surface Water Designated Best Use by CPCB.

3.10 LAND AND ENVIRONMENT

3.10.1. Topography

The topographical survey of the proposed project has been carried out. The terrain of the site is undulating where rocks are generally exposed with soil at places. Contour level of the site varies from 181 msl to 191 msl.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

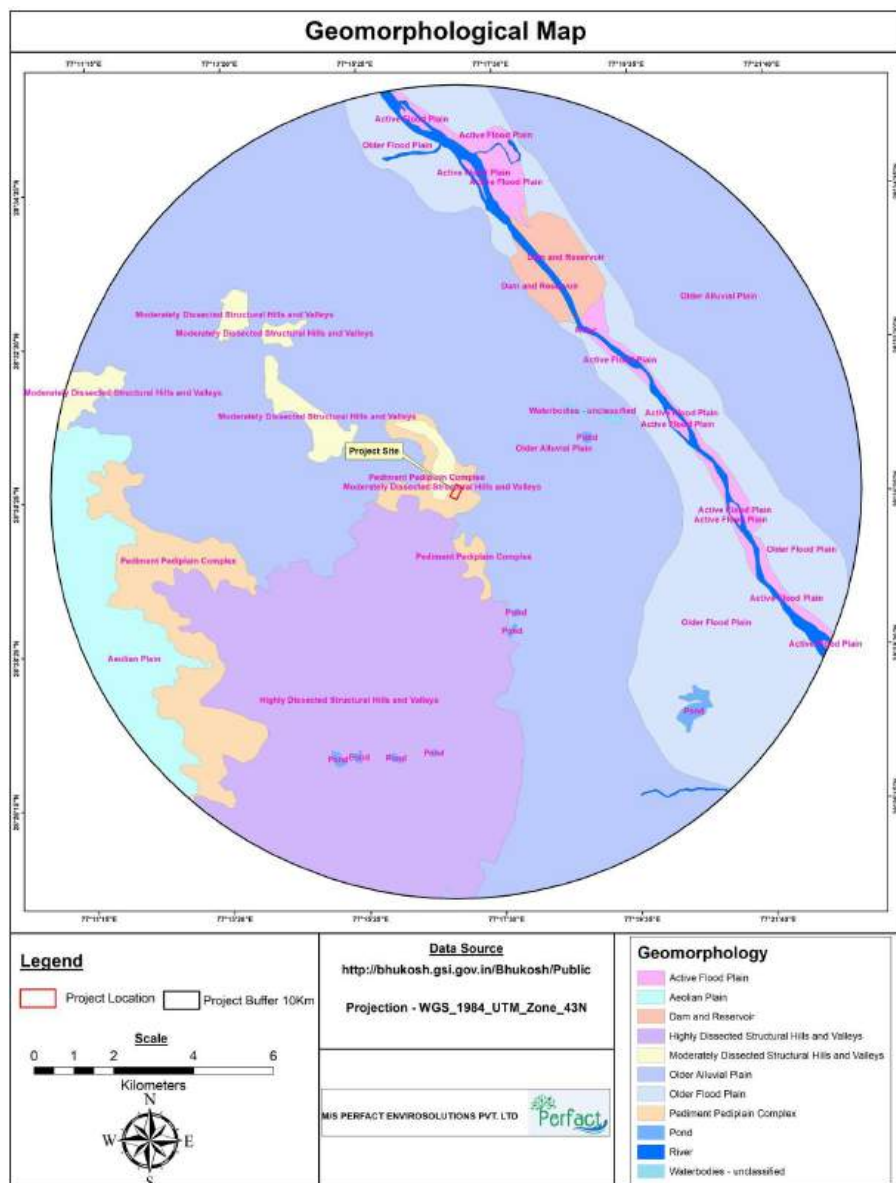


Figure 55. Geomorphological Map

3.10.2. DEM Map

Digital Elevation Model

Digital Elevation Models are data files that contain the elevation of the terrain over a specified area, usually at a fixed grid interval over the "Bare Earth". The intervals between each of the grid points will always be referenced to some geographical coordinate system. This is usually either latitude-longitude or UTM (Universal Transverse Mercator) coordinate systems. The closer together the grid points are located, the more detailed the information will be in the file. The details of the peaks and valleys in the terrain will be better modeled with small grid spacing than

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

when the grid intervals are very large. Elevations other than at the specific grid point locations are not contained in the file. As a result, peak points and valley points not coincident with the grid will not be recorded in the file. For practical purposes this "Bare Earth" DEM is generally synonymous with a Digital Terrain Model (DTM).

(A) Data Used

DEM Data: Shuttle Radar Topographic Mission (SRTM) data

Data Source: <http://srtm.csi.cgiar.org>

Software Used: ArcGIS

(B) Methodology

Shuttle Radar Topographic Mission (SRTM) data has been used for creation of the Digital Elevation Model of the study area. The SRTM data has vertical accuracy of 16m and the spatial resolution of 90m.

1st Stage:

The first processing stage involves importing and merging the 1-degree tiles into continuous elevation surfaces in Arc GRID format.

2nd Stage:

Resampling the data at 23m is done and a contour interval of 5m through the usual process of interpolation is created.

3rd Stage:

SRTM data is converted in grid format through ArcGIS to obtain elevation information of study area. Contours are then generated at a 2.0 m interval through a 3D analyst of Arc GIS and then are interpolating with raster data.

4th Stage:

Integration of DEM with contour map showing 3D view for analysis of surface is done.

(C) Interpretation

It is very clear from the DEM that the elevation varies from 172 m to 307 m in the whole area study area but the maximum elevation in the project site is 260 m. General Slope in the study area is towards the South East.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

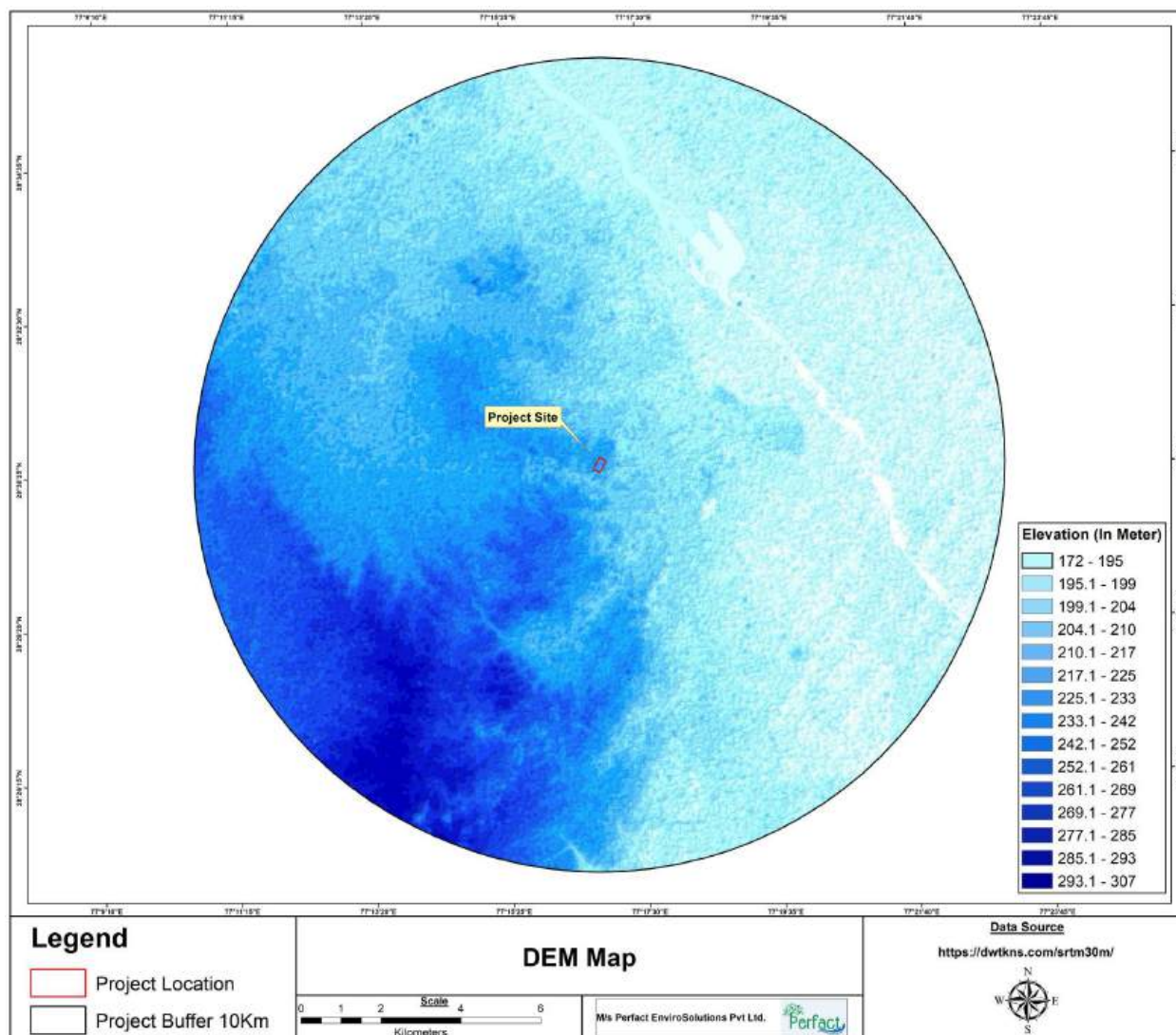


Figure 56. Digital Elevation Model of the Study Area

3.10.3. Land Use

INTRODUCTION

The land use/ land cover map has been generated on 1:50,000 scale using digital classification of Imagery. Based on the methodology developed for the present land use/ land cover, categories have been grouped under the following major land use/land cover categories. The data analysis process involves examining the data using various image processing techniques by a digital computer. Its application in the field of environmental management is of great prominence.

Objective

The objective of Land use studies is to determine the present land use pattern.

Data Used

A. Remote sensing data

- LANDSAT-09 - **Used for FCC Image** (Resolution 30m) (Date – 07-06-2025)
- Google Earth Image - **Used for preparation of Land Use/Land Cover Data** (Quickbird Resolution 0.6m Date- October 2024)
- ISRO Classification - **Used for map preparation**

B. Collateral Data

The study area comprises a 10 km buffer from the periphery of the project site. In this study Topo sheets 53 H/2, 53 H/3, 53 H/6 & 53 H/7 with 1:50,000 Scale were acquired from Survey of India (SOI).

METHODOLOGY

The methodology applied comes under following steps:

Image Extraction:

Satellite images for the Area of Interest were created through Image processing software.

Geo-Rectification:

Geometric correction includes correction for geometric distortions due to sensor, earth geometry variations and conversion of the data to real world coordinates (e.g. Latitude and Longitude) on the Earth's surface. The satellite imagery was geometrically rectified with reference to the geo-referenced toposheets and vector data.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Image Enhancement:

Image enhancement is one of the important image processing functions primarily done to improve the appearance of the imagery to assist in visual interpretation and analysis. Various options of image enhancement techniques were tried out to get the best image for visual interpretation. Histogram equalized stretch enhancement techniques were applied to the imagery of the study area for better interpretation of different features in the satellite imagery.

INTERPRETATION OF SATELLITE IMAGE

Visual interpretation techniques have been used for digitization of geographical features for different land use and vegetation cover classes based on spatial patterns of geographic features. Spectral signatures represent various land use classes. Image interpretation keys are developed based on image characteristics like color, tone, size, shape, texture, pattern, shadow, association etc, which enables interpretation of satellite images for ground features. Statistics of geographic features have been developed for impact assessment due to project activity.

After the above process the final LULC map has been prepared. The Flow chart of the methodology is given below.

Flow Chart for Methodology of LULC Map Preparation

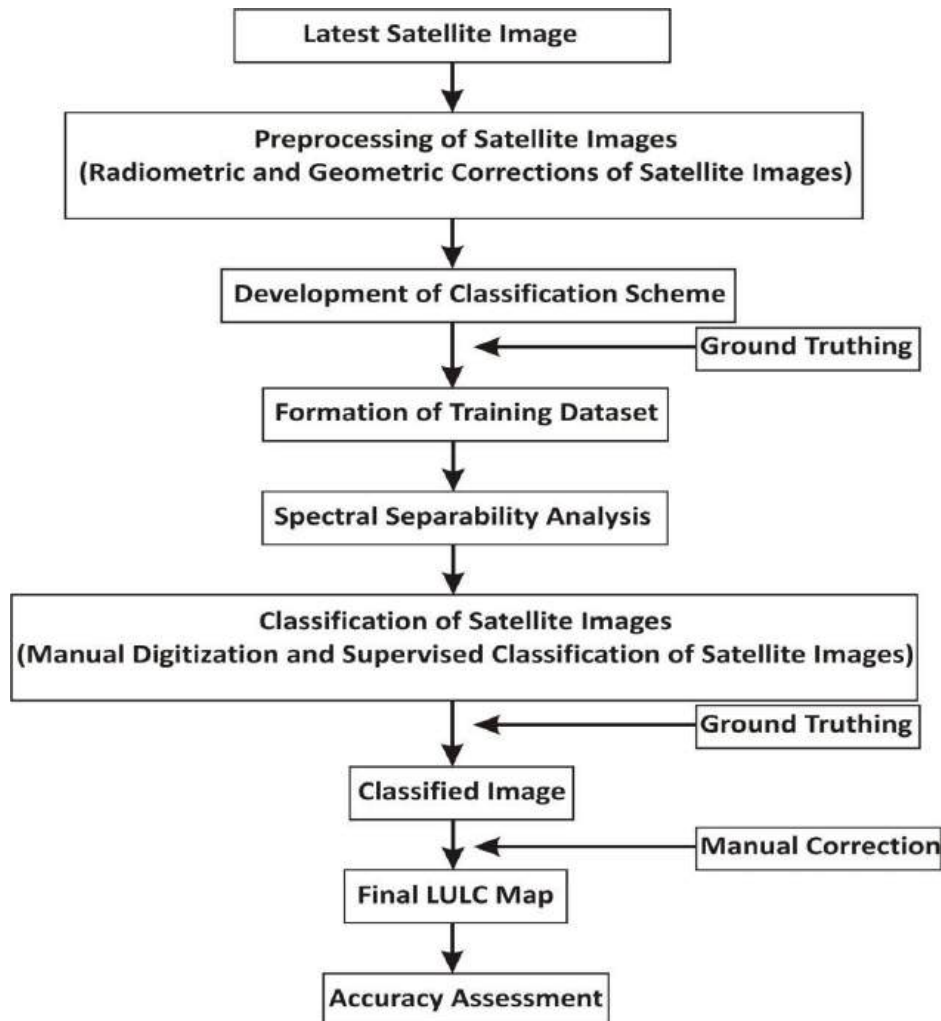


Figure 57. Flow Chart for Methodology of LULC Map Preparation

Pre-field Interpretation of Satellite Data

False color images are a representation of a multi-spectral image produced using bands other than visible red, green and blue as the red, green and blue components of an image display. The False Colour Composite (FCC) of LANDSAT satellite imagery having 30m spatial resolution satellite data and SOI toposheet at 1:50,000 scale was used for pre-field interpretation work. Taking the help of toposheets and by using the image elements, the features were identified. Each feature was identified on image by their image elements like tone, texture, color, shape, size, pattern and

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association. A tentative legend in terms of land cover and land use was formulated. The sample area for field check is selected covering all the land use/land cover feature cum image characteristics. FCC map of 10 km radius of LANDSAT imagery.

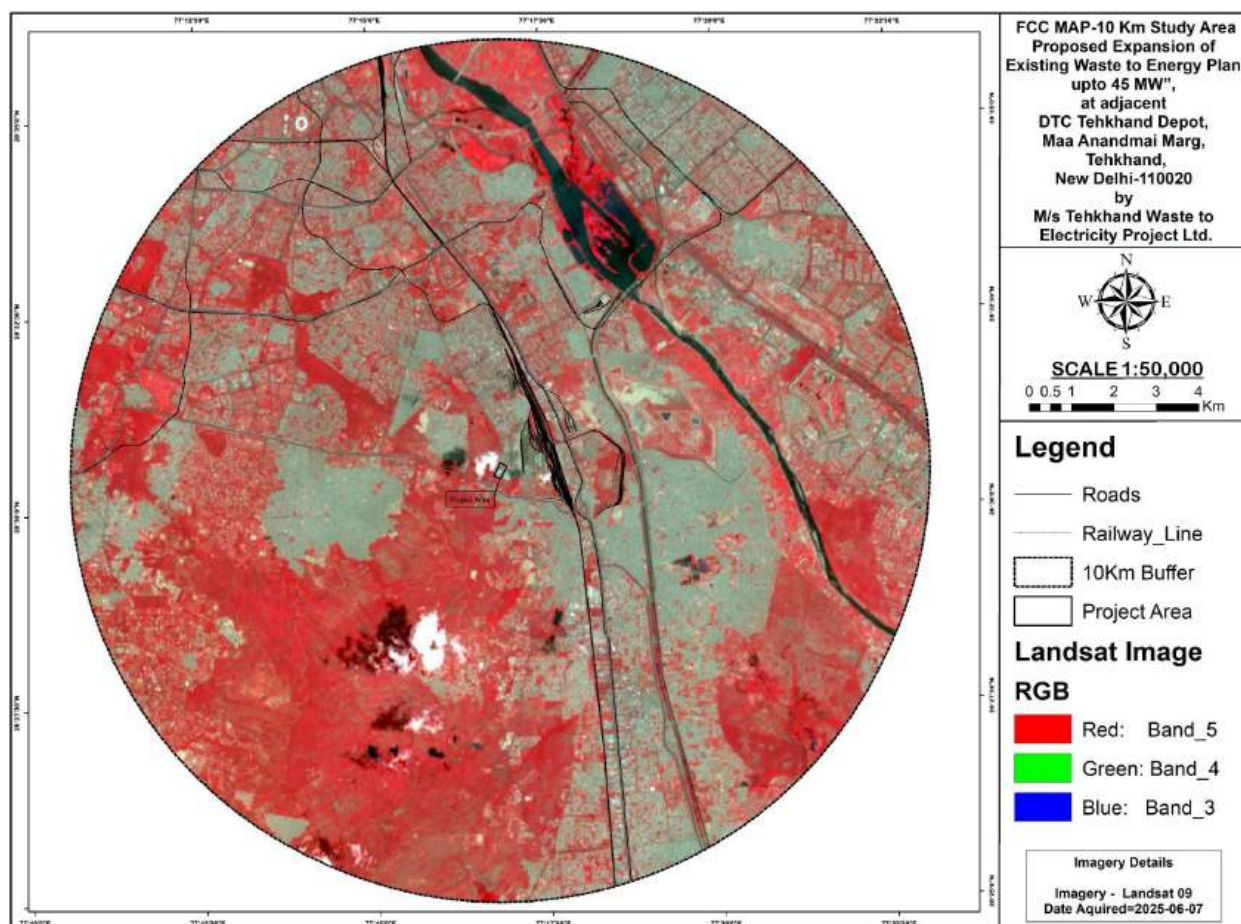


Figure 58. FCC Map

RESULTS AND CONCLUSIONS:

After the above process, the final LULC map has been prepared & the land use/ land cover map has been generated on a 1:50,000 scale using digital classification of Imagery. Based on the methodology developed for the present land use/ land cover, categories have been grouped under the following major land use/land cover categories.

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Land Use Map

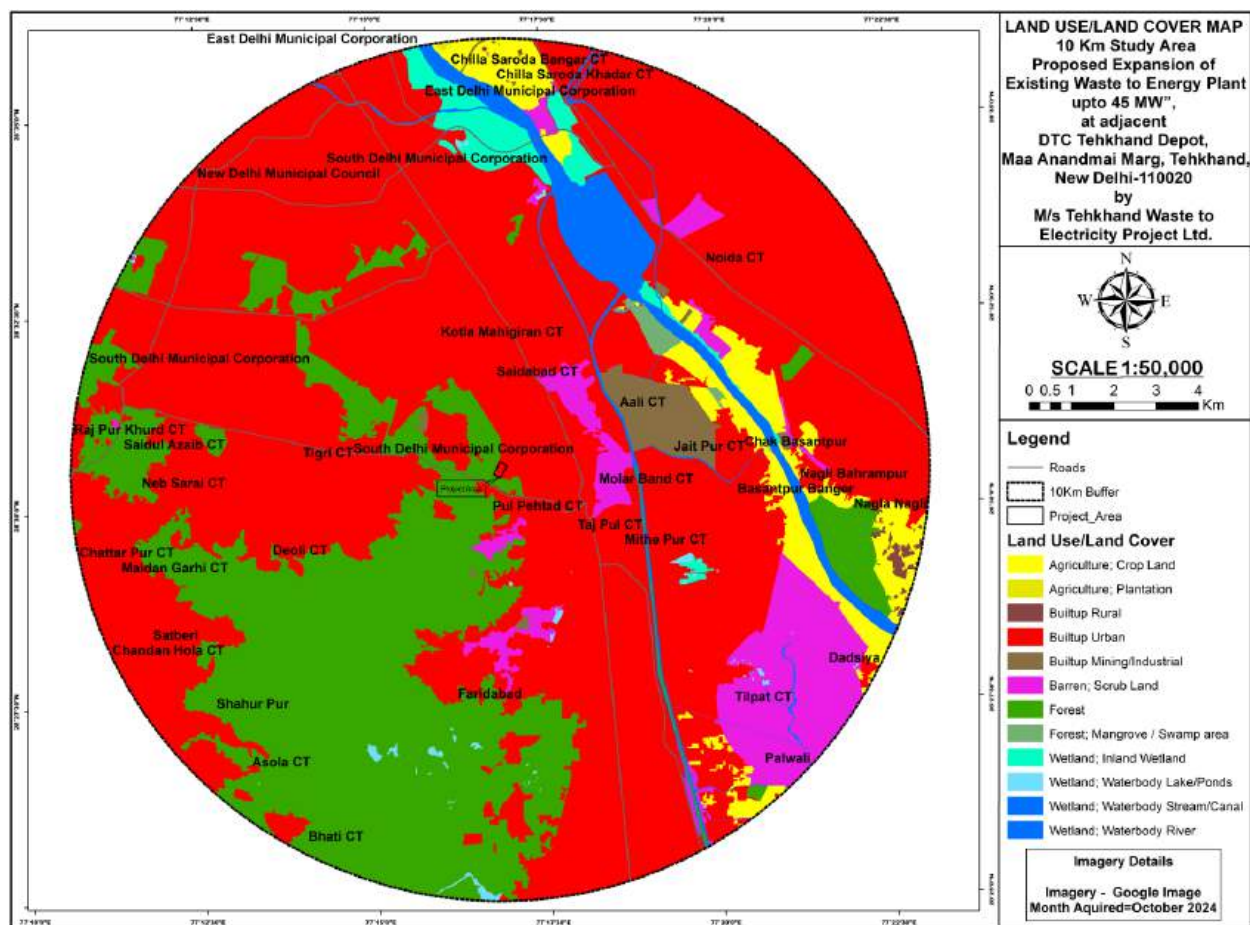


Figure 59. Land Use Map

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S No.	Category		Area in SQ Km	Area In Ha	Percentage
	Level-I	Level-II			
1	Agriculture Land (3.95%)	Agriculture; Crop Land	12.74965	1274.9	3.93
		Agriculture; Plantation	0.066004	6.6	0.02
2	Built-up Land (63.00%)	Built-up Rural	0.532815	53.2	0.16
		Built-up Urban	199.6506	19965.0	61.55
		Built-up Mining/Industrial	4.176258	417.6	1.29
3	Barren Land (5.43%)	Barren; Scrub Land	17.62316	1762.3	5.43
4	Forest Land (22.64%)	Forest	72.66188	7266.1	22.40
		Forest; Mangrove / Swamp area	0.766593	76.6	0.24
5	Wet Land (4.98%)	Wetland; Inland Wetland	5.033999	503.3	1.55
		Wetland; Water body Lake/Ponds	0.752095	75.2	0.23
		Wetland; Water body Stream/ Canal	1.453685	145.3	0.45
		Wetland; Water body River	8.905626	890.5	2.75
	Total		324.3723	32436.6	100.00

Table 76. Major land use/land cover categories of study area (10 Km Radius Buffer zone)

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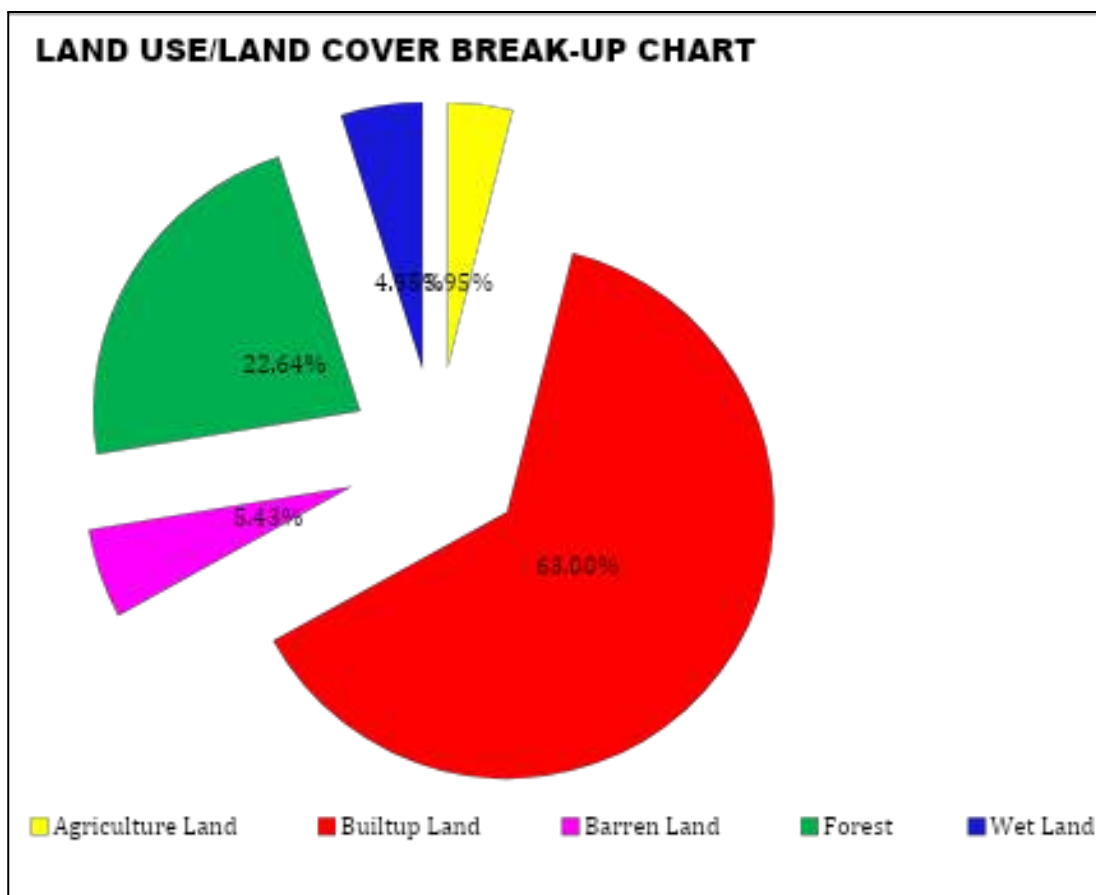


Figure 60. Land Use/ Land cover breakup chart

- **Agriculture Land:**

Based on analyzed imagery and ground truth, Crop land area extents have been extracted. The Agricultural Land area is about 1281.5 hectares which is 3.95 percent of the total 10 km radius study area.

- **Built up Land:**

Based on analysis of imagery, using GIS and ground truth the total built up area is about 20435.8 hectares which is 63.0 percent of the total study area.

- **Waste/Barren Land:**

The Barren Land area occupies around 1762.3 ha which is 5.43 percent of the study area.

- **Forest Land:**

The Barren Land area occupies around 7342.7 ha which is 22.64 percent of the study area.

- **Wet Land-Water Bodies:**

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Based on satellite data and ground truth, the total area covered by the inland wetland, river and water bodies is 1614.3 hectares which is 4.98 percent of the total study area.

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3.11 Soil Quality

To assess the soil quality of the proposed area, the following 10 stations were selected. Soil profile and quality was studied at different locations.

3.11.1 Sampling Location

(December 2017–February 2018)

Monitoring Station	Location	Distance & Direction	Environmental Significance
SQ 1	Project Site	-	Existing soil quality at Core Zone
SQ 2	Propose Landfill Site	200 m, E	Existing soil quality at Buffer Zone
SQ 3	Existing Landfill site	300 m, N	
SQ 7	Existing Mannur Site	4.91 Km, N	
SQ 4	Badarpur Village	Approx 2 Km, E	
SQ 5	Okhla Phase-1	2.11 Km, NE	
SQ 6	Asola Wildlife Sanctuary	4 Km, SW	
SQ 8	Jasola Vihar	5 Km, NE	
SQ 9	Near Tilpat Village	7.5 Km, SE	
SQ 10	Shahpur Govardhanpur Bangar	8.25 Km, E	

Table 77. Soil sampling Location for December 2017 - February 2018

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

(March 2024-May 2024)

Monitoring Station	Location	Distance & Direction	Environmental Significance
SQ 1	Project Site	-	Existing soil quality at Core Zone
SQ 2	Proposed Landfill Site	200 m , E	Existing soil quality at Buffer Zone
SQ 3	Existing Landfill site	300 m, N	
SQ 4	Badarpur Village	2 Km, E	
SQ 5	Okhla Phase-1	2.11 Km, NE	
SQ 6	Asola Wildlife Sanctuary	4 Km, SW	
SQ 7	Existing Mannur Site	4.91 Km, N	
SQ 8	Jasola Vihar	5 Km, NE	
SQ 9	Near Tilpat Village	7.5 Km, SE	
SQ 10	Shahpur Govardhanpur Bangar	8.25 Km, E	

Table 78. Soil sampling Location for March 2024 - May 2024

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3.11.2. Soil Sampling Locations

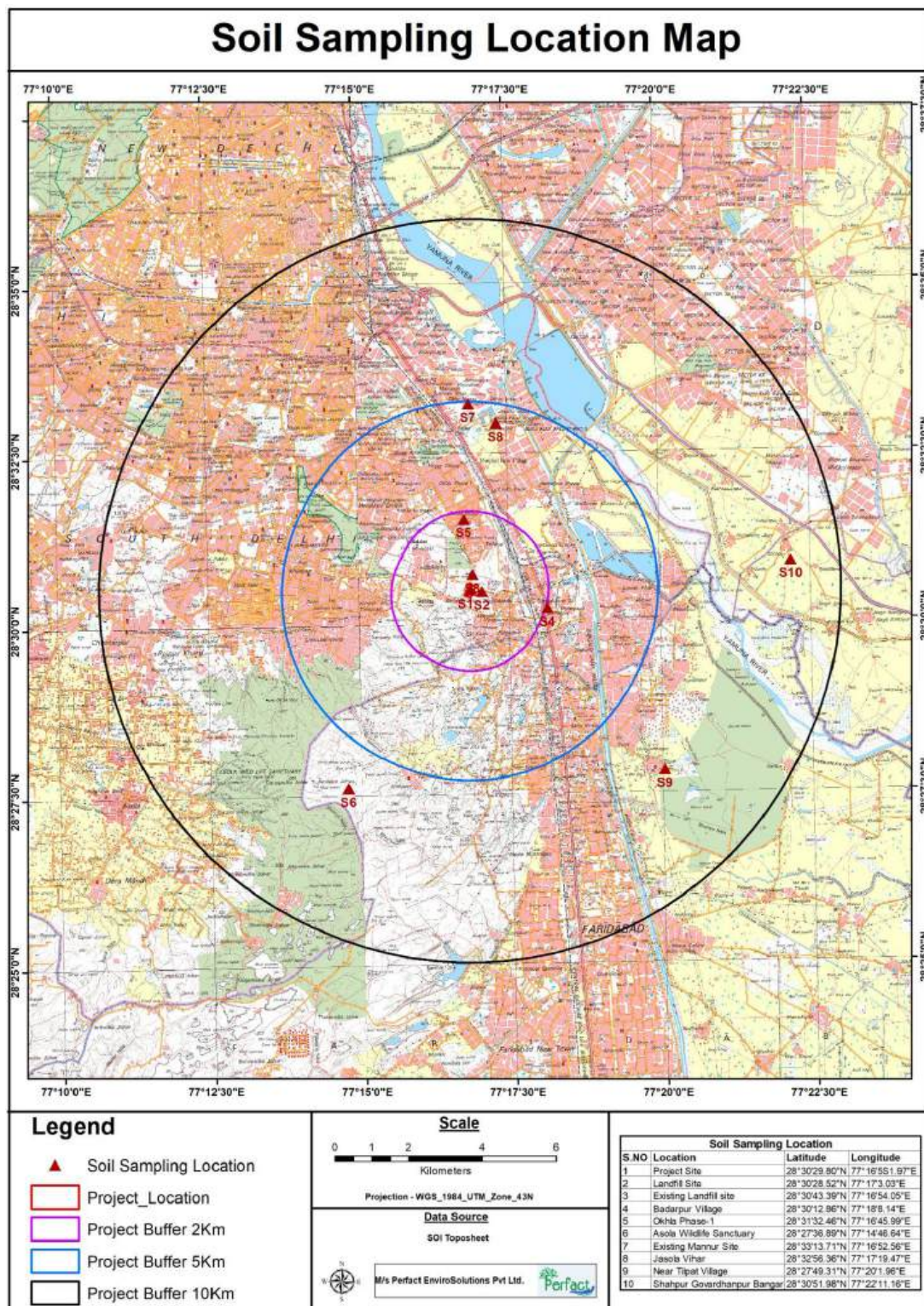


Figure 61. Soil Sampling Location Map

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

3.11.3. Laboratory Analysis

Prior to soil sampling, any waste material including leaves, grasses etc, were removed from the surface. Augur method was used and samples were collected at 15 cm depth after removing the upper crust. Materials such as stone, leaves, roots, sticks, etc., if present were removed. To prevent any contamination, samples were kept closed on clean and tight polythene bags for transportation to the laboratory. In the laboratory, samples from each spot were well mixed with hands on a clean polythene sheet. About 1 kg of soil was retained after the quartering process. This sample was kept for some time for air-drying at room temperature, stored in a polythene bag with a label at the top. Samples were analysed for bulk density, pH, nitrogen, phosphorus, calcium, magnesium and organic contents. Soil Quality Results are summarized below:

3.11.4. Physical & Chemical Properties of Soil

A comparative of Baseline collected in previous EIA i.e. **December 2017 to February 2018** (Winter Season) & Current baseline of **March to May 2024** (Summer Season) is given below:

December 2017 to February 2018

			SQ1- Project Site	SQ2- Propose landfill site	SQ3- Existing landfill site	SQ4- Existing manure site	SQ5- Badarpur Village	SQ6- Okhla phase 01	SQ7- Asola Wildlife sanctuary	SQ8- Jasola Vihar	SQ 9- Near Tilpat Village	SQ -10 Shahpur Govardhan pur Bangar
S. No.	Parameters	Units	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
1	Color		Brown	Brown	Brown	Brown	Light Brown	Brown	Brown	Brown	Brown	Brown
2	Textural class		Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam	Sandy clay Loam
3	Bulk Density	gm/cc	1.41	1.35	1.29	1.34	1.482	1.38	1.32	1.48	1.38	1.34
4	Water holding capacity	%	45	46.7	44.7	49.5	53.2	46.5	51.4	52.2	48.9	51.7
5	Porosity	%	42.7	47.5	45.9	51.2	54	41	59	40	47	46
6	sand	%	51.4	52.4	49.8	56.5	54.2	57.4	49.8	52.5	53.4	53.9
7	Silt	%	20.8	21.2	23.1	21	19.4	16.5	22.7	19.1	19.1	17.9
8	Clay	%	27.8	26.4	27.1	22.5	26.4	26.1	27.5	28.4	27.5	28.2
9	pH		7.47	7.48	7.78	7.42	7.6	7.42	7.65	8.3	7.3	8.09
10	Electrical Conductivity	µmhos /cm	895	688	425	842	964	847	1386	160	522	1406
11	Organic Carbon	%	0.021	0.024	0.026	0.027	0.024	0.029	0.067	0.023	0.034	0.031
12	Organic Matter	%	0.0350 7	0.04	0.043	0.045	0.04	0.048	0.111	0.038	0.056	0.051

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			SQ1- Project Site	SQ2- Propose landfill site	SQ3- Existing landfill site	SQ4- Existing manure site	SQ5- Badarpur Village	SQ6- Okhla phase 01	SQ7- Asola Wildlife sanctuary	SQ8- Jasola Vihar	SQ 9- Near Tilpat Village	SQ -10 Shahpur Govardhan pur Bangar
13	Exchangeable Calcium	mg/10 Ogm	533.06	324.6	285.8	284.5	140.28	435.5	645.28	424.8	136.27	120.24
14	Exchangeable Magnesium	mg/10 Ogm	29.16	24.3	26.7	24.2	218.7	204.5	102.06	29.16	31.57	194.4
15	Cation Exchange Capacity	meq/100 gm	15.62	9.72	9.42	9.94	14.95	21.33	-	12.72	-	13.65
16	Iron	mg/kg	746.6	847.5	782.1	654.2	711	1088	1125.6	1064	192	475.2
17	Lead	mg/kg	7.2	6.8	6.1	8.2	4.05	4.7	2.8	4.1	3.5	7.2
18	Moisture Content	%	3.43	1.68	3.46	7.2	8.6	4.9	7.5	8.4	4.87	4.1
19	Nitrogen	kg/Ha	542.5	574.2	586.2	742.5	425	645.2	652.5	356	485.2	742.5
20	Phosphorus	kg/Ha	37.6	29.8	65.2	38.4	45.25	40.7	41.49	41.2	41.9	38.5
21	Exchangeable Potassium	kg/Ha	21.01	9.16	7.75	35.2	13.88	41.5	112.8	14.07	21.51	17.57
22	SAR		0.16	0.13	0.34	0.36	0.62	0.21	3.5	0.17	0.58	0.7
23	Boron	mg/kg	1.11	0.97	0.75	1.8	1.5	1.4	1.815	1.2	1.5	1.7
24	Exchangeable Sodium	mg/10 Omg	12.57	8.34	20.72	21.2	45.47	19.8	325.3	12.12	26.14	48.37
25	Zinc	mg/kg	34.5	37.5	45.6	27.5	45.2	34.2	37.2	38.6	39.5	49.4

Table 79. Soil Sampling location results for December 2017 - February 2018

March to May 2024

Table 81. Soil Sampling location results for March 2024 - May 2024

			SQ1- Project Site	SQ2- Propose landfill site	SQ3- Existing landfill site	SQ4- Existing manure site	SQ5- Badarpur Village	SQ6- Okhla phase 01	SQ7- Asola Wildlife sanctuary	SQ8- Jasola Vihar	SQ 9- Near Tilpat Village	SQ -10 Shahpur Govardhanpur Bangar
S. No.	Parameters	Units	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
1	pH	-	7.32	7.15	7.26	7.35	7.45	7.53	7.26	7.48	7.53	7.42
2	Conductivity	mS/m	726	632	845	682	726	658	782	635	814	762
3	Moisture content	%	3.5	3.1	2.6	4.2	6.3	2.4	3.6	3.5	4.1	4.6
4	WHC	%	33.2	32.6	33.4	31.8	32.8	36.4	32.1	31.6	33.5	32.8

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			SQ1- Project Site	SQ2- Propose landfill site	SQ3- Existing landfill site	SQ4- Existing manure site	SQ5- Badarpur Village	SQ6- Okhla phase 01	SQ7- Asola Wildlife sanctuary	SQ8- Jasola Vihar	SQ 9- Near Tilpat Village	SQ -10 Shahpur Govardhanpur Bangar
5	Specific Gravity	%	3.26	4.15	3.62	4.25	4.15	4.18	4.51	5.46	4.13	4.23
6	Porosity	%	36.5	40.3	41.3	39.5	34.8	36.8	35.4	36.7	34.6	38.2
7	Bulk density	%	2.25	2.45	2.36	2.15	2.85	2.65	2.48	2.59	2.84	2.64
8	Sodium	mg/ 100g	8.0	10.0	11.0	9.0	10.0	7.0	12.0	10.0	11.0	8.0
9	Potassium	mg/ 100g	5.0	4.0	6.0	4.0	5.0	4.0	8.0	7.0	7.0	5.0
10	Calcium	mg/ 100g	16.5	15.2	14.3	19.2	14.5	11.8	13.5	14.7	13.6	14.2
11	Magnesium	mg/ 100g	9.5	8.3	9.4	7.6	6.4	6.2	7.5	9.4	7.1	6.3
12	Nitrate Nitrogen	mg/ 100g	6.85	9.26	7.35	6.24	6.40	6.48	7.26	8.45	8.62	7.36
13	Total Phosphate	mg/ 100g	32.6	36.4	37.8	38.5	40.3	39.5	40.3	36.4	35.8	36.9
14	Cadmium	mg/ 100g	<0.001									
15	Copper	mg/ 100g	<0.1									
16	Lead	mg/ 100g	<0.1									
17	Manganese	mg/ 100g	0.36	0.38	0.40	0.43	0.39	0.41	0.41	0.41	0.41	0.41
18	Zinc	mg/ 100g	<01									
19	Boron	mg/ 100g	<0.5									
20	CEC (Cation exchange Capacity)	Meq/100 gm	12.36	11.66	10.38	12.68	12.14	12.72	15.5	13.3	16.48	15.4
21	Organic Carbone	%	0.68	0.83	0.69	0.84	0.57	0.86	0.75	0.65	0.74	0.95
22	Nitrogen	mg/ 100g	16.5	18.3	16.2	15.7	18.3	19.5	13.4	20.3	18.7	20.4
23	Phosphorus	mg/ 100g	22.6	20.4	19.3	23.4	21.6	21.3	26.4	21.8	22.1	20.9
24	Texture:	-	Sandy Clay loam	Sandy Clay loam	Sandy loam	Sandy Clay loam	Sandy Clay loam	Sandy Clay loam	Sandy Clay loam	Sandy Clay loam	Sandy Clay loam	Sandy Clay loam
25	SAND	%	60	62	64	66	62	64	60	64	58	62
26	Silt	%	18	18	18	12	16	14	12	12	12	11

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

			SQ1- Project Site	SQ2- Propose landfill site	SQ3- Existing landfill site	SQ4- Existing manure site	SQ5- Badarpur Village	SQ6- Okhla phase 01	SQ7- Asola Wildlife sanctuary	SQ8- Jasola Vihar	SQ 9- Near Tilpat Village	SQ -10 Shahpur Govardhanpur Bangar
27	Clay	%	22	20	18	22	22	22	28	24	30	27
28	SAR	-	0.38	0.51	0.55	0.44	0.55	0.41	0.65	0.50	0.60	0.44
29	Pesticides											
(i)	2,4-D Iso-Octyl Ester	mg /100gm	ND	NA								
(ii)	Captan	mg/ 100 gm	ND	NA								
(iii)	Diazinon	mg/ 100gm	ND	NA								
(iv)	Fenamiphos	mg/ 100gm	ND	NA								
(v)	Fenpropimorph	mg/ 100gm	ND	NA								
(vi)	Glyphosate	mg /100gm	ND	NA								
(vii)	Imazaquin	mg/ 100gm	ND	NA								
(viii)	Metsulphuron Methyl	mg/ 100gm	ND	NA								
(ix)	Methidathion	mg/ 100gm	ND	NA								
(x)	Simazine	Mg 100gm	ND	NA								

Table 80.

3.11.5 Fertility of Soil at Onsite

Parameters	On site result in mg/kg (0-15 cm)	Low mg/kg (0-15 cm)	Medium mg/kg (0-15 cm)	High mg/kg (0-15 cm)	Remarks
Nitrogen	542.5	<156	157-313	>314	High
Potassium	21.01	<67	67.1-156	>156	Low
Phosphorus	37.6	<5.5	5.6-13.9	>14.0	High

Table 81. Fertility Soil at Onsite (December 2017 to February 2018)

Parameters	On site result in mg/kg (0-15 cm)	Low mg/kg (0-15 cm)	Medium mg/kg (0-15 cm)	High mg/kg (0-15 cm)	Remarks
Nitrogen	16.5	<156	157-313	>314	Low
Potassium	5	<67	67.1-156	>156	Low
Phosphorus	22.6	<5.5	5.6-13.9	>14.0	High

Table 82. Fertility Soil at Onsite (March to May 2024)

3.11.6 Data Interpretation

Interpretation of Baseline data of December 2017 to February 2018

Core Zone (S1): The samples collected from the site - S1 shows that the soil moisture content is 3.43%, pH is 7.47. The amount of primary nutrients like Organic matter is 0.03507%, the available nitrogen content is 542.5 mg/kg is high, available Potassium from 21.01 mg/kg is low while the available Phosphorus is 37.6 mg/kg is high. Therefore, the Primary nutrient profile shows that soil is low to medium fertile due to high concentration of available nitrogen, low concentration of potassium and High concentration of phosphorus.

Buffer Zone (S2- S10): The samples collected from the site S2- S10 shows that the soil moisture content in the buffer zone is between 1.68 -8.6 %, pH is 7.3 - 8.3. Amount of primary nutrients like Organic matter is 0.038 - 0.111 %, the available nitrogen 356 - 742.5 mg/kg is high, available Potassium 7.75 - 112.8 mg/kg is low-medium while the available Phosphorus 29.8- 65.2 mg/kg is in higher range. Therefore, the Primary nutrient profile shows that soil is Low to Medium fertile in the buffer zone due to the availability of high amounts of nitrogen, low-medium amount of potassium and higher concentration of phosphorus.

Interpretation of Baseline data of March to May 2024

Core Zone (S1): The samples collected from the site - S1 shows that the soil moisture content is 3.5%, pH is 7.32. The amount of primary nutrients like Organic matter is 0.68%, the available nitrogen content is 16.5 mg/kg is very low, available Potassium from 5.0 mg/kg is very low while the available Phosphorus is 22.6 mg/kg is very high. Therefore, the Primary nutrient profile shows that soil is low fertile due to low concentration of available nitrogen, potassium and High concentration of phosphorus.

Buffer Zone (S2- S10): The samples collected from the site S2- S10 shows that the soil moisture content in the buffer zone is between 2.4 -6.3 %, pH is 7.15 - 7.53. Amount of primary nutrients like Organic matter is 0.57 - 0.95 %, the available nitrogen 13.4 - 20.4 mg/kg is low, available Potassium 4.0 - 8.0 mg/kg is low while the available Phosphorus 19.3 - 26.4 mg/kg is in medium to higher range. Therefore, the Primary nutrient profile shows that soil is low fertile in the buffer zone due to the availability of low amounts of nitrogen, potassium and medium to higher concentration of phosphorus.

3.12 Ecology & Biodiversity

Objective

The objective of this study is in accordance with the Terms of Reference (ToR), primarily concentrating on a detailed inventory of the species (flora and fauna) identified in the vicinity

encompassing a 10 km radius. As such, the key objectives involve assessing the ecological health of the existing flora and fauna and their habitats, creating foundational data, and evaluating potential project induced impacts on the biological environment.

o Terrestrial and Arboreal Ecology and Biodiversity

- Scrutinization the key characteristics of the vegetation, with an emphasis on the various types of natural forests, the most frequently encountered and dominant floral species, their foliage retention patterns, associated families, the occurrence of man-made plantations, Exotic plant species.
- One of the objectives against the current study entails recognizing the prevailing habitat and land cover categories within the study region, such as forests, wetlands, agricultural areas, and urban development *etc.*
- Evaluation of the crop-diversity of the study area, along with an assessment allied to the native plant species with commercial and ethnomedicinal values.
- Identification of the susceptible plant and animal species in respect to their long-term survivability on the basis of IUCN Red Data List.
- Identification of the Schedule I species (as per WLPA, 1972 and the amendments thereafter).
- Studying the dietary and habitat preference of the animal species found.

o Aquatic Ecology and Biodiversity

- Identification of aquatic species including macrophytes, and fish species.
- This study focuses on identifying aquatic species that are susceptible to threats, evaluating their long-term viability according to the IUCN Red Data List and the Wildlife Protection Act of 1972, including its amendments afterward.

Environmental Sensitivity:

Within a 10 km radius, the study area includes ecologically significant features such as the Asola Wildlife Sanctuary and the Okhla Bird Sanctuary along the Yamuna River, both of which serve as important habitats for resident and migratory avifauna.

In addition, the region also supports Forest patches, together with notable surface water bodies that contribute to hydrological connectivity and biodiversity support. These sensitive ecological components play a critical role in sustaining local ecosystem services and maintaining environmental resilience in the urban landscape.

A detailed inventory of these water bodies within the 10 km buffer zone has been compiled to assess any potential project-related impacts and to guide appropriate mitigation strategies, ensuring the ecological stability and sustainable development of the region. The detailed list of environment sensitive places are given at chapter 2

Survey Methodology

o Baseline survey Period

March 2024 to May 2024

o Expanse of Study Area

314.16 square kilometers ($\pi r^2 = \pi \cdot 10^2 \approx 314.16$).

o Survey Approach

The primary and secondary survey that included the core zone—the area allocated for industry—as well as a buffer zone that extended 10 km surrounding the core zone was used to assess the biological variety of the area. Primary and secondary surveys were the main focus of the survey methodology. The adjacent land and water regions were taken into account for the assessments associated with natural vegetation. The process used for establishing a thorough inventory of the study area's floral variety and habitat categories using original observations and secondary data. Furthermore, the local population's traditional ecological knowledge supported these findings.

Investigations toward fauna species were carried out in day time (considering both direct and Indirect survey) usually by visual encounters and tracking animal calls, pugmarks, excreta evidence, scents of particular animals, etc., in order to gather ground truthing. A comprehensive listing of the study area's animal species was created by gathering primary and secondary records. Understanding the existing faunal life in the study region is additionally significantly helped by the insights offered by the locals. To improve and streamline the process of identifying different species, the surveys included photographic evidence. Consequently, the following is a summary of the environmental indicators associated with biological factors for the current course of action:

- Species composition of flora and fauna.
- Flora: Species diversity, predominant floral species, economic significance, and commercial values.
- Fauna: Species diversity, their feeding habit, migratory habits of avifauna species, etc.
- Primary Survey:

A conscious effort was made to clearly note the variety of plant species, including aquatic flora, during the field study, with a focus on the most common species and their habitats. Through visual observations, the existence of animal species, including birds, reptiles, and mammals, was carefully assessed. The information that locals in the study region supplied was essential for guiding current projects. Fish markets have become important informational resources for the diversity of fish and other aquatic creatures found there.

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Understanding the distinctive characteristics of animals in a particular area requires a significant investment of time and effort. In addition to collecting direct observations of species, ecological studies often documented indirect evidence of their presence, such as animal odors, footprints, droppings, and vocalizations. Furthermore, the confirmation of the existence of wildlife was made easier by talking to locals, who shared insightful information and mentioned how frequently animals interacted in the survey region.

The early morning hours of 7:00 to 9:00 am and the late afternoon hours of 3:30 to 5:00 pm were set aside for the avifauna survey. During the day, surveys of animals, amphibians, reptiles, and vegetation were carried out, along with from 9:00 am to 4:00 pm, butterflies were observed. A comprehensive survey of the bird species was carefully documented at each sample location, resulting in the creation of an extensive list. Binoculars and reputable field guides made it easier to identify different kinds of birds, guaranteeing precise species identification. Fishermen, fish markets, and other similar sources were the only sources of the primary aquatic data.

- **Secondary Survey:**

Many secondary sources, including books, research projects, and research papers, have provided support for the data and conclusions drawn from the primary survey. Additionally, the Divisional Forest Officer's verified list of plants and animals for the present project serves as a valuable additional source of information.

- **Species Inventorization:**

After merging primary data with information from desktop analysis, the biological diversity record of the study region for the current project was finally acquired and completed.

Survey Limitation

- **Insufficient Vegetation Density:** The limited density of vegetation has restricted the variety of sampling sites, thereby hindering the observation of species and the collection of relevant data.
- **Fragmentation of Natural Environments:** Agricultural practices and human activities have led to the fragmentation of natural environments, posing challenges for a thorough assessment of ecological patterns.
- **Seasonal Limitations:** The timing of the survey may not have aligned with the peak seasons for biodiversity, potentially resulting in the absence of migratory species or seasonal plant growth.
- **Limitation in Survey Stretch:** The surveys were exclusively conducted in daylight, thereby confining the observed bird activities to the hours of daylight. No surveys were performed at night.

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- **Shorter Timeframe:** The rapid surveys were executed over a limited timeframe, resulting in the report's omission of any analysis regarding seasonal variability in the data.

Cropping Pattern

During the baseline environmental monitoring season from March 2024 to May 2024 in the study area, agriculture was dominated by the rabi harvest and early kharif sowing in the limited peri-urban farmlands. Wheat was the principal crop, with harvesting carried out in March–April, providing both staple grain and fodder. Mustard, widely grown for its oilseed, was harvested during March, marking the end of the rabi cycle. Pulses such as chickpea and lentil were also harvested in this season, contributing to soil fertility enhancement through nitrogen fixation. With irrigation support, vegetables including cauliflower, spinach, radish, carrot, and leafy greens were cultivated, with harvesting extending through March–May, primarily to meet urban market demand. Following the rabi harvest, preparations for the kharif season began towards the end of May, with limited sowing of paddy, bajra (pearl millet), and fodder crops in pockets where irrigation and rainfall permitted. Overall, despite the significant decline in agricultural land due to urbanization, the residual agricultural areas in Delhi maintained a wheat–mustard–pulse dominated rabi system, supplemented by vegetables and early kharif sowings during the March–May monitoring period, ensuring local food supply and livelihood support in the urban fringe.

https://delhiplanning.delhi.gov.in/sites/default/files/Planning/2012-13/es_2012-13_agriculature_and_rural_development.pdf

Forest Type and Dominant Flora and Fauna Species

Within the vicinity of the proposed Waste-to-Energy Plant expansion at Tehkhand, the region's natural forest cover is confined primarily to the Delhi Ridge, a remnant of the ancient Aravalli system. This ridge supports tropical thorn and secondary forests, which represent the region's native vegetation under semi-arid conditions (*Delhi Forest Dept.; FSI, 2019*). Classified under the Tropical Thorn Forest type (Champion & Seth, 1968), these woodlands comprise sparse, thorny vegetation adapted to low-rainfall environments, with dominant species such as *Acacia nilotica*, *Acacia leucophloea*, and *Ziziphus spp.*

<https://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-delhi.pdf>

- **Flora of the study area:**

Approximately 6219 numbers of individual tree species have already been planted at the site. The list of trees planted at the site are given below:

Existing Tree Plantation list in the study area:

S. No.	Common Name	Botanical Name	Quantity
1	Silver Snake	<i>Sansevieria trifasciata</i>	131

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S. No.	Common Name	Botanical Name	Quantity
2	Firebush	<i>Hamelia patens</i>	166
3	Gudhal	<i>Hibiscus rosa -sinesis</i>	174
4	Bougainvillea	<i>Bougainvillea glabra</i>	55
5	Peepal	<i>Ficus religiosa</i>	136
6	China Palm	<i>Livistona chinensis</i>	15
7	Shahtoot	<i>Morus alba</i>	53
8	Neem	<i>Azadirachta indica</i>	243
9	Ficus	<i>Ficus benamina</i>	561
10	Kanak Champa	<i>Pterospermum acerifolium</i>	204
11	Tekoma	<i>Tecoma stans</i>	217
12	Harshringar	<i>Nyctanthes arbor-tristis</i>	26
13	Papaya	<i>Carica papaya</i>	2
14	Raatrani	<i>Cestrum nocturnum</i>	48
15	Lasoda	<i>Cordia myxa L</i>	21
16	Papdi	<i>Holoptelea integrifolia</i>	190
17	Jamun	<i>Syzygium cumini</i>	4
18	Pakar/Pilkhan	<i>Ficus virens</i>	95
19	Serissa	<i>Serissa foetida</i>	127
20	Sheesham	<i>Dalbergia sissoo</i>	329
21	Kikar	<i>Vachellia nilotica</i>	162
22	Molshree	<i>Mimusops elengi</i>	85
23	Panda Ficus	<i>Ficus benamina</i>	247
24	Arjun	<i>Terminalia arjuna</i>	245
25	Chandni	<i>Tabernaemontana divaricata</i>	22
26	Rose	<i>Rosa rubiginosa</i>	33
27	Bottle Brush	<i>Callistemon citrinus</i>	77
28	Jatropha	<i>Jatropha curcas</i>	331
29	Kandel	<i>Kandelia candel</i>	85
30	Kachnar	<i>Bauhinia variegata</i>	64
31	Marod phali	<i>Helicteres isora</i>	114
32	Buttonwood	<i>Conocarpus erectus</i>	1349
33	Balam kheera	<i>Kigelia africana</i>	116
34	Amaltas	<i>Cassia fistula</i>	13
35	Ber	<i>Ziziphus mauritiana</i>	1
36	Chilbal	<i>Holoptelea integrifolia</i>	16
37	Bargad	<i>Ficus benghalensis</i>	9

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S. No.	Common Name	Botanical Name	Quantity
38	Semal	<i>Bombax ceiba</i>	12
39	Gulmohar	<i>Delonix regia</i>	27
40	Shami	<i>Prosopis cineraria</i>	2
41	Cassia Semia	<i>Senna siamea</i>	44
42	Ashok	<i>Saraca asoca</i>	90
43	Bottle Palm	<i>Hyophorbe lagenicaulis</i>	41
44	Khajur	<i>Phoenix dactylifera</i>	23
45	Amla	<i>Embllica officinalis</i>	9
46	Bael	<i>Aegle marmelos</i>	6
47	Fish Palm	<i>Caryota urens</i>	20
48	Alii ficus	<i>Ficus maclellandii</i>	16
49	Guava	<i>Psidium guajava</i>	16
50	Anaar	<i>Punica granatum</i>	5
51	Mango	<i>Mangifera indica</i>	8
52	Chukrasia	<i>Chukrasia tabularis</i>	62
53	Kadam	<i>Neolamarckia cadamba</i>	19
54	Imli	<i>Tamarindus indica</i>	2
55	Guldar	<i>Gliricidia sepium</i>	50
56	Lemon	<i>Citrus limon</i>	1
Total			6219

Table 83. List of the existing plantation in the Study Area

- A primary and secondary floral study was conducted to record the floral species and their composition in the study area. The table below provides details of the existing natural floral composition in the study area.

S.NO.	SCIENTIFIC NAME	COMMON NAME	FAMILY	ORIGIN	IUCN STATUS
HABIT: TREE					
1	<i>Acacia nilotica</i>	Kikar	Fabaceae	Native	LC
2	<i>Prosopis juliflora</i>	Kabli Kikar	Fabaceae	Exotic	LC
3	<i>Azadirachta indica</i>	Neem	Meliaceae	Native	LC
4	<i>Holoptelea integrifolia</i>	Papri	Ulmaceae	Native	LC
5	<i>Eucalyptus sp</i>	Safeda	Myrtaceae	Exotic	-
6	<i>Dalbergia sissoo</i>	Sheesham	Fabaceae	Native	LC
7	<i>Albizia sp</i>	Siras	Fabaceae	Native	LC
8	<i>Acacia auricularia</i>	Sopab Babool	Fabaceae	Exotic	LC

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S.NO.	SCIENTIFIC NAME	COMMON NAME	FAMILY	ORIGIN	IUCN STATUS
9	<i>Anogeissus pendula</i>	Kardhai	Combretaceae	Native	LC
10	<i>Acacia catechu</i>	Khair	Fabaceae	Native	LC
11	<i>Butea monosperma</i>	Palash	Fabaceae	Native	LC
12	<i>Cassia fistula</i>	Amaltas	Fabaceae	Native	LC
13	<i>Prosopis juliflora</i>	Kanta babool	Fabaceae	Exotic	LC
14	<i>Tridax procumbens</i>	Coat button	Asteraceae	Exotic	-
15	<i>Pongamia pinnata</i>	Karanj	Fabaceae	Native	LC
16	<i>Ziziphus mauritiana</i>	Ber	Rhamnaceae	Native	LC
17	<i>Ficus benghalensis</i>	Pipal	Moraceae	Native	-
18	<i>Syzygium cumini</i>	Jamun	Myrtaceae	Native	LC
19	<i>Acacia modesta</i>	Phulai	Fabaceae	Native	-
20	<i>Acacia senegal</i>	Gum Arabic Tree	Fabaceae	Native	LC
21	<i>Acacia leucophloea</i>	White-bark Acacia	Fabaceae	Native	LC
22	<i>Salvadora persica</i>	Toothbrush Tree	Salvadoraceae	Native	LC
23	<i>Wrightia tinctoria</i>	Pala Indigo Plant	Apocynaceae	Native	LC
24	<i>Balanites aegyptiaca</i>	Desert Date	Zygophyllaceae	Native	LC
25	<i>Erythrina Variegata</i>	Indian Coral Tree	Fabaceae	Native	LC
26	<i>Derris indica</i>	Indian Beech	Fabaceae	Native	-
27	<i>Neolamarckia cadamba</i>	Kadamba Tree	Rubiaceae	Native	-
28	<i>Diospyros cordifolia</i>	Indian Ebony	Ebenaceae	Native	-
29	<i>Anogeissus pendula</i>	Button Tree	Combretaceae	Native	LC
30	<i>Acacia tortilis</i>	Umbrella Thorn Acacia	Fabaceae	Exotic	LC
31	<i>Alstonia scholaris</i>	Indian Devil Tree	Apocynaceae	Native	LC
32	<i>Balanites roxburghii</i>	Hingot	Zygophyllaceae	Native	LC
33	<i>Erythrina variegata</i>	Indian Coral Tree	Fabaceae	Native	LC
34	<i>Euphorbia neriifolia</i>	Milk Hedge	Euphorbiaceae	Native	LC
35	<i>Jacaranda mimosifolia</i>	Blue Jacaranda	Bignoniaceae	Exotic	VU
36	<i>Maytenus senegalensis</i>	Confetti Tree	Celastraceae	Native	-
37	<i>Fernandoa adenophylla</i>	Katsagon Tree	Bignoniaceae	Native	LC
38	<i>Capparis decidua</i>	Caper Bush	Capparaceae	Native	LC
HABIT: SHRUBS					
1	<i>Capparis sepiaria</i>	Karbala	Capparaceae	Native	LC

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S.NO.	SCIENTIFIC NAME	COMMON NAME	FAMILY	ORIGIN	IUCN STATUS
2	<i>Ziziphus oenoplia</i>	Jujubae	Rhamnaceae	Native	LC
3	<i>Calotropis procera</i>	Aak	Apocynaceae	Native	LC
4	<i>Withania somnifera</i>	Ashwagandha	Solanaceae	Native	DD
5	<i>Cannabis sativa</i>	Canabis	Cannabaceae	Exotic	-
6	<i>Adhatoda vasica</i>	Malabar Nut	Acanthaceae	Native	LC
7	<i>Grewia tenax</i>	Dhaman Fruit	Malvaceae	Native	LC
8	<i>Carissa spinarum</i>	Karonda	Apocynaceae	Native	LC
9	<i>Adhatoda zeylanica</i>	Malabar Nut	Acanthaceae	Native	LC
10	<i>Jatropha gossypifolia</i>	Bellyache Bush	Euphorbiaceae	Exotic	LC
11	<i>Opuntia dillenii</i>	Prickly Pear Cactus	Cactaceae	Exotic	LC
12	<i>Abrus precatorius</i>	Ratti	Fabaceae	Native	-
13	<i>Asparagus racemosus</i>	Shatavari	Asparagaceae	Native	-
14	<i>Datura metel</i>	Kala Dhatura	Solanaceae	Exotic	-
15	<i>Ipomoea carnea</i>	Bush Morning Glory	Convolvulaceae	Exotic	-
16	<i>Lantana camara</i>	Lantana	Verbenaceae	Exotic	-
17	<i>Oxystelma esculentum</i>	Dudhi Bel	Apocynaceae	Native	-
18	<i>Plumbago zeylanica</i>	Chitrak	Plumbaginaceae	Native	-
19	<i>Solanum xanthocarpum</i>	Yellow-berried Nightshade	Solanaceae	Native	-
20	<i>Tabernaemontana divaricata</i>	Crape Jasmine	Apocynaceae	Native	LC
21	<i>Withania somnifera</i>	Ashwagandha	Solanaceae	Native	DD
NE: Not evaluated, DD: Data deficient, LC: Least Concern, VU: Vulnerable, NT: Near Threatened, EN: Endangered, CR: Critically Endangered					

Table 84. List of Trees and Shrubs of the study area

S. NO.	SCIENTIFIC NAME	COMMON NAME	FAMILY	ORIGIN	IUCN STATUS
HABIT: HERBS					
1	<i>Alternanthera spp.</i>	Joseph's Coat	Amaranthaceae	Native	-
2	<i>Eichhornia crassipes</i>	Jal kumbhi	Pontederiaceae	Exotic	-
3	<i>Chenopodium sp</i>	Bathua	Amaranthaceae	Exotic	LC
4	<i>Ipomoea sp</i>	Behaya	Convolvulaceae	Native	LC
5	<i>Xanthium strumarium</i>	Cocklebur	Asteraceae	Exotic	-
6	<i>Euphorbia hirta</i>	Asthma weed	Euphorbiaceae	Exotic	-

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S. NO.	SCIENTIFIC NAME	COMMON NAME	FAMILY	ORIGIN	IUCN STATUS
7	<i>Tridax procumbens</i>	Coat button	Asteraceae	Exotic	-
8	<i>Acalypha indica</i>	Indian Copperleaf	Euphorbiaceae	Native	-
9	<i>Achyranthes aspera</i>	Prickly Chaff Flower	Amaranthaceae	Native	-
10	<i>Ageratum conyzoides</i>	Billygoat Weed	Asteraceae	Exotic / Invasive	LC
11	<i>Alysicarpus vaginalis</i>	Alyce Clover	Fabaceae	Native	-
12	<i>Blepharis maderaspatensis</i>	Madras Blepharis	Acanthaceae	Native	-
13	<i>Blepharis repens</i>	Creeping Blepharis	Acanthaceae	Native	-
14	<i>Boerhavia diffusa</i>	Punarnava	Nyctaginaceae	Native	-
15	<i>Borreria articularis</i>	Jointed Buttonweed	Rubiaceae	Native	-
16	<i>Cassia pumila</i>	Dwarf Cassia	Fabaceae	Native	-
17	<i>Cassia tora</i>	Sickle Senna	Fabaceae	Native	-
18	<i>Chenopodium album</i>	Bathua	Amaranthaceae	Exotic	-
19	<i>Corchorus capsularis</i>	White Jute	Malvaceae	Exotic	-
20	<i>Corchorus depressus</i>	Low Jute	Malvaceae	Native	-
21	<i>Evolvulus alsinoides</i>	Shankhpushpi	Convolvulaceae	Native	-
22	<i>Indigofera enneaphylla</i>	Creeping Indigo	Fabaceae	Native	-
23	<i>Indigofera linifolia</i>	Narrow-leaved Indigo	Fabaceae	Native	LC
24	<i>Justicia simplex</i>	Simple Justicia	Acanthaceae	Native	-
25	<i>Malvastrum coromandelianum</i>	False Mallow	Malvaceae	Exotic/ Invasive	-
26	<i>Ocimum americanum</i>	Hoary Basil	Lamiaceae	Native	-
27	<i>Oxalis corniculata</i>	Creeping Wood Sorrel	Oxalidaceae	Native	-
28	<i>Parthenium hysterophorus</i>	Congress Grass	Asteraceae	Exotic / Invasive	-
29	<i>Peristrophe paniculata</i>	Magenta Peristrophe	Acanthaceae	Native	-
30	<i>Sesamum orientale</i>	Sesame	Pedaliaceae	Exotic	-
31	<i>Sida cordata</i>	Heart-leaved Sida	Malvaceae	Native	--

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S. NO.	SCIENTIFIC NAME	COMMON NAME	FAMILY	ORIGIN	IUCN STATUS
32	<i>Sida rhombifolia</i>	Arrowleaf Sida	Malvaceae	Native	-
33	<i>Tephrosia purpurea</i>	Wild Indigo	Fabaceae	Native	LC
34	<i>Tephrosia strigosa</i>	Hairy Wild Indigo	Fabaceae	Native	-
35	<i>Tribulus terrestris</i>	Gokhru	Zygophyllaceae	Native	LC
36	<i>Tridax procumbens</i>	Coat Buttons	Asteraceae	Exotic/ Invasive	-
37	<i>Triumfetta rhomboidea</i>	Burr Bush	Malvaceae	Exotic	-
38	<i>Vernonia cinerea</i>	Little Ironweed	Asteraceae	Native	-
39	<i>Xanthium strumarium</i>	Cocklebur	Asteraceae	Exotic/ Invasive	-
HABIT: GRASS					
1	<i>Cyperus sp</i>	Sedge grass	Cyperaceae	Native	LC
2	<i>Saccharum spontaneum</i>	Wild Sugarcane	Poaceae	Native	LC
3	<i>Saccharum bengalense</i>	Sarkanda	Poaceae	Native	-
4	<i>Typha angustifolia</i>	Herbaceous	Typhaceae	Native	LC
5	<i>Arundo donax</i>	Cane grass	Poaceae	Exotic	LC
6	<i>Aristida sp</i>	Wire grass	Poaceae	Native	LC
7	<i>Eragrostis poaeoides</i>	Cane grass	Poaceae	Native	-

Table 85. List of flora other than trees and shrubs

- Fauna of the Study area :

A comprehensive study of the local fauna within the study area was conducted through both primary and secondary surveys, with a focus on birds, mammals, and herpetofauna. Given that the study was limited to a single season and data was extensive, secondary sources were also utilized to enhance our ecological biodiversity assessment. This included an extensive review of existing literature, such as research papers, recent articles, dissertations, topographical maps, and textbooks, to identify critical corridors and the presence of any endangered species near the project buffer zone.

S. NO.	ZOOLOGICAL NAME	COMMON NAME	FAMILY	SCHEDULE (WLPA, 2022)	IUCN STATUS
1	<i>Boselaphus tragocamelus</i>	Nilgai	Bovidae	II	LC
2	<i>Sus scrofa</i>	Wild Pig	Suidae	II	LC
3	<i>Funambulus palmarum</i>	Indian Palm squirrel	Sciuridae	-	-
4	<i>Rattus rattus</i>	Black rats	Muridae	-	LC
5	<i>Mus musculus</i>	House mouse	Muridae	-	LC
6	<i>Felis chaus</i>	Jungle cat	Felidae	I	LC
7	<i>Macaca mulatta</i>	Rhesus macaque	Cercopithecidae	-	LC
8	<i>Canis aureus</i>	Jackal	Canidae	I	LC

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S. NO.	ZOOLOGICAL NAME	COMMON NAME	FAMILY	SCHEDULE (WLPA, 2022)	IUCN STATUS
9	<i>Herpestes edwardsii</i>	Indian grey mongoose	Herpestidae	I	LC
10	<i>Hyaena hyaena</i>	Striped Hyaena	Hyaenidae	I	NT
11	<i>Viverricula indica</i>	Small Indian civet	Viverridae	I	LC
12	<i>Lepus nigricollis</i>	Rufous Tailed hare	Leporidae	II	LC
13	<i>Hystrix indica</i>	Indian Crested Porcupine	Hystriidae	I	LC
14	<i>Axis axis</i>	Chital	Cervidae	-	LC
15	<i>Panthera pardus</i>	Leopard	Felidae	I	VU
16	<i>Lepus nigricollis</i>	Black Naped Hare	Leporidae	-	LC
17	<i>Urva smithii</i>	Ruddy Mongoose	Herpestidae	I	LC
18	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	Viverridae	I	LC
19	<i>Canis lupus</i>	Indian Wolf	Canidae	I	EN
H: Herbivore, C: Carnivore, O: Omnivore.					
NE: Not evaluated, LC: Least Concern, VU: Vulnerable, NT: Near Threatened, EN: Endangered, CR: Critically Endangered.					

Table 86. List of the Mammals in the Study Area

S. No.	Common Name	Scientific Name	Family	Food Habit	Schedule (Wlpa, 2022)	IUCN Status
Category: Amphibians						
1	Common Indian Toad	<i>Duttaphrynus melanostictus</i>	Bufonidae	C	-	LC
2	Skittering Frog	<i>Euphlyctis cyanophlyctis</i>	Dicroglossidae	C	II	LC
3	Indian Bull Frog	<i>Hoplobatrachus tigerinus</i>	Dicroglossidae	C	II	LC
Category: Reptiles						
1.	Spotted Indian House Gecko	<i>Hemidactylus frenatus</i>	Gekkonidae	C	-	LC
2.	Indian chameleon	<i>Chamaeleo zeylanicus</i>	Chamaeleonidae	C	I	LC
3.	Indian Garden Lizard	<i>Calotes versicolor</i>	Agamidae	C	-	LC
4.	Indian Rat Snake	<i>Ptyas mucosa</i>	Colubridae	C	I	LC
5.	Spiny tailed lizard	<i>Uromastix hardwickii</i>	Agamidae	H	I	VU
6.	Indian Cobra	<i>Naja naja</i>	Elapidae	C	I	LC
O- Omnivorous, H- Herbivorous, C- Carnivorous Data Deficient (DD) • Least Concern (LC) • Near Threatened (NT) • Vulnerable (VU) • Endangered (EN)						

Table 87. List of the Herpetofauna in the Study Area

Avi-Fauna of the Study area:

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S. No	Common Name	Scientific Name	Family	IUCN Status	Schedule (WLPA, 2022)
1	Blue rock Pigeon	<i>Columba livia</i>	Columbidae	LC	-
2	Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae	LC	II
3	Roller / Blue Jay	<i>Coracias benghalensis</i>	Coraciidae	LC	II
4	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	LC	II
5	House Crow	<i>Corvus splendens</i>	Corvidae	LC	-
6	Plain Prinia	<i>Prinia inornata</i>	Cisticolidae	LC	II
7	Little Egret	<i>Egretta garzetta</i>	Ardeidae	LC	II
8	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	LC	II
9	Indian Pond Heron	<i>Ardeola grayii</i>	Ardeidae	LC	II
10	Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	LC	II
11	Common Pariah Kite	<i>Milvus migrans</i>	Accipitridae	LC	II
12	Shikra	<i>Accipiter badius</i>	Accipitridae	LC	I
13	Common Tailor Bird	<i>Orthotomus sutorius</i>	Cisticolidae	LC	II
14	Asian Koel	<i>Eudynamis scolopaceus</i>	Cuculidae	LC	-
15	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC	II
16	Green Bee-eater	<i>Merops orientalis</i>	Meropidae	LC	II
17	Indian Robin	<i>Copsychus fulicatus</i>	Muscicapidae	LC	-
18	Purple Sunbird	<i>Nectarinia asiatica</i>	Nectariniidae	LC	-
19	Jungle Babbler	<i>Argya striata</i>	Leiothrichidae	LC	-
20	Common Hoopoe	<i>Upupa epops</i>	Upupidae	LC	II
21	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittacidae	LC	II
22	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	LC	II
23	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	LC	I
24	Gray Francolin	<i>Ortygornis pondicerianus</i>	Phasianidae	LC	-
25	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Columbidae	LC	II
26	Laughing Dove	<i>Spilopelia senegalensis</i>	Columbidae	LC	-
27	Yellow-footed Green-Pigeon	<i>Treron phoenicopterus</i>	Columbidae	LC	II
28	Greater Coucal	<i>Centropus sinensis</i>	Cuculidae	LC	II
29	Pied Cuckoo	<i>Clamator jacobinus</i>	Cuculidae	LC	II

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30	Asian Koel	<i>Eudynamys scolopaceus</i>	Cuculidae	LC	II
31	Gray-bellied Cuckoo	<i>Cacomantis passerinus</i>	Cuculidae	LC	II
32	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae	LC	II
33	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	LC	II
34	Black Kite	<i>Milvus migrans</i>	Accipitridae	LC	II
35	Spotted Owlet	<i>Athene brama</i>	Strigidae	LC	II
36	Asian Green Bee-eater	<i>Merops orientalis</i>	Meropidae	LC	II
37	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	LC	-
38	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Megalaimidae	LC	II
39	Brown-headed Barbet	<i>Psilopogon zeylanicus</i>	Megalaimidae	LC	II
40	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittaculidae	LC	II
41	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Vangidae	LC	II
42	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC	II
43	House Crow	<i>Corvus splendens</i>	Corvidae	LC	-
44	Common Tailorbird	<i>Orthotomus sutorius</i>	Cisticolidae	LC	II
45	Ashy Prinia	<i>Prinia socialis</i>	Cisticolidae	LC	II
46	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	LC	II
47	Jungle Babbler	<i>Argya striata</i>	Leiothrichidae	LC	II
48	Indian Robin	<i>Copsychus fulicatus</i>	Muscicapidae	LC	II
49	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Muscicapidae	LC	II
50	Purple Sunbird	<i>Cinnyris asiaticus</i>	Nectariniidae	LC	II
51	House Sparrow	<i>Passer domesticus</i>	Passeridae	LC	II
52	Indian Thick-knee	<i>Burhinus indicus</i>	Burhinidae	LC	II
53	Egyptian Vulture	<i>Neophron percnopterus</i>	Accipitridae	EN	I
54	Eurasian Hoopoe	<i>Upupa epops</i>	Upupidae	LC	II
55	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Corvidae	LC	II
56	White-eared Bulbul	<i>Pycnonotus leucotis</i>	Pycnonotidae	LC	II
57	Large Gray Babbler	<i>Argya malcolmi</i>	Leiothrichidae	LC	II
58	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	LC	II
59	Indian Silverbill	<i>Euodice malabarica</i>	Estrildidae	LC	II

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60	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Meropidae	LC	II
61	Black-rumped Flameback	<i>Dinopium benghalense</i>	Picidae	LC	II
62	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnonotidae	LC	II
63	Indian White-eye	<i>Zosterops palpebrosus</i>	Zosteropidae	LC	II
64	Rock Pigeon	<i>Columba livia</i>	Columbidae	LC	-
65	Sirkeer Malkoha	<i>Taccocua leschenaultii</i>	Cuculidae	LC	II
66	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Cuculidae	LC	II
67	Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Ardeidae	--	-
68	Indian Gray Hornbill	<i>Ocyeros birostris</i>	Bucerotidae	LC	II
69	Indian Golden Oriole	<i>Oriolus kundoo</i>	Oriolidae	LC	II
70	Indian Eagle owl	<i>Bubo bengalensis</i>	Strigidae	LC	I
71	Long-tailed Shrike	<i>Lanius schach</i>	Laniidae	LC	II
72	Large-billed Crow	<i>Corvus macrorhynchos</i>	Corvidae	LC	II
73	Rufous-fronted Prinia	<i>Prinia buchanani</i>	Cisticolidae	LC	I
74	Gray-breasted Prinia	<i>Prinia hodgsonii</i>	Cisticolidae	LC	II
75	Common Babbler	<i>Argya caudata</i>	Leiothrichidae	LC	II
76	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Passeridae	LC	II
77	Black-winged Kite	<i>Elanus caeruleus</i>	Accipitridae	LC	II
78	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Accipitridae	LC	II
79	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Sylviidae	LC	II
80	Lesser Whitethroat	<i>Curruca curruca</i>	Sylviidae	LC	II
81	Indian Pied Starling	<i>Gracupica contra</i>	Sturnidae	LC	II
82	Alexandrine Parakeet	<i>Psittacula eupatria</i>	Psittaculidae	NT	II
83	Asian Tit (Great Tit)	<i>Parus cinereus</i>	Paridae	--	II
84	Plain Prinia	<i>Prinia inornata</i>	Cisticolidae	LC	II
85	Taiga Flycatcher	<i>Ficedula albicilla</i>	Muscicapidae	LC	II
86	Steppe Eagle	<i>Aquila nipalensis</i>	Accipitridae	EN	I
87	Common Rosefinch	<i>Carpodacus erythrins</i>	Fringillidae	LC	II
88	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Anatidae	LC	II
89	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Monarchidae	LC	II
90	Black Redstart	<i>Phoenicurus ochruros</i>	Muscicapidae	LC	II

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91	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Acrocephalidae	LC	II
92	Sulphur-bellied Warbler	<i>Phylloscopus griseolus</i>	Phylloscopidae	LC	II
93	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Phylloscopidae	LC	II
94	Orange-headed Thrush	<i>Geokichla citrina</i>	Turdidae	LC	II
95	Red-breasted Flycatcher	<i>Ficedula parva</i>	Muscicapidae	LC	II
96	Little Swift	<i>Apus affinis</i>	Apodidae	LC	II
97	White-tailed Iora	<i>Aegithina nigrolutea</i>	Aegithinidae	LC	II
98	Hume's Warbler	<i>Phylloscopus humei</i>	Phylloscopidae	LC	II
99	Tickell's Thrush	<i>Turdus unicolor</i>	Turdidae	LC	II
100	Red headed Vulture	<i>Sarcogyps calvus</i>	Accipitridae	CR	I
101	Verditer Flycatcher	<i>Eumyias thalassinus</i>	Muscicapidae	LC	II
102	Gray-headed Canary-Flycatcher	<i>Culicicapa ceylonensis</i>	Stenostiridae	LC	II
103	Ultramarine Flycatcher	<i>Ficedula superciliaris</i>	Muscicapidae	LC	II
104	Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	LC	II
105	Bay-backed Shrike	<i>Lanius vittatus</i>	Laniidae	LC	II
106	Citrine Wagtail	<i>Motacilla citreola</i>	Motacillidae	LC	II
107	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Motacillidae	LC	II
108	Booted Eagle	<i>Hieraaetus pennatus</i>	Accipitridae	LC	I
109	Northern Shoveler	<i>Spatula clypeata</i>	Anatidae	LC	II
110	Greater Spotted Eagle	<i>Clanga clanga</i>	Accipitridae	VU	I

Table 88. List of Avifauna Species of the Study Area

Source: <https://ebird.org/hotspot/L2666166/bird-list>

Aquatic Species:

S. No.	Species	Family/Class
1	Chaetophora sp.	Chlorophyceae
2	Cladophora sp.	Cladophoraceae
3	Oscillatoria sp.	Oscillatoriaceae
4	Spirogyra sp.	Zygnemataceae
5	Bacillaria sp.	Bacillariophyceae
6	Navicula sp.	Bacillariophyceae
7	Scytonema sp.	Cyanophyceae

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8	Pinnularia sp.	Bacillariophyceae
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Table 89. List of phytoplankton

S. No.	Group	Species
1	Crustaceans	Cyclops sp.
2	Crustaceans	Chydorus sp.
3	Rotifers	Brachionus sp.
4	Rotifers	Anuraeopsis fissa
5	Arthropoda	Daphnia longispina
6	Rotifers	Monostyla bulla

Table 90. List of Zooplankton

S. No.	Scientific Name	Common Name
1	<i>Barilius barila</i>	Barred Baril
2	<i>Chanda nama</i>	Elongate Glass-Perchlet
3	<i>Channa marulius</i>	Bullseye Snakehead
4	<i>Channa striatus</i>	Chevron Snakehead
5	<i>Clarias batrachus</i>	Walking Catfish
6	<i>Clupisoma garua</i>	River Catfish
7	<i>Crossocheilus latius</i>	Tista Loach (Tista River Loach)
8	<i>Danio devario</i>	Bengal Danio
9	<i>Glossogobius giuris</i>	Tank Goby
10	<i>Gonialosa manminna</i>	Ganges River Gizzard Shad
11	<i>Gudusia chapra</i>	Indian River Shad

Table 91. List of fish fauna

Schedule I species:

Based on both our primary and secondary surveys, as well as the compiled table above, we have identified a total of 23 species listed under Schedule I of the Wildlife Protection Act, indicating their endangered status and necessitating conservation efforts (<https://www.iucnredlist.org>). Accordingly a detailed conservation plan for these scheduled species will be submitted separately.

S. NO.	ZOOLOGICAL NAME	COMMON NAME	FAMILY	SCHEDULE (WLPA, 2022)	UCN STATUS
CLASS: MAMMALIA					

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S. NO.	ZOOLOGICAL NAME	COMMON NAME	FAMILY	SCHEDULE (WLPA, 2022)	UCN STATUS
1.	<i>Felis chaus</i>	Jungle cat	Felidae	I	LC
2.	<i>Canis aureus</i>	Jackal	Canidae	I	LC
3.	<i>Hyaena hyaena</i>	Striped Hyaena	Hyaenidae	I	NT
4.	<i>Viverricula indica</i>	Small Indian civet	Viverridae	I	LC
5.	<i>Hystrix indica</i>	Indian crested Porcupine	Hystriidae	I	LC
6.	<i>Herpestes edwardsii</i>	Indian Grey Mongoose	Herpestidae	I	LC
7.	<i>Indian Wolf</i>	<i>Canis lupus</i>	Canidae	I	EN
8.	<i>Leopard</i>	<i>Panthera pardus</i>	Felidae	I	VU
9.	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	Viverridae	I	LC
10.	<i>Urva smithii</i>	Ruddy Mongoose	Herpestidae	I	LC
CLASS: REPTILIA					
11.	<i>Ptyas mucosa</i>	Indian rat snake	Colubridae	I	LC
12.	<i>Chamaeleo zeylanicus</i>	Indian chameleon	Chamaeleonidae	I	LC
13.	<i>Naja naja</i>	Indian Cobra	Elapidae	I	LC
14.	<i>Saara hardwickii</i>	Spiny tailed lizard	Agamidae	I	VU
CLASS: AVES					
15.	<i>Accipiter badius</i>	Shikra	Accipitridae	I	LC
16.	<i>Pavo cristatus</i>	Indian Peafowl	Phasianidae	I	LC
17.	<i>Neophron percnopterus</i>	Egyptian Vulture	Accipitridae	I	EN
18.	<i>Bubo bengalensis</i>	Indian Eagle owl	Strigidae	I	LC
19.	<i>Prinia buchanani</i>	Rufous-fronted Prinia	Cisticolidae	I	LC
20.	<i>Aquila nipalensis</i>	Steppe Eagle	Accipitridae	I	EN
21.	<i>Sarcogyps calvus</i>	Red headed Vulture	Accipitridae	I	CR
22.	<i>Hieraetus pennatus</i>	Booted Eagle	Accipitridae	I	LC
23.	<i>Clanga clanga</i>	Greater Spotted Eagle	Accipitridae	I	VU

Table 92. List of schedule I species

References:

1. <https://kvkdelhi.org/wp-content/uploads/2024/07/District-at-Glance-Delhi.pdf>
2. https://delhiplanning.delhi.gov.in/sites/default/files/Planning/2012-13/es_2012-13_agriculture_and_rural_development.pdf
3. <https://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-delhi.pdf>
4. <https://www.iucnredlist.org>
5. <https://ebird.org/hotspot/L2666166/bird-list> (e-Bird, An Introduction to Delhi Ridge, Department of Forest and Wildlife, Delhi NCR, Delhi Forest Department)

3.13 Socio-Economic Survey

Objectives of conducting SE study

The main objective of the study is as follows:

1. To identify and assess socio-economic activities significantly influenced by a waste-based thermal power plant.
2. To understand the perceptions of people about the proposed power project and its possible impact on their socio-economic life.
3. To suggest interventions that can assist in mitigating the negative impacts of the proposed project.

TOR Points covered in the study:

- A need based Social Impact Assessment Study shall also be carried out and an action plan on its recommendations may also be submitted with budgetary provisions.
- Socio-economic study of the study area comprising 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detailed assessment of the impact on livelihood of the local communities.
- Action Plan for identification of local employable youth for training in skills relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.
- If the area has a tribal population, it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.

SCOPE OF THE STUDY & STUDY AREA

Scope of Socio-Economic Impact Assessment (SIA)

1. Description of the study area.
2. Finalization of Approach & Methodology.
3. Collection of baseline data from primary and secondary sources.
4. To comprehend the socio-economic status of people living in the study area.
5. To evaluate the impact of the project on the social and economic life of the people in the study area.
6. To measure the impact of the project on the quality of life of the people living in the study area.
7. To ensure sustainability of positive impacts.
8. To recommend mitigation measures on adverse impacts.
9. To record the perception of people about the project.

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Study Area

The study area for the proposed '25 MW Municipal Solid Waste Based Thermal Power Plant' in Tehkhand, Okhla, is an Impact Area defined by a 10-kilometer radius from the project's periphery, encompassing all natural and man-made landmarks within it. This zone spreads across the National Capital Territory (NCT) of Delhi, Uttar Pradesh, and Haryana, including the districts of South Delhi, Gautam Buddha Nagar, and Faridabad.

Key environmental landmarks nearby are the Jahanpanah City Protected Forest (3.30 km to the WNW), Okhla Bird Sanctuary (4.95 km to the NE), and Asola Wildlife Sanctuary (1.65 km to the SE). The Yamuna River flows through this predominantly urban area, which also contains several lakes such as Okhla Bird Sanctuary Lake and Badkal Lake. According to the 2011 Census, the area is composed of 8 villages, and 29 census towns.

TOWNS					
1	Pul Pehlad (CT)	11	Tilpat (CT)	21	Saidul Azaib (CT)
2	Tigri (CT)	12	Faridabad (M Corp.)	22	Chilla Saroda Bangar (CT)
3	Saidabad (CT)	13	Bhati (CT)	23	Chilla Saroda Khadar (CT)
4	Kotla Mahigiran (CT)	14	Asola (CT)	24	Noida (CT)
5	Taj Pul (CT)	15	Chandan Hola (CT)	25	DMC (U) (Part)
6	Mithe Pur (CT)	16	Chattar Pur (CT)	26	NDMC (Part)
7	Molar Band (CT)	17	Maidan Garhi (CT)	27	DMC (U) (Part)
8	Aali (CT)	18	Raj Pur Khurd (CT)	28	DMC (U) (Part)
9	Jait Pur (CT)	19	Deoli (CT)	29	DMC (U) (Part)
10	Gollarahalli	20	Neb Sarai (CT)		
VILLAGE					
1	Palwali(138)	4	Basantpur Banger	7	Satberi
2	Dadsia(147)	5	Nagla Nagli	8	Shahur Pur
3	Chak Basantpur	6	Nagli Bahrapur		

Table 93. List of Towns and Villages falling in the study area

Source: PCA Census 2011

Slum Areas:

A slum is a compact settlement of at least 20 households with a collection of poorly built tenements, mostly of temporary nature, crowded together usually with inadequate sanitary and drinking water facilities in unhygienic conditions.

About 6343 slums with approximately 10.20 lakhs households were estimated to be in existence in urban Delhi in 2012. About 90% of slums were built on public land, owned mostly by local bodies (46%), railways (28%) and state government (16%), etc. The nearest slum area from the project site is Tughlakabad. Details are given ahead:

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Socio-Economic Profile of Slum Pockets around Tughlakabad: A few slum areas nearest to study area are given ahead:

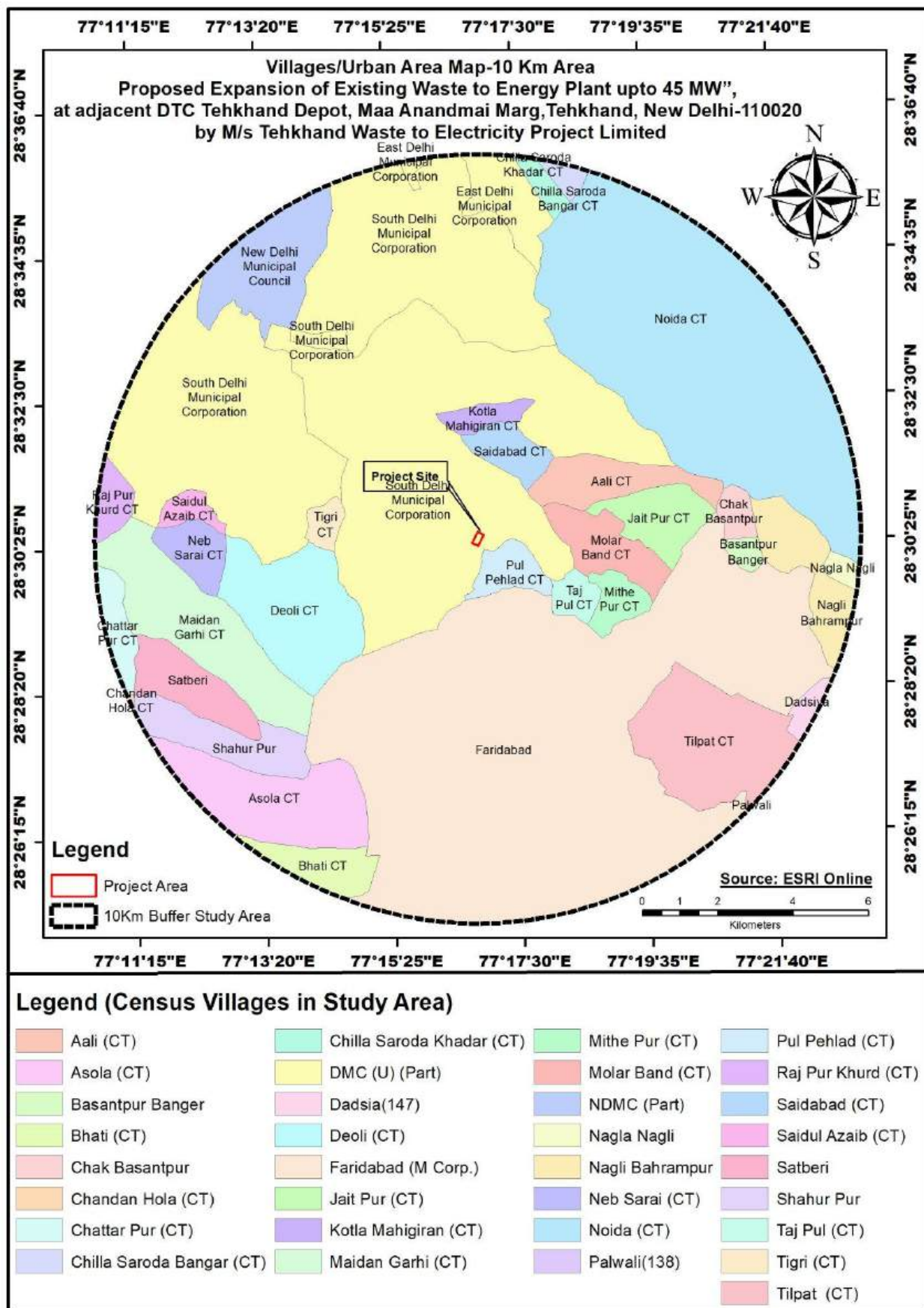
Slum Areas		
S.No	Name	Distance & Direction
1	Tughlakabad Basti	0.25 Km SSW
2	JJ Basti near DDA Park Tughlaqabad Extension, Railway Colony, Tughlakabad New Delhi	0.52 Km ESE
3	Tughlakabad Nardan basti	1.0 Km SW
4	Subhash Camp, Ali Gaon,	1.8 Km E
5	New Priyanka Camp near Sarita Vihar Rajasthani Camp Near Janta Quarter, Sarita Vi	3.0 Km NE
6	Abul Fazal Enclave Okhla Village	5.65 NE
7	Noor Nagar Okhla Village	5.5 Km NNE
8	North of Jamia College Mehboob Nagar/Ground Okhla	5.7 Km N
9	Jagdamba Camp Near SFS Sheikh Sarai	6.7 Km NW
10	Indira Camp Pahari No.-2 Tamur Nagar	7.0 Km NNW
11	Indira Camp Park 2 Okhla (Tamur Nagar)	7.2 Km NNW

Table 94. List of slums area nearby

Source: Delhi Urban Shelter Improvement Board

The Village map with the Study area is shown below

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Figure 62. The Village map with the Study area

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Demographic Structure

Demographic details such as household, total population, sex ratio, %age of SC and % age of ST population, literacy rate and employment pattern are summarized. Demographic details presented in below Table and shown in Figure ahead:

Study area	Total Household	Population			0-6 Child Population	Sex Ratio	SC %	ST %	Others
		Total	Male	Female					
Urban	1162485	5444214	2923470	2520744	677668	862	12.9	0	87.1
Rural	2747	14312	7954	6358	2246	799	17.8	0	82.2
Overall	1165232	5458526	2931424	2527102	679914	862	12.9	0	87.1

Table 95. Demographic details

Source: PCA Census 2011

Literacy Details

Data extracted from PCA Census 2011, Literacy Detail of villages in study area are compared with details of Villages surveyed by primary survey team of Perfact is prepared and annexed as **Annexure-II**. Summarized details are tabulated in below Table:

Study Area	Population above 0-6 Years			Literate			
	Total	Male	Female	Total	Overall %	Male (%)	Female (%)
Urban	4766546	2561270	2205276	2341485	86.4	91.4	80.5
Rural	12066	6736	5330	5768	76.9	85.6	65.8
Overall	4778612	2568006	2210606	2347253	86.3	91.4	80.5

Table 96. Literacy Details

Source: PCA Census 2011

WorkForce/Employment Pattern

The workforce/employment in the study area as per Census 2011 is prepared and annexed as **Annexure-III**. Summarized details are tabulated in the Table below.

Study area	Total Population	Total Working Population	% Total Working Population	% Non-working Population	% Main-working Population	% Marginal working Population
Urban	4766546	1865567	34.3	65.7	91.6	8.4
Rural	12066	4324	30.2	69.8	87.7	12.3
Overall	4778612	1869891	34.3	65.7	91.6	8.4

Table 97. Working Pattern

Source: PCA Census 2011

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Main Workforce Employment Pattern

The main workers employment pattern in the study area as per Census 2011 is prepared and Summarized details are tabulated in the Table below.

Study area	Total no of Main Workforce	Cultivators %	Agricultural Labour %	Household Industries %	Others Includes Labour, Govt. Job, Private service, Self Employed, etc %
Urban	1708511	0.6	1	3.7	94.7
Rural	3793	5.3	9.2	2.3	83.2
Overall	1712304	0.6	1.1	3.7	94.6

Table 98. Main Workforce Employment Pattern

Source: PCA Census 2011

Summary

Summary of Demographic Profile (Study Area) :

As per the 2011 Census, details of the Study Area is as below

- Total Population: 5458526
- Total House Hold: 1165232
- Sex Ratio: 862
- Child Population (0-6 years): 679914
- Overall Literacy Rate: 86.3%
- Male Literacy Rate: 91.4%
- Female Literacy Rate: 80.5%
- Scheduled Caste (SC) %: 12.9%
- Scheduled Tribe (ST) %: 0%
- Others (not SC/ST): 87.1

Summary Slum Areas Profile near to project area

The slum settlements around Tughlakabad, including Tughlakabad Basti, JJ Basti near DDA Park, Nardan Basti, Subhash Camp, Priyanka Camp, and adjoining clusters in Okhla and Sarita Vihar, face multiple challenges such as dense semi-pucca housing, inadequate water supply, overburdened community toilets, irregular solid-waste management, and unsafe electrical connections, which increase the risks of waterborne diseases, vector outbreaks, and fire hazards. Livelihoods are predominantly informal, with residents engaged in daily wage labour, vending, domestic work, and small repair trades, while access to education drops significantly beyond the

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primary level, especially for girls. These settlements comprise diverse migrant populations from several states, with vulnerable groups including women-headed households, the elderly, and seasonal workers. Priority interventions needed include reliable water points, improved sanitation, regular waste collection, better streetlighting, and expanded access to healthcare, social security, and livelihood support schemes to improve overall living conditions.

Industries within study Area

Okhla Industrial Area Phase 1

Okhla Industrial Area Phase 1 is a bustling industrial and commercial hub in South Delhi, New Delhi, known for its numerous small and medium-scale industries, manufacturing units, and businesses like ready-made garment exporters, pharmaceutical and plastic industries, and call centers. It is a significant employment center with commercial spaces and offers good public transportation access, particularly via the Govind Puri metro station and the Okhla NSIC metro station on the Magenta Line of the Delhi Metro.

Key features of Okhla Industrial Area Phase 1:

Industries:

It houses a diverse range of businesses, including ready-made garment exporters, leather garment exporters, pharmaceutical manufacturing units, plastic industries, packaging industries, printing presses, and call centers.

Commercial Hub:

The area serves as a significant commercial space, offering opportunities for various businesses and employers.

Connectivity:

Okhla Industrial Area Phase 1 is well-connected by public transport, with the Govind Puri metro station and the Okhla NSIC metro station providing access to Delhi Metro's lines 3, 4, and the Magenta Line.

Location:

It is located in New Delhi and is approximately 6 kilometers from the employment hub of Nehru Place. The list of industries are given at chapter 2

Okhla Industrial Area Phase II

Okhla Industrial Area Phase II, is a business and industrial hub in South Delhi with a Pincode of 110020. The area is characterized by offices, factories, and showrooms, with wide roads, 24/7 security, good road quality, and access to public transport and metro stations for connectivity. It is a well-known location for companies in various sectors, including textiles, IT, and packaging, and is situated near Nehru Place.

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Infrastructure: Features wide roads and has good infrastructure, including buildings with lifts and fire safety approvals.

Connectivity: Well-connected by road and public transport, with nearby metro stations facilitating easy travel.

Business :

IT Services:

Companies like Tech Solutions Ltd. offer software, web, and app development.

Textiles:

Businesses have more focus on high-quality fabrics for domestic and export markets.

Packaging:

Packaging Co. provides eco-friendly and sustainable packaging materials.

Electronics:

Electronics supplies electronic parts and components.

Distribution:

Company operates as a leading IT and mobility distribution and supply chain solutions provider

S. No.	List of industries	Distance & Direction
1	Pioneer Plastic Industries Limited - Plastic fabrication company A-135 Pocket W, Okhla Phase II, Okhla Industrial Estate New Delhi,	2.48 Km NNW
2	BHAWANI REALLINES INDUSTRIES - Manufacturer A 52, Sector 80, Molarband, Sector - 106 Noida, New Delhi	3.04 Km ESE
3	Able Industries - Manufacturer Y-3 opposite Okhla Metro Station Sanjay Colony II, Pocket Y, Sanjay Colony, Okhla Phase II, Okhla Industrial Estate New Delhi,	3.62 Km NNW
4	Ceasefire Industries Pvt. Ltd. B-1, above Audi Showroom, H-1, Mohan Cooperative Industrial Estate, Badarpur, New Delhi, Delhi 110044	1.40 Km East
5	Nagpal Industrie E - 26 , B-1 Extension, Mohan Cooperative Industrial Estate Mathura Road, Badarpur., New Delhi, Delhi 110044	1.46 Km ESE
6	Vinko Auto Industries Limited FIEE Complex, A-69, Block A, Okhla Phase II, Okhla Industrial Estate, New Delhi, Delhi 110020	2.86 Km NNW
7	Akash Industries T19, Block T Okhla Industrial Estate Phase 2 Rd, Pocket W, Okhla Phase II, Okhla Industrial Estate, New Delhi, Delhi 110020	2.67 Km NNW
8	Vaish Industries ph 2, y - 50, Sanjay Colony II, Pocket Y, Sanjay Colony, Okhla Phase II, Okhla Industrial Estate, New Delhi, Delhi 110020	3.39 Km NNW

Table 99. Major Industries in the Okhla Industrial Area Phase II Area

Okhla Industrial Area Phase III

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Okhla Industrial Area Phase III is an industrial area in South Delhi, New Delhi, housing manufacturing units, IT/ITeS, warehouses, showrooms, and service centers, characterized by small, independent buildings. It offers good metro connectivity to Govindpuri Metro Station (Purple Line) and excellent road access, with hotels, hospitals, and malls nearby. The area is well-equipped with modern amenities and is close to areas like Giri Nagar, Ishwar Nagar, and Govind Puri.

Key Features

Industrial Hub:

The area is a significant industrial and commercial zone within the larger Okhla Industrial Area.

Types of Businesses:

It hosts a variety of businesses, including manufacturing units, IT/ITeS companies, warehouses, and service centers.

Building Characteristics:

Okhla Phase 3 consists mainly of small, independent buildings

Faridabad Area:

The Faridabad Industrial Belt serves as a major industrial hub for the National Capital Region (NCR), offering significant logistical and manufacturing advantages due to its strategic location near key expressways and freight corridors. Its proximity to other industrial areas, including Okhla Industrial Area, a large industrial estate in Delhi, allows for efficient supply chain management and access to a skilled workforce and diverse industries.

Key aspects of the Faridabad Industrial Belt's relationship with Okhla Industrial Area:

Geographic Proximity:

Faridabad is a key part of the NCR's industrial landscape, located close to Okhla, a historic and established industrial estate in Delhi.

Logistics and Connectivity:

Faridabad's strategic position offers excellent connectivity to major transport networks, including the Delhi-Mumbai Industrial Corridor (DMIC) and various expressways, which are beneficial for businesses in the broader region, including those in Okhla.

Manufacturing and Logistics Hub:

The region's strength in both manufacturing and logistics makes it a central point for industrial operations within the NCR.

Industrial Ecosystem:

Faridabad hosts a variety of enterprises, including micro, small, and large-scale industries, and benefits from vendorisation and ancillarisation.

Industrial categorisation

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Automotive parts manufacturing, rubber products, machinery, industrial equipment, and conveyors and belting, alongside those in chemicals, metals and alloys, and hydraulics.

Business Synergies:

The proximity of the two areas fosters synergies in terms of supply chain management, distribution networks, and access to resources and labor.

Thus Faridabad's industrial belt functions as a critical industrial and logistical center within the Delhi-NCR, benefiting from and contributing to the overall industrial ecosystem that includes Okhla.

S. No.	List of industries	Distance & Direction
1	M K Lide Auto Clutch Industries - Manufacturer 12/1, NH-19 Sector 27D Faridabad, Haryana 121003	3.21Km SE
2	Shree Industries - Machining manufacturer Gali-2, Gurukul Rd Ind Area, Sarai khwaja Faridabad, Haryana 121003	4.16 Km SE
3	Ar Industrie Gali No. 3, Plot no. 79/A, Gurukul Rd, Industrial Area, Sector 42, Faridabad, Haryana 121010	4.03 Km SSE
4	Nmf Equipments And Plants Pvt. Ltd. - Manufacturer Plot no 25 Lane 2 & 3 Gurukul Rd Industrial Area, Sector 42 Faridabad, Haryana 121001	4.16Km SSE
5	CMR Green Technologies Ltd. Scrap Metal Recycling Company in India - Aluminium Supplier 7TH FLOOR, TOWER 2 L & T BUSINESS PARK 12/4, NH-19, Sector 27DFaridabad, Haryana 121003	4.1 SSE
6	Imperial Auto Industries 13/6, NH-19, Sector 32 DLF Area, Block C, DLF Industrial Area, Sector 32, Faridabad, Haryana 121003	5.78 Km SSE
7	S K Hydraulic Services - Hydraulic equipment supplier HIG -II 904 Sector 29 Faridabad, Haryana 121008	9.3Km SSE
8	Hindustan Rubber Industries - Corporate office House No. 1557 Sector 15 Faridabad, Haryana 121007	13.5Km SSE

Table 100. Major Industries in the Faridabad Industrial Area

Primary Survey of Influence Area:

This socio-economic survey was conducted to assess the demographic and infrastructural conditions within the influence zone of the proposed expansion project. The study focuses on three zones around the project site:

Zone I: 0 – 500 meters (Immediate Influence Area)

Zone II: 500 meters – 1 km

Zone III: 1 – 2 km

The data presented here has been collected from primary field observations, stakeholder consultations, and secondary sources (Census, MCD, DDA).

Parameters	Zone I (0–500 m)	Zone II (500 m–1 km)	Zone III (1–2 km)	Key Gaps
Settlements / Villages / Slums	Tehkhand Village,	Tughlakabad Village,	Khizrabad Village, Madanpur Khadar,	High slum population;

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Parameters	Zone I (0–500 m)	Zone II (500 m–1 km)	Zone III (1–2 km)	Key Gaps
	Golakuan JJ Cluster	Sanjay Colony (Okhla II, Slum area)	Indira Kalyan Vihar (JJ slum colony).	sanitation and waste issues
Educational Institutions	2 Anganwad, 1 Primary School	4–5 Anganwad, 2 Primary, 1 Middle, 1 Secondary, 1 Skill Centre	10+ Anganwad, 3+ Primary, 2 Middle, 2 Secondary, 1 Higher Secondary, Vocational Training	No higher education institutions within 2 km
Health Facilities	1 Dispensary, 2–3 private clinics	1 Dispensary, 5+ private clinics	1 Ayushman Mandir, 2+ dispensaries, 10+ clinics, 2 Nursing Homes, 1 CHC, 1 Maternity Centre	No major hospital in 2 km radius
Basic Requirements	Water: DJB + borewells, community toilets; limited Number of streetlights, kutchra drains	Water: DJB + borewells, tankers; public toilets; partial street lighting	Water: DJB + borewells, tanker supply; banks, post office, govt. offices; street lighting satisfactory	Poor roads in Tehkhand & Sanjay Colony; inconsistent water supply
Transport & Connectivity	Four-wheelers, autos; nearest metro >1 km	Public buses, autos, trucks; metro nearby (1.5 km)	Public buses, autos, trucks; metro (Govindpuri, Mohan Estate), railway siding	Limited direct metro access in Zone I
Disease Prevalence	Fever, diarrhoea, dengue, asthma	Typhoid, gastro, dengue, flu, asthma	Dengue, diarrhoea, asthma, BP, diabetes	High vector-borne diseases in slums

Table 101. Primary field data for Zone I, II & III

Zone I: 0–500 meters (Immediate Influence Area)

This zone includes Tehkhand Village and Golakuan JJ Cluster. The population is semi-urban with slum clusters. Educational facilities are minimal, limited to 2 Anganwadis and 1 Primary School. Health infrastructure consists of one government dispensary and a few private clinics. Water is supplied through DJB pipelines and borewells, but sanitation facilities are weak with kutchra drains and poor waste management. Seasonal diseases such as fever, dengue, and diarrhoea are common. Roads are in poor condition.

Zone II: 500 meters – 1 km

Zone II covers Tughlakabad Village and Sanjay Colony (Okhla Phase II). This area has slightly better education facilities with 4–5 Anganwadis, 2 Primary Schools, a Middle and Secondary School, along with one NGO-run skill development centre. Healthcare includes one government dispensary and several private clinics, but no higher-level medical centres. Water supply is mixed (DJB, borewells, tankers) with sanitation challenges in slum areas. Transport includes buses, autos, and proximity to metro stations at Govindpuri and Tughlakabad. Diseases like typhoid, gastroenteritis, and asthma are prevalent.

Zone III: 1-2 km

This zone consists of Khizrabad Village, Madanpur Khadar Village, and Indira Kalyan Vihar JJ Camp (Okhla Phase I). Education facilities are relatively better, with multiple schools, 1 higher secondary school, and vocational training centres. Healthcare is more developed with Ayushman Mandir, CHC, maternity ward, dispensaries, and small nursing homes. Infrastructure is comparatively developed with banks, post offices, and government offices. Transport connectivity includes buses, metro stations (Govindpuri, Mohan Estate), and a railway siding at Tughlakabad ICD. Common health issues include dengue, diarrhoea, asthma, diabetes, and hypertension. Sanitation gaps persist in JJ clusters.

Key Gaps Across Influence Area

- Lack of higher education institutions (colleges/universities)
- Healthcare limited to dispensaries and clinics; no major hospital in 2 km radius
- Weak sanitation and solid waste management in slum clusters
- Inconsistent drinking water in informal settlements
- Poor road conditions in Tehkhand & Sanjay Colony
- Minimal solar street lighting
- High demand for skill development centres

3.14 Traffic Survey

Traffic survey is a very important parameter to assess the impact due to the proposed project on local existing transportation. Baseline Study for Mehrauli - Badarpur Road. is the main access road to Project Site. and Road Anandmayee Marg is approach road for this project.

Road Identification:

A traffic survey was carried out on Mehrauli - Badarpur Road is a Fore lane two-way road 15 Mtr. (Divided Road). with 1mtr space on either side. and App. Road is Ma Anandmayee Marg Fore lane two-way 17 Mtr. Road (Divided Road).

Conversion Factor (Ref: IRC 106, 1990):

PCU values are used to convert various vehicles into one standard vehicle i.e. Passenger car units (PCU). The PCU values as per IRC are as given below:

S. No.	VEHICLE TYPE	PCU VALUE
1	Car	1
2	Two-wheeler	0.5
3	Truck/bus	2.2

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4	Auto	1.2
5	LCV	2
6	Tractor and Trailer	5
7	Cycle rickshaw	0.5

Table 102. PUC values as per IRC

Methodology:

A traffic survey was carried out on both sides (up & down) of the Fore lane two-way road 15 Mtr. (Divided Road). with 1mtr space on either side.and App. Road is Ma-Anandmayee Marg Fore lane two-way 17 Mtr. Road (Divided Road).

Vehicles were observed and the count was recorded for 24 hours. The table below represents the total no. of vehicles over 24-hour duration.

Table 107. Traffic Analysis: 4 Lane Road 2 way (Divided), 15 Meters (Mehrauli - Badarpur Road)

Hours	Baseline					Incremental					
	Car	Bus/ Truck	Two Wheeler	Others/ Auto	PCU/ Hr	Incremental PCU/Hr	Incremental+ Baseline PCU/Hr	Capacity of Road in PCU/Hr	LOS Baseline	LOS of Incremental+ Baseline	% increase
06:00- 07:00	329	156	553	30	985	36	1021	5143	0.191	0.198	3.655
07:00- 08:00	389	70	579	40	880	40	920	5143	0.171	0.179	4.544
08:00-09:00	456	80	612	46	993	50	1043	5143	0.193	0.203	5.034
09:00-10:00	469	98	578	50	1034	56	1090	5143	0.201	0.212	5.418
10:00-11:00	426	142	605	60	1113	46	1159	5143	0.216	0.225	4.133
11:00-12:00	410	136	523	59	1042	40	1082	5143	0.203	0.210	3.841
12:00-13:00	396	163	585	50	1107	36	1143	5143	0.215	0.222	3.251
13:00-14:00	368	186	512	48	1091	42	1133	5143	0.212	0.220	3.850
14:00-15:00	412	200	587	42	1196	42	1238	5143	0.233	0.241	3.511
15:00-16:00	423	240	553	46	1283	46	1329	5143	0.249	0.258	3.587
16:00-17:00	369	176	512	50	1072	40	1112	5143	0.208	0.216	3.731
17:00-18:00	340	98	611	48	919	36	955	5143	0.179	0.186	3.917
18:00-19:00	382	59	580	52	864	46	910	5143	0.168	0.177	5.326
19:00-20:00	369	75	532	53	863	40	903	5143	0.168	0.176	4.634
20:00-21:00	373	73	511	49	848	46	894	5143	0.165	0.174	5.426
21:00-22:00	333	80	312	21	691	40	731	5143	0.134	0.142	5.787
22:00-23:00	250	110	310	23	674	32	706	5143	0.131	0.137	4.747

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23:00-24:00	213	153	269	16	703	36	739	5143	0.137	0.144	5.119
24:00-01:00	239	146	139	10	642	38	680	5143	0.125	0.132	5.922
01:00-02:00	236	136	125	15	616	42	658	5143	0.120	0.128	6.822
02:00-03:00	210	98	132	11	505	48	553	5143	0.098	0.107	9.509
03:00-04:00	225	103	125	10	526	40	566	5143	0.102	0.110	7.603
04:00-05:00	214	121	100	12	545	38	583	5143	0.106	0.113	6.978
05:00-06:00	210	111	120	14	531	42	573	5143	0.103	0.111	7.910
Average	335	125	419	36	863	42	905	5143	0.17	0.18	5.18

Table 103.

Carrying Capacity at **Mehrauli - Badarpur Road** =5143 PCU/hr

Existing traffic density at **Mehrauli - Badarpur Road**= **863** PCU/hr

Existing LOS (**Without Project**) = 0.16 i.e. Cat "A"

Proposed+ Existing traffic from Site=905 PCU/hr

LOS (**With Project**) = 0.17 i.e. Cat "A"

A traffic survey was carried out on both sides (up & down) of the **Mehrauli - Badarpur Road** .
Vehicles were observed and the count was recorded for 24 hours. The table below represents the
total no. of vehicles over 24-hour duration.

Hours	Baseline					Incremental		Capacity of Road in PCU/Hr	LOS Baseline	LOS of Incremental+ Baseline	% increase
	Car	Bus/ Truck	Two Wheeler	Others /Auto	PCU /Hr	Incremental PCU/Hr	Incremental + Baseline PCU/Hr				
06:00- 07:00	144	62	96	22	355	36	391	5143	0.069	0.076	10.147
07:00- 08:00	148	56	114	26	359	40	399	5143	0.070	0.078	11.130
08:00-09:00	152	59	110	28	370	50	420	5143	0.072	0.082	13.508
09:00-10:00	161	62	114	32	393	56	449	5143	0.076	0.087	14.259
10:00-11:00	159	70	120	28	407	46	453	5143	0.079	0.088	11.313
11:00-12:00	153	89	103	28	434	40	474	5143	0.084	0.092	9.209
12:00-13:00	150	87	98	24	419	36	455	5143	0.082	0.089	8.586
13:00-14:00	152	78	104	26	407	42	449	5143	0.079	0.087	10.313
14:00-15:00	148	73	97	30	393	42	435	5143	0.076	0.085	10.684
15:00-16:00	150	69	108	30	392	46	438	5143	0.076	0.085	11.741
16:00-17:00	150	82	97	26	410	40	450	5143	0.080	0.088	9.756
17:00-18:00	156	76	103	24	403	36	439	5143	0.078	0.085	8.923
18:00-19:00	162	80	98	26	418	46	464	5143	0.081	0.090	11.000
19:00-20:00	160	36	106	28	326	40	366	5143	0.063	0.071	12.277

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20:00-21:00	142	68	98	27	373	46	419	5143	0.073	0.081	12.332
21:00-22:00	122	54	102	26	323	40	363	5143	0.063	0.071	12.384
22:00-23:00	120	62	96	25	334	32	366	5143	0.065	0.071	9.571
23:00-24:00	106	88	90	19	367	36	403	5143	0.071	0.078	9.799
24:00-01:00	104	65	87	18	312	38	350	5143	0.061	0.068	12.176
01:00-02:00	93	98	80	18	370	42	412	5143	0.072	0.080	11.345
02:00-03:00	86	106	72	13	371	48	419	5143	0.072	0.081	12.945
03:00-04:00	73	108	64	10	355	40	395	5143	0.069	0.077	11.280
04:00-05:00	70	99	60	11	331	38	369	5143	0.064	0.072	11.480
05:00-06:00	98	89	56	12	336	42	378	5143	0.065	0.074	12.493
Average	132	76	104	23	373	42	415	5143	0.07	0.08	11.19

Table 104. Traffic Analysis: App. Road 17 Mtr. with Divided Road 4 Lane 2 Way (Ma Anandmayee Marg)

Carrying Capacity at App. Road (Ma Anandmayee Marg)=5143 PCU/hr

Existing traffic density at Approach Road (Ma Anandmayee Marg)= 373 PCU/hr

Existing LOS (Without Project) = 0.072 i.e. Cat "A"

Proposed+Existing traffic from Site=415 PCU/hr

LOS (With Project) = 0.08 i.e. Cat "A"

S.No	LOS Value (Ratio of V:C) (V/C)	Category	Inference based on IRC 106: 1990
1	0-0.2	A	Represents a condition of free flow; individual users are generally unaffected by others in the traffic and this condition is generally considered in the Excellent Category.
2	0.2-0.4	B	Represents a condition of stable flow; individual users have a level of comfort and convenience but less than that of A.
3	0.4-0.6	C	Represents a condition of zonal stable flow; individual users are starting in a bit of discomfort; users start to feel inconvenience due to the presence of other users on the road. The general level of discomfort increases and there is a noticeable decline in convenience.
4	0.6-0.8	D	Represents the level of stable flow; the level of comfort of users is poor and discomfort is significant in the flow of traffic. This category traffic streams are extremely susceptible to traffic problems.
5	0.8-1	E	Represents operating conditions close to capacity level; freedom to traffic stream is low and the speed is relatively uniform but very less. Comfort and convenience is relatively poor and discomfort is visible.

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6	1 or above	F	Breakdown Flow; These streams often break down, susceptible to long delays and therefore there is huge discomfort in these streams.
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Table 105. LOS Value

Conclusion :

Road 1. The carrying capacity of the **Mehrauli - Badarpur Road** is much higher than the traffic volume. The traffic (to & fro) from the "**Tehkhand Waste to Electricity Project Ltd.**" will not create traffic congestion. **Mehrauli - Badarpur Road** The volume/capacity ratio is likely to change from 0.16 to 0.17 with LOS being "A" to "A"

Road 2. The carrying capacity of the **Approach Road (Ma Anandmayee Marg)** is much higher than the traffic volume. The traffic (to & fro) from the "**Tehkhand Waste to Electricity Project Ltd.**" will not create traffic congestion **Approach Road (Ma Anandmayee Marg)**. The volume/capacity ratio is likely to change from 0.07 to 0.08 with LOS being "A" to "A"

	Parameter	Existing	Proposed
I. Traffic Analysis: 4 Lane Road 2 way (Divided), 15 Meters (Mehrauli - Badarpur Road)	WIDTH (m)	15	15
	Carrying Capacity (PCU/ Hr)	5143	5143
	Traffic (PCU/Hr)	863	905
	LOS	0.16 i.e. Cat "A"	0.17 i.e cat "A"

Table 106. Traffic analysis : 4 Lane road

	Parameter	Existing	Proposed
II. Traffic Analysis: App. Road 17 Mtr. with Divided Road 4 Lane 2 Way (Ma Anandmayee Marg)	WIDTH (m)	17	17
	Carrying Capacity (PCU/ Hr)	5143	5143
	Traffic (PCU/Hr)	373	415
	LOS	0.07 i.e. Cat "A"	0.08 i.e cat "A"

Table 107. Traffic analysis approach Road

4. Anticipated Environmental Impact & Mitigation Measures

- Prediction of impacts is the most important component in the Environmental Impact Assessment studies. Several scientific techniques and methodologies are available to predict impacts of developmental activities on physical, ecological and socio-economic environments.
- 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.

4.1 Impact Assessment Methodology

For the proposed project, the impact assessment will be performed in following steps:

- Identification of interactions between activities and environmental receptors.
- Identification of potentially significant environmental impacts.

Based on this preliminary identification, environmental indices that are likely to be impacted due to the project are:

- ❖ Land use/Land cover: Land use will not change as the land is an industrial land of Tehkhand, New Delhi. The land of the project site will be aesthetically landscaped with extensive plantation and greenery.
- ❖ Air quality:

Emissions Source: The construction activities that contribute to the impact on air environment are broadly given below:

- Dust generation from earth work
- Emissions from DG at site;
- Emissions from the operation of construction equipment and machines;
- Emissions of pollutants from vehicular exhaust.
- Emissions during the unloading of material at the site;
- **Noise:** Vehicle movement during construction, operation of DG sets/ Boilers, movement of vehicles carrying materials and loading & unloading activities., Noise from excavation machines, concrete mixer and other construction machines. Noise during concreting, hammering, etc.

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- **Water:** Disposal of waste water from construction activity/ labour, manufacturing process, Utilities, cooling tower, and other domestic use.
- **Soil:** Excavation activity and chemical contamination.
- **Storage and handling:** Storage Municipal solid waste and hazardous waste
- **Ecology and Biodiversity:** Construction activities and emission from operational activities may have an effect on the avi fauna and the existing plantations of the study area.
- **Socio- Economic:** There will be both Positive and negative impact. Positive impact due to creation of jobs and increase in indirect income. Indirect impact on the surrounding environment due to air emissions, solid waste generation and Noise generation
- **Occupational health, community Health and safety:** Occupational risk during various activities associated with construction and the running of the project.

4.2 POTENTIAL IMPACTS DURING CONSTRUCTION PHASE

There will be no construction on the site as it is an existing unit & further expansion will be done only in additional machinery installation.

4.2.1 Activity – Construction of new structure/ Sheds and Installation of Machineries and Utilities

Aspects

- Generation of Scrap
- Fugitive Dust Emissions
- Noise from construction equipment & machinery
- Noise and Air Emissions from Construction Machinery Fugitive Dust Emissions due to Movement of Traffic
- Deposition of spilled construction material/wastes on soil

Environmental component	Impact	Proposed Mitigation
Air Environment	Increased dust generation due to construction activity and handling of C&D waste may lead to degradation of air quality which would be harmful for workers & nearby people.	-Water sprinkling will be done to reduce the dust generation. -Construction and Demolition Waste generated will be properly stacked and covered within the project site for the due course of time before reuse or disposal.

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Environmental component	Impact	Proposed Mitigation
Water Environment	-During the construction period, stagnation of water & run off water may lead to breeding of mosquitoes & water runoff can lead to soil erosion.	-During the construction period, runoff from the construction site will not be allowed to stand (water logging) or enter the roadside or nearby drain.
Land Use	Land use will not change as the land is industrial land.	The land of the project site will be aesthetically landscaped with extensive plantation and greenery.
Soil Environment	-Improper disposal of Construction Waste may lead to degradation of soil and its microclimate.	-Construction waste will be reused as much as possible and rest will be sent to the C&D Waste site.
Socio-Economic	-Dust generation leads to increase in PM _{2.5} and PM ₁₀ levels, which leads to deposition of dust layers in lungs and can impact breathing issues. -Increased noise and dust emission might cause irritation to workers and nearby people. -Positive impact by giving employment to the villagers.	-Regular sprinkling shall be done to keep PM _{2.5} and PM ₁₀ levels under control. -Ear plugs shall be provided and Machines shall be serviced from time to time so that there is no major impact due to noise level. -Increase in earning will lead to better living conditions.
Ecology & Biodiversity	-Increase in PM level will result in deposition of dust on Leaves which may cause decrease in Transpiration rate of flora. -Increased noise & vibration during construction activities may lead to displacement of nearby fauna.	-Water sprinkling will be done to reduce dust generation. -All the activity will be carried along within the site However, all machinery will be checked and maintained properly to reduce the noise level. -Activities will be executed during day time only. -Barricading will be done to avoid entry of any stray animals into the construction site.
Noise & Vibration	-Noise during Foundation work, movement of vehicles carrying materials and loading & unloading activities, may cause psychological & physiological effects like annoyance, headache.	-Noise generating equipment will be operated during day time only. -All the vehicles entering the project site will maintain speed limits and will not blow horns unless it is required. -Loading and unloading of C&D waste will be done from loaders/excavators directly to tippers/trucks to ensure minimal noise generation. Workers will be provided with ear plugs/ear muffs.

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Environmental component	Impact	Proposed Mitigation
Hydrology & Geology	Excavation will lead to minor change natural drainage of the area.	The drainage of the core zone will be modified. Drains will be constructed to channelize the surface runoff.
Solid & Hazardous Waste	The construction solid waste includes debris, concrete, bricks (often recycled and reused at the site), steel and other metals, pallets, packaging and paper products, fluorescent tubes, wood e.t.c. will decrease the aesthetic value of the site, dust emissions and unhygienic environment	-Recyclable waste construction material will be sold to authorised recyclers -The construction debris will be used within the site for filling floors, roads, aggregate for mortar etc. to the extent feasible.

Table 108. Activity-construction of new structure/sheds

4.2.2 Activity – Operation of Construction machinery (Concrete mixing machinery, JCB, etc)

Aspects

- Air emission
- Dust generation
- Noise generation

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	-Emissions from the use of construction machinery will cause respiratory problems to the workers at site and nearby population. -Generation of dust from the operation of construction machinery. -Spillage of Diesel, used oil, may result in emission of VOCs in the air environment which will cause irritation in eyes, nose and throat, difficulty breathing and nausea. -Emissions which will take place during mixing of cement with other building materials during construction phase	-Personal Protective Equipment like nose masks will be provided to the construction workers. -Proper maintenance of construction equipment/ machineries, etc. will be done. -Low Sulphur fuel will be used in operation of DG sets.
Water Environment	- Spillage of Oil , if in any case encounters with water bodies can deteriorate the groundwater & surface water body which in turn may affect life also.	-The hazardous waste generated will be used oil. Used oil will be stored in HDPE drums and kept in covered rooms under lock and key and will be sold to authorized vendors only.
Land Use	None	None
Soil Environment	-Chemical degradation of soil may occur while refueling vehicles transporting construction	-Procedures for maintenance of equipment will be ensured that this risk is minimized, and

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Environmental components	Impact	Proposed Mitigation Measures
	materials and servicing of vehicles through breakage due to wear and tear. -Cement residue from concrete mixer plants may degrade the quality of soil. -Spillage of diesel, chemicals, if in any case encounters with soil & the contaminated soil.	clean-up response will be rapid if any spill occurs. - cement residue from concrete mixer plants will be properly collected and reused in construction sites. -Lubricating waste oil will be collected separately in drums and handed over to the authorized outside agency.
Socio-Economic	-Accidents if they happen during JCB usage may lead to loss of human life. -Noise due to the operation of DG Set and machinery. -Impact due to sudden slip/breakage of machinery can cause injury to workers.	-Safety gadgets will be provided & earmarking of safe areas will be done. -DG Sets will be used during the emergency only. -No outsiders will be allowed near the construction area.
Ecology & Biodiversity	-Increase in PM level will result in deposition of dust on leaves which may cause decrease in transpiration rate of flora. -Increased noise will cause disturbance of avi-fauna; however, avifauna is not restricted to one place for a long time, thus it will not result in their displacement.	-Water sprinkling will be done at the site to reduce dust emission. -All the construction activities will be carried out during the daytime. No activity will be done during late evenings or night time which is the roosting time for the avian population. -All the machinery will be provided with vibration isolators in accordance with their vibration generation.
Noise & Vibration	-Noise and vibration generated due to the operation of machinery and equipment may cause physiological and psychological effects on laborers like annoyance, problems like speech interference, sleep disturbance, headache, auditory impact, increase in heartbeat of elderly people. Running of machinery will cause vibration generation in the immediate surrounding area.	-Noise & vibration due to the running of concrete mixture/ Pneumatic hammer will be prevented by provision of protective devices like earmuff/plugs to the workers and keeping the machine in an enclosed system with a provision of vibration isolator. -Less noise producing machinery will be purchased and will be properly lubricated and regularly maintained.
Hydrology & Geology	None	None
Solid & Hazardous Waste	-Waste generated from construction machinery including waste oil, grease, sludge and any other may cause nuisance if not maintained properly.	-All the waste generated will be properly disposed of as per Solid Waste Management Rules, 2016.

Table 109. Operation of Construction machinery (Concrete Mixing Machinery, etc.)

4.2.3 Activity – Transportation (Raw Material, Labour)

Aspects

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- Spillage of construction material and flow into streams Run-off from Construction Material and wastes Areas Spillage/ spread of debris material and flow into streams
- Deposition of spilled construction material/wastes on soil
- Road congestion & breakage of roads
- Noise generation
- Dust Emissions

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	-Transportation of construction material can result in dust emission which will affect the respiratory health of construction workers and nearby population	-Vehicles with valid PUC certificates will be used for transportation of construction material. -Construction material will be transported in closed and covered trucks. -Water sprinkling will be carried out for dust suppression from movement of transport vehicles -Wheel washing arrangement will be provided.
Water Environment	-Accidental leakage of diesel/ petrol from vehicles, if in any case comes in contact with the water body then it may deteriorate the groundwater & surface water body quality. This in turn may affect aquatic life also. -Vehicular emission & dust emission if deposited over the surface of the water body may deteriorate the water quality and thereby affect aquatic life and make water unfit for consumption. -If raw material falls near or on the water body it can deteriorate the water quality.	-PUC certified vehicles will be used, so that diesel/ petrol leakage does not occur & air emissions will be maintained within the prescribed limit & thereby restricting its deposition on the water bodies. -The vehicles carrying construction material and construction debris will be cleaned before they are permitted to ply on the road and covered vehicles will be used to reduce the dust emission & thereby restricting its deposition on the water body.
Land Use	None	None
Soil Environment	-Contamination of soil may occur due to diesel/ petrol seepage into the soil if any spillage occurs or while refueling (diesel/ petrol) of vehicles transporting construction materials and servicing of vehicles.	-Procedures for maintenance of vehicles ensure that this risk is minimized, and clean-up response is rapid if any spill occurs. Lubricating waste oil will be collected separately in drums and handed over to the authorized outside agency.
Socio-Economic	-For the installation of the machinery and equipment there could be an increase in usage of vehicles which will have a direct impact on traffic load on the existing roads in the area. Due to which there will be a traffic jam, chaos, discomfort, safety issues on the roads. -Indirect employment generation due to transportation will be there, hence, the economic condition of their families will improve. The purchasing power of people will increase. Hence, there will be overall development of the area.	-Existing road width is sufficient to handle the load of slight increase in traffic. -There will be a positive impact due to increase in employment and other indirect requirements. Small businesses will be generated.

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	-Positive impact for small workers like tier puncture and tea stall.	
Ecology & Biodiversity	-Vehicular emission like NO₂, NO etc. can inhibit the growth of plants and premature leaves senescence. -Increased PM level will result in deposition of dust on leaves which may cause decrease in Transpiration rate of flora. -Increased noise will cause disturbance of existing avi-fauna; however, avifauna is not restricted to one place for a long time, thus it will not result in their displacement.	-Vehicles used in the transportation of construction material will have a PUC certificate. -Water sprinkling will be done to reduce the dust generation. -Dust suppression systems (water spray) will be installed as per requirement at the construction site.
Noise & Vibration	-Due to transportation of construction materials and machinery for installation, high levels of noise may be generated which may cause physiological & psychological effects on workers like annoyance, speech interference, headache, Auditory impact, increase in heartbeat of elderly people. -There will not be much impact due to vibration on project	-Barriers of noise absorbing materials with adequate height will be maintained throughout the boundary of the project site.
Hydrology & Geology	-If raw material falls down near or on the water body it can deteriorate the water quality.	Tarpaulin covered transportation vehicles will only be used.
Solid & Hazardous Waste	-Due to improper handling & transportation of raw material such as RMC & waste during transportation, littering of waste will occur leading to unhygienic conditions.	-Proper care will be taken while handling & transportation of raw material such as RMC & waste during transportation to avoid littering of it on roads and sites.

Table 110. Transportation(raw Material, Labour)

4.2.4 Activity – Working & daily activity of labor

Aspects

- Solid waste generation
- Water requirement & waste water disposal
- social relations (local labours will be employed, so negligible impact will be there)
- Sewage from labour will be treated in Leachate treatment having primary and secondary leachate treatment.

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	-Domestic solid waste generation may lead to odour problems if not stored properly & treated within time.	-Domestic solid waste will be incinerated in the in-house Boiler.

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Environmental components	Impact	Proposed Mitigation Measures
Water Environment	The waste-water if not properly disposed off, then it can deteriorate the surface water quality.	-The existing toilets/sanitary facility will be utilized
Land Use	None	None
Soil Environment	-Impact on soil due to improper disposal of solid waste & liquid waste includes the leaching from biodegradable waste and effect on flora from spillage of waste on soil.	-Domestic solid waste will be incinerated in the in-house Boiler.
Socio-Economic	-If solid waste & waste-water is generated, it may cause nuisance due to smell if not properly managed & treated.	-Domestic solid waste will be incinerated in the in-house Boiler.
Ecology & Biodiversity	No impact	None
Noise & Vibration	-Noise will be generated from DG Sets, Boilers, Plant & Machinery and Internal transportation.	-Noise attenuating devices like earplugs and earmuffs is being/will be provided to the workers exposed to high noise levels. Noise generating machinery is being/will be kept in the covered sheds.
Hydrology & Geology	No impact	None
Solid Waste	-Improper storage and disposal of Biodegradable waste will enhance the risk of microbial contamination and will enhance the risk of disease occurrence and cause foul smell. It will attract the disease vectors.	-Solid waste from the laborers will be incinerated in house boilers. -Recyclable waste like aluminum, steel, wood pieces, cement bags, plastic containers, cartons, glass etc. will be given to recyclers. -E-waste if generated is being/will be properly disposed of as per E-Waste (Management) Rules, 2016.

Table 111. Working & Daily Activity of Labour

4.3 POTENTIAL IMPACTS DURING OPERATION PHASE

4.3.1 Activity Associated with Loading, Unloading & Storage of Raw Materials (MSW)

Aspects

- Generation of PM, Dust, odour
- Accidental Spillage/Leakage of raw materials
- Generation of Noise

Environmental Components	Impact	Mitigation Measures
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Air Environment	-The proposed Municipal Solid Waste (MSW) to Electricity generating plant will have emissions in the form of methane, H₂S, NH₃, CO₂ and other gaseous pollutants and also fugitive emission -Small amounts of dust will be generated during the loading or unloading activity.	-Proper ventilation system in the enclosed dusty areas & foul smelling areas. -Transfer of MSW in MSW pits is being/will be done through weigh bridge to avoid accidental spillage/leakage. -Water sprinkling is being/will be done at the dust generation point whenever required. -Accidental Spillage is being/will be managed by detection of leaks in the first place from structures or vessels.
Water Environment	-Accidental Leakage/ spillage of leachate while loading and unloading from containers, if in any case comes in contact with the water body then it may deteriorate the groundwater & surface water body quality. This in turn may affect aquatic life also & make water unfit for consumption.	-To prevent leachate from contaminating groundwater and surface water, the tipping bay is designed to collect maximum leachate. -The loading unloading activity is being/will be done with a safe zone defined and in a marked safe area. All systems and connections are maintained and checked regularly so that connections are leak proof. -The tankers, drums etc. are approved and as per the specifications of approved vendors so as to minimize any spillage therefore there is being/will be no impact on soil after this precaution is ensured. -Containment such as proper slopes connected with the sump has been/will be provided in the stock yard where the storage is done, so that during spillage if any occurs, the spill is being/will be collected and disposed off properly.
Land Use	No impact	None
Soil Environment	Chemical degradation of soil may occur. This will lead to change in porosity, permeability & also Chemical characteristics of soil of the area.	-Procedures for maintenance of equipment ensures that this risk is being/will be minimized and clean up response will be rapid if any spill occurs. -Soil samples is being/ will be collected and tested at regular intervals for the nearby areas. This will help in mitigation of any harmful impact on soil due to the project activity.
Socio-Economic	No impact	None
Ecology & Biodiversity	-Spillage of raw material on soil during loading and unloading activities can inhibit the growth of plants.	-The loading unloading activity is being/will be done with a safe zone defined and in a marked safe area.
Noise & Vibration	-Loading and unloading of raw materials will not cause much of a significant impact on noise level of the area, it may only cause physiological effects like annoyance to the workers.	-Proper training is being/will be given to the workers for handling raw materials. If required, PPE will be also provided to the workers.
Hydrology & Geology	Spillage of waste, material, Oil & any other storage material.	Procedures for maintenance of equipment would ensure that this risk is being/will be minimized.

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Solid & Hazardous Waste	May lead to odour and vector related issues due to foul smell	The waste is stored in a closed pit with adequate ventilation and odour control measures
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Table 112. Loading, Unloading & Storage of Raw Materials

4.3.2 Activity– Power generation Process and Operation of Manufacturing Machinery & Equipment (Boiler, DG set, etc)

Aspects

- Air Emissions from process manufacturing
- Water consumption for Process
- Wastewater Generation for Process
- Generation of Solid & Hazardous waste from manufacturing process
- Generation of Noise & Vibration
- Generation of odour

Environmental Components	Impact	Mitigation Measures
Air Environment	-Process emissions will be from the stacks attached to the Boiler from which pollutants/gasses PM, NO₂, SO₂ & CO and other pollutants will be released in the form of flue gasses which will degrade the ambient air quality of the area by increasing GLC and may cause eye irritation and acute respiratory illness to the people nearby. -Heat from combustion of RDF can increase the temperature of the room -Accidental release of RDF may result in emission of particulate matter in the air environment which will cause difficulty breathing and nausea. -Odour may negatively affect the psychological/ aesthetic stability of the nearby population. -Utilization of non-renewable fuel i.e., diesel which may lead to scarcity of the fuel.	-For process Boilers stacks, APCS like bag filter and FGCS with Bag filter have been installed along with each boiler in the unit along with a stack of 60 m height in accordance with CPCB norms -Regular maintenance of all the joints, flanges, pumps, glands seals, valves, pipes etc has been done and adequate PPE are provided to the workers.
Water Environment	-During the operation phase, the source of water supply will be treated STP water from DJB. No fresh water will be drawn from any surface water body. The main water pollution sources in the WtE plant will be storage area of leachate, blow down water from boiler & cooling tower, DM plant effluent and floor washing sewage. -Ground water impact during operation phase arises typically due to percolation of	-Complete water system has been designed based on zero discharge concept. The treated waste water is being/will be reused and reutilized. Leachate from the plant is being/will be treated in a combined leachate treatment plant. Condensate water from the leachate treatment plant is being/will be used for quenching of bottom ash. Blow down water from boiler and cooling tower and DM plant waste is being/will be neutralized and after treatment is being/will be utilized for

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Environmental Components	Impact	Mitigation Measures
	waste water from drains and pits, process chemicals.	various purposes. Sewage water is being/will be treated in the biological pretreatment section of the leachate treatment plant. -The ground water is not being/will not be utilized for plant use or for any other purpose. The neutralization pit and all the drain and collecting system is being/will be properly concretized to reduce chances of contamination of ground water.
Land Use	No impact	None
Soil Environment	-Chemical degradation of soil may occur due to disposal of waste water, solid waste on the soil or accidental spillage of chemicals on soil.	-All the waste is collected in MSW Pit. The existing unit is a ZLD unit and shall be followed after further expansion also. No disposal of waste or waste water is being done on soil. -Procedures for maintenance of equipment will be ensured that this risk is minimized and clean-up response is rapid if any spill occurs. The tankers, drums etc. are approved as per the specifications of approved vendors to minimize any spillage therefore there is no impact on soil. -Sumps are made and proper channelization of spillage will be made.
Socio-Economic	-Increased noise from machinery.	-Stationary machineries and equipment will be properly enclosed by enclosures. Earplugs are provided to workers to reduce the impact from noise.
Ecology & Biodiversity	-The ecology of the area during the operation phase generally gets affected due to discharge of water effluents and emission from the stack. -Increased dust emission can lead to climate change which eventually will result in a decrease in plant/tree cover. -Increased noise will cause disturbance of fauna. -Impact on aquatic life of nearby surface water. -Spillage of waste on soil can inhibit the growth of plants and promote premature leaves senescence.	-the project is designed on zero discharge concept. After adequate treatment all the effluents will be recycled and re-utilized and there will be no discharge. Hence, no aquatic system will be affected. -The project has a 30 m wide green belt in the premises with local species with aesthetic appeal. Tolerant tree species are planted which acts as a sink for pollutants and odour. The air pollution control system is designed to comply with regulatory emission standards. In view of this, the impact of the projects during operation on ecology will be insignificant. Since the predicted incremental the values of air pollutants are very low. -Water sprinkling is done to reduce dust generation.

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Environmental Components	Impact	Mitigation Measures
		-Ambient air quality is regularly monitored to ensure that ambient air quality standards and suggested limits meet at all times. -All measures are taken to avoid spillage of waste and chemicals on soil.
Noise & Vibration	-During the operation phase the main noise generating sources are turbines, generators, boilers, feed pumps, air compressor, cooling tower etc. These equipment will be housed in cluster/single buildings of different dimensions made of different materials or installed in open or under sheds. The material of construction implies different attenuation co-efficient.	-Sufficient oiling and lubrication is being /will be done to all the parts of the machineries to ensure that minimal noise is generated. -The noise levels will be less than 85 dB (A) limit at a distance of 1 m, except at turbine and boiler feed pump area. Persons handling noisy equipment or working in noisy places are provided with ear plugs and earmuffs. -All rotating items are/will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Vibration isolators have been provided to reduce vibration and noise wherever possible. -In general, noise generating items such as fans, blowers, compressors, pumps, motors etc. are so specified as to limit their speeds to generate minimum noise levels. Static and dynamic balancing of equipment will be insisted upon and will be verified during inspection and installation. -The insulation provided for prevention of loss of heat and personnel safety shall also act as noise attenuator. -Layouts of equipment's foundations and structures has been /will be designed keeping in view the requirement of noise abatement. -Central control room(s) provided for operation and supervision of plants and equipment is air-conditioned, insulated and free from plant noise. Necessary enclosures are provided on the working platforms/areas to provide local protection in high noise level areas. -In addition 30m green belt has been provided to further attenuate noise level.
Hydrology & Geology	-Due to accidental spillage/leakage the chances of contamination of surface water as well as ground water increases.	-The total fresh water is/ will be sourced from DJB Supply for drinking water and Sewage water is being/will be discharged and treated in the

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Environmental Components	Impact	Mitigation Measures
		biological pretreatment section of the leachate treatment plant. -The ground water is not being/will be utilized for plant use or for any other purpose. The neutralization pit and all the drain and collecting system are properly concretized to reduce chances of contamination of ground water.
Solid & Hazardous Waste	-Process waste will be generated which is hazardous and may cause harm if it comes into contact with skin. -Sludge and any other may cause nuisance if not maintained properly.	-Recyclable waste of 4 MT/day will be sold to registered recyclers; Manure (from composting) 2 MT/day will be Used as compost/soil conditioner. -Bottom Ash of 310 MT/day will be used for various construction activities for e.g. road and any unutilized material will be sent to ESLF. -Fly Ash 47 MT/day will be Supplied to ash brick manufacturers and any unutilized material will be sent to ESLF. -Inert 444 MT/day will be used for various construction activities for e.g. road and any unutilized material will be sent to ESLF. -Domestic Solid Waste 32 kg/day will be incinerated in- house boilers -Used oil 7 MT/day will be sold to registered recyclers. The above mentioned measures are followed in the existing operational phase. Same will be practiced after expansion too.

Table 113. Manufacturing Process of Product

4.3.3 Activity – Operation of Manufacturing Process & Equipment (DG sets, LTP, WTP, Boilers etc)

Aspects

- Generation of waste gasses, PM, SO₂, NO₂, PM_{2.5}, CO.
- Generation of Sludge, used oil.
- Water requirement and generation of wastewater
- Generation of Noise & vibration
- Generation of waste water
- Requirement of Fuel
- Generation of Ash
- Spillage/leakage
- Generation of Hazardous waste

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Environmental Components	Impact	Mitigation Measures
Air Environment	-Flue gas emissions (SO ₂ , NO _x , CO) & PM will be generated from a stack attached D.G. set, Boilers	-To prevent emissions, all DG Sets is being /will be provided with an appropriate stack height from ground level. -To prevent emissions from boiler bag filters with FCGS is/will be provided. -Regular maintenance of valves, pipes etc is being /will be done. PPEs have been/will be provided to the workers. -Frequent work area monitoring is being /will be done to ensure fugitive emission is under control.
Water Environment	-Utilization of water may impact the water demand of the vicinity and improper disposal of waste water generated may affect the quality of nearby surface water body & ground water. -The waste water If not properly disposed off, then it can deteriorate the surface water quality of nearby water bodies by increasing the no. of pathogens, BOD, COD, TSS etc and making water unfit for consumption. It will also affect aquatic life. -Ground water impact during operation phase arises typically due to percolation of waste water from drains and pits, process chemicals	State-of-the-art technology is being /will be used for minimizing the water requirement in various processes and for the treatment of wastewater. The effluent/rejects coming out of the DM plant and cooling system blow down etc. is brought to the neutralization pit. After neutralization, is being/will be used for the gas conditioning tower of FGCS and service water for floor washing, sprinkling on road and other general purposes. The treated water from Leachate treatment plant is being /will be recycled to DM Plant and rejected for quenching of bottom ash. The existing 244 KLD (240 KLD-leachate + 4 KLD-Sewage) leachate is being treated in a leachate treatment plant of capacity up to 360 KLD. After expansion, it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants. -The ground water will not be utilized for plant use or for any other purpose. The neutralization pit and all the drain and collecting system will be properly concretized to reduce chances of contamination of ground water.

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Environmental Components	Impact	Mitigation Measures
Socio-Economic	-DG sets & Boiler emission exhales PM, SO₂, NO₂, CO. This increases eye irritation, breathing issues and skin irritation. -Improper disposal of hazardous waste may cause health hazards. -Positive impact of Reduction of wastes going to Landfill and the associated costs.	-Proper air pollution control measures has been/ will be installed. -All Hazardous waste and other process residual is being /will be handled and disposed of as per The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2009. -Hazardous waste is being/will be stored in a separate area and sent to an authorized recycler. -Waste that would have normally gone to landfills are diverted to the proposed energy processing unit. It will thus save valuable land for alternate uses. Similarly, the cost associated with the transport of wastes to landfill will reduce and also the landfill taxes imposed by the local body if any will come down. This is a positive impact of the project.
Ecology & Biodiversity	-Refuse derived fuel will be used as Primary fuel for industrial boilers and other gaseous emissions from the DG set inhibit the growth of plants and premature leaves senescence. -Increased dust generation will result in decrease in transpiration rate of flora which may have an impact on the tree cover. -Ash-filled voids cannot support tree species because of poor root system development which in turn results in uprooting of trees even by low velocity winds. -Untreated water can deteriorate the plant/tree	-Bag filters with stack for boiler and stack height of 60 m are being/will be provided to DG Set. -No untreated water is being/will be used for green belt areas.
Noise & Vibration	-During the operation of DG set, LTP noise and vibration may be generated from the machinery which may cause speech interference, annoyance, hearing impairment, increase in heartbeat/ blood pressure in the workers.	-Machineries of the reputed make and less noise producing has been/ will be purchased. -DG set has been/ will be kept in an acoustically enclosed room with the provision of mufflers and silencers and has been/ will be kept on the surface. DG set is being/ will only be used in case of emergency. -Stationary machinery and equipment has been/ will be properly enclosed by enclosures and provided with dampeners for minimising noise generated due to vibration of machinery. -Silencers of all the machinery and equipment are being /will be checked and old worn out machinery will be replaced by new and less noisy machinery/equipment.

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Environmental Components	Impact	Mitigation Measures
		-Sufficient oiling and lubrication is being /will be done to all the parts of the machineries to ensure that minimal noise is generated.
Hydrology & Geology	-Due to spillage/leakage of the used oil, chemicals, and untreated wastewater, the chances of contamination of surface water as well as ground water increases.	Waste water generated is being /will be treated in LTP plants. No wastewater is being /will be discharged to the surface body or groundwater. -All probable leakage areas such as pipelines, joints, pumps and structure of reactor/storage vessels are being /will be inspected and maintained proactively.
Solid & Hazardous Waste	Used oil will be generated which are hazardous, which may cause harm if come into contact. Sludge and any other may cause nuisance if not maintained properly. -Fly ash and bottom ash are the major solid waste generated from the "WtE" project. Approx. 47 MT/day of fly ash & 310 MT/day of bottom ash will be generated from this project. These waste are required to be properly handled to avoid environmental consequences.	-Hazardous waste is being /will be stored in a separate area and sent to authorized recyclers. -Fly ash is being /will be supplied to ash brick manufacturers and any unutilized material is being /will be sent to ESLF. -Bottom Ash is being /will be used for various construction activities for e.g. road and any unutilized material is being /will be sent to ESLF. -Hazardous waste will be handled as per Waste Management and Handling Rule 2016.

Table 114. Operation of Process Equipment (DG Sets, LTP, WTE Boiler, etc)

4.3.4 Activity – Transportation of Raw materials/fuel, wastes, etc

Aspects

- Vehicular Emission and Dust emission
- Littering of solid waste
- Road congestion & Breakage of roads
- Noise Generation
- Accidental Spillage/leakage of raw material

Environmental Components	Impact	Mitigation Measures
Air Environment	-Gaseous emission from vehicles used for transportation will affect the respiratory health of staff and nearby population. Vehicular transportation also generates excessive dust and can lead to respiratory ailments. -Dust generation will be high if the movement of vehicles is done on breached roads. Increased dust emission may cause respiratory problems to nearby Population.	-Vehicles with valid PUC certificates are being /will be used for transportation. -Plantation all around the periphery has been done. -Proper maintenance of vehicles is being /will be done periodically to ensure no leakage from the vehicles. -Proper maintenance and cleaning of vehicles and tires is being /will be done in order to reduce dust generation. -Proper maintenance, cleaning of vehicles and tires, and sprinkling of water is being /will be done in order to reduce dust generation.

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Environmental Components	Impact	Mitigation Measures
	-Air Dispersion Modelling has been done. The maximum predicted increase in GLC with 75 m height - PM10 is 0.773 $\mu\text{g}/\text{m}^3$ with APCS & 5.05 $\mu\text{g}/\text{m}^3$ without APCS, SO₂ is found to be 1.91 $\mu\text{g}/\text{m}^2$ With APCS & 15.80 $\mu\text{g}/\text{m}^2$ without APCS. Post-project air quality for PM10, SO₂, is within the limits for the core zone and buffer zone as per the Ambient Air Quality standard NAAQS. The maximum GLC does not have a significant impact on environment/ ambient air quality on sensitive receptors of the project. Appropriate Measures will be identified and proper installation of air control devices will be done to control the source and impact of air pollution. 60 m height of stack is optimized considering all the conditions. Air modelling details with isopleth are given in section 4.4 & Detailed air quality modelling report is given in Section D.	
Water Environment	-The transportation of the raw material (MSW) will be done through trucks. If dust emitted or accidental spillage/leakage gets deposited on the water body it can deteriorate the water quality.	-The transportation of the raw products is being/will be done in Leak Proof MS Tankers/Drums while transporting through trucks. -Trucks used are/will be fully covered during transportation to the project by road.
Land Use	No Impact	None
Soil Environment	-Chemical degradation of soil would occur due to spill of chemical or other waste on soil.	-Procedures for maintenance of equipment ensure that this risk will be minimized and clean-up response will be rapid if any spill occurs. The tankers, drums etc. will be approved as per the specifications of approved vendors to minimize any spillage etc. therefore there will be no impact on soil. -Trucks used will be fully covered during transportation to the project by road.
Socio-Economic	-Dust and emission from movement of vehicles are likely to cause some impacts on the working population within the immediate vicinity of the project site. -Traffic congestion in the area -Accidental leakage of the chemical during transportation can cause fire.	-The present road conditions will be reasonably good for proposed movement of traffic, the site is connected to the National Highway. -Preventive maintenance and pollution checks will be carried out for vehicles on a periodic basis. -Materials transported will be fully covered during transportation to the project site by road.

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Environmental Components	Impact	Mitigation Measures
		-Proper First Aid facilities will be provided within the transportation vehicle in case of any accidental release.
Ecology & Biodiversity	-Increased noise due to vehicular transportation will cause disturbance of existing avi-fauna, however, avifauna is not restricted to one place for a long time, thus it will not result in their displacement.	-Vehicles used in the transportation of construction material will have a PUC certificate. -Water sprinkling will be done to reduce dust generation. -Vehicular movement for transportation of raw material will be carried out only in day-time and any unnecessary honking will be avoided.
Noise & Vibration	-Due to transportation of construction materials and machinery for installation high levels of noise may be generated which may cause physiological & psychological effects on workers like annoyance, speech interference, headache, Auditory impact, increase in heartbeat of elderly people. - There will not be much impact due to vibration on the project.	-Silencers is being/will be checked in the vehicles used for transportation of materials. -No honking zone will be maintained. -Reverse horn in the transportation vehicles is being/will be banned. -Only PUC certified vehicles is being/will be allowed for transportation -Maintenance of vehicles is being/will be done on a regular basis. -Plantation has been /will be done which will dampen the noise.
Hydrology & Geology	Due to accidental spillage of chemical/ waste there may be chances of contamination of surface water as well as ground water increases	-Appropriate measures are being/will be taken to avoid spillage of chemical/waste.
Solid & Hazardous Waste	Accidental litter of material, may cause potential health impacts.	-The waste is being/will be transported in closed trucks and all the measures are being/will be adapted to avoid litter of waste.

Table 115. Transportation of Raw Material, Waste, Fuel etc

4.3.5 Activity - Working & daily activity of staff, Visitors

Aspects

- Solid & E-waste generation
- water requirement & waste water generation

Environmental Components	Impact	Mitigation Measures
Air Environment	-Bio-degradable waste generation may lead to odour problems if not stored properly.	-All the domestic solid waste is being/will be incinerated in an in-house boiler.

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Environmental Components	Impact	Mitigation Measures
Water Environment	-Waste water, if not properly disposed of, can deteriorate the surface water quality of nearby water bodies. -The abstraction of groundwater is not proposed for the project, hence there will be no impact on Groundwater. -Disposal of untreated waste water may deteriorate water quality of surface & ground water by increase in the no. of pathogens, BOD, COD, TSS etc in surface/ground and thereby affecting aquatic life and making water unfit for consumption.	-No ground water abstraction is being/will be done. Domestic waste water generated is being/will be treated in Primary leachate followed by secondary leachate and RO system. No wastewater is being/will be discharged to the surface body or groundwater.
Land Use	No Impact	None
Soil Environment	-Impact on soil due to improper disposal of solid waste includes, the leaching from biodegradable waste and effect on flora from spillage of waste on soil.	-All domestic solid waste is being/will be properly collected, stored and incinerated in an in-house boiler. - Manure (from composting) 2 MT/day will be used as compost/soil conditioner.
Socio-Economic	-Improper storage and disposal of solid waste, may decrease the aesthetic value of the project and lead to an increase in risk of disease occurrence of persons. -There may occur foul smells which will cause nuisance to staff. -Direct & indirect employment generation -Ever Increasing Volume of Municipal Waste at Okhla Landfill Site. -Increase in Revenue to the DISCOMs as well as to the local body -Reduction of wastes going to Landfill and the associated costs. -Increase In Availability of Power	-All solid waste is being/will be properly collected, stored and disposed of. -Total no. of Manpower required will be 468 nos. -The Waste-to-Electricity plant next to the Okhla landfill site will reduce the volume of processed waste to the extent of 90 percent. This will result in stoppage of expansion of existing landfill at Okhla, both vertically and horizontally. This is a positive impact of the proposed Waste-to-Electricity (WtE) Thermal power project. -The cost associated with the transport of wastes to landfill will reduce and also the landfill taxes imposed by the local body if any will come down. This is a positive impact of the project. -With the availability of additional power for distribution to the needy consumers in the national capital the DISCOMs will be able to increase their revenue graph. Similarly, income of the local body will increase by higher collection of electricity taxes. -The setting up of the Waste to Energy plant at Okhla will definitely increase the availability of power to the DISCOMs for supply to the consumers by 25 MW. This is a positive and direct impact of the project.
Ecology & Biodiversity	No significant impact	None
Noise & Vibration	No significant impact	None

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Environmental Components	Impact	Mitigation Measures
Hydrology & Geology	Due to spillage of waste there may be chances of contamination of surface water as well as ground water increases.	-Measures is being/will be taken to avoid spillage of waste.
Solid & Hazardous Waste	-Improper storage and disposal of MSW waste, will enhance the risk of disease occurrence and cause foul smell. It will attract the vectors. -Improper Process waste & hazardous chemical disposal if comes in contact with human body may cause skin irritation and could be flammable also sometimes	- MSW is being/will be stored in designated storage pits near the tipping floor. The tipping floor is elevated and equipped with gates for effective unloading into the pits. -Recyclable waste of 4 MT/day will be sold to registered recyclers; Manure (from composting) 2 MT/day will be Used as compost/soil conditioner. -Bottom Ash of 310 MT/day will be used for various construction activities for e.g. road and any unutilized material will be sent to ESLF. -Fly Ash 47 MT/day will be Supplied to ash brick manufacturers and any unutilized material will be sent to ESLF. -Inert 444 MT/day will be used for various construction activities for e.g. road and any unutilized material will be sent to ESLF. -Domestic Solid Waste 32 kg/day will be incinerated in- house boilers -Used oil 7 MT/day will be sold to registered recyclers. The same practices are being followed for the existing operational Phase.

Table 116. Working & daily activity of staff, Visitors

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4.4 AIR QUALITY MODELING (AERMOD)

4.4.1 Input parameters for air quality modeling

Input		Description
Modeling Software Used		AERMOD View-Version 11.2.0
Control Pathway		
Terrain		Elevated
Dispersion Coefficient		Rural
Meteorology Pathway		
1	Met Input Data	AERMET Meteorological data for the year 2024
2	Latitude:	Plant Location as shown earlier
3	Longitude:	
4	Datum	WGS 84
5	Base Elevation:	250 AMSL
Receptor		Uniform Cartesian Grid 2, 1 x 1 grid network and grid spacing as 100 m.

Table 117. The input parameters for air quality modeling (AERMOD)

1. Scenario I - Normal or With APCS (Modeled on regulatory discharge norms) with 60m, 65 m, 70 m & 75 m stack height
2. Scenario II - Abnormal or without APCS (Modeled on 1 hr failure of APCS for 20 days per year) with 60m, 65 m, 70 m & 75 m stack height

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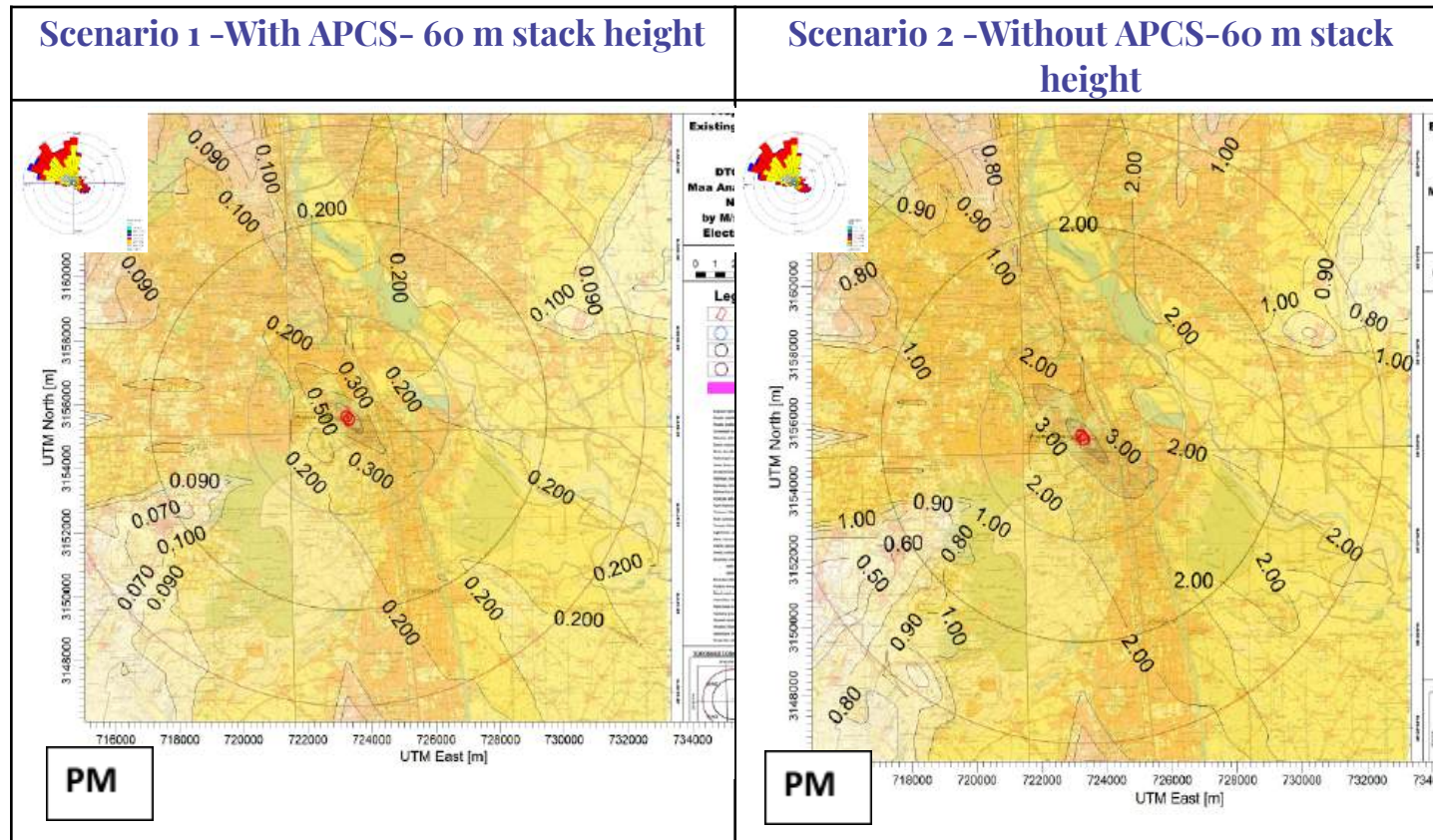
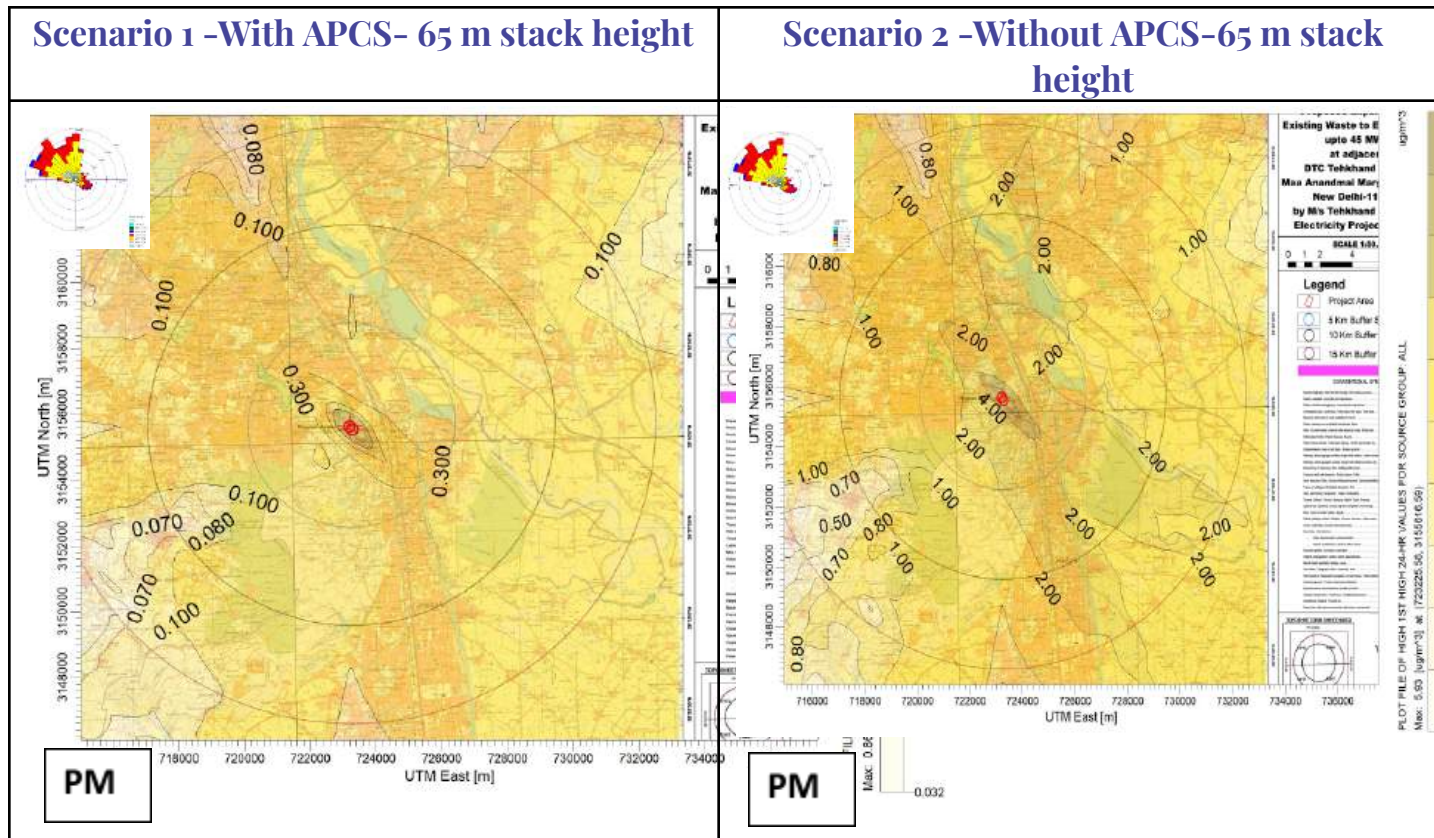


Figure 63. Scenario I & Scenario II for PM with stack height of 60 m

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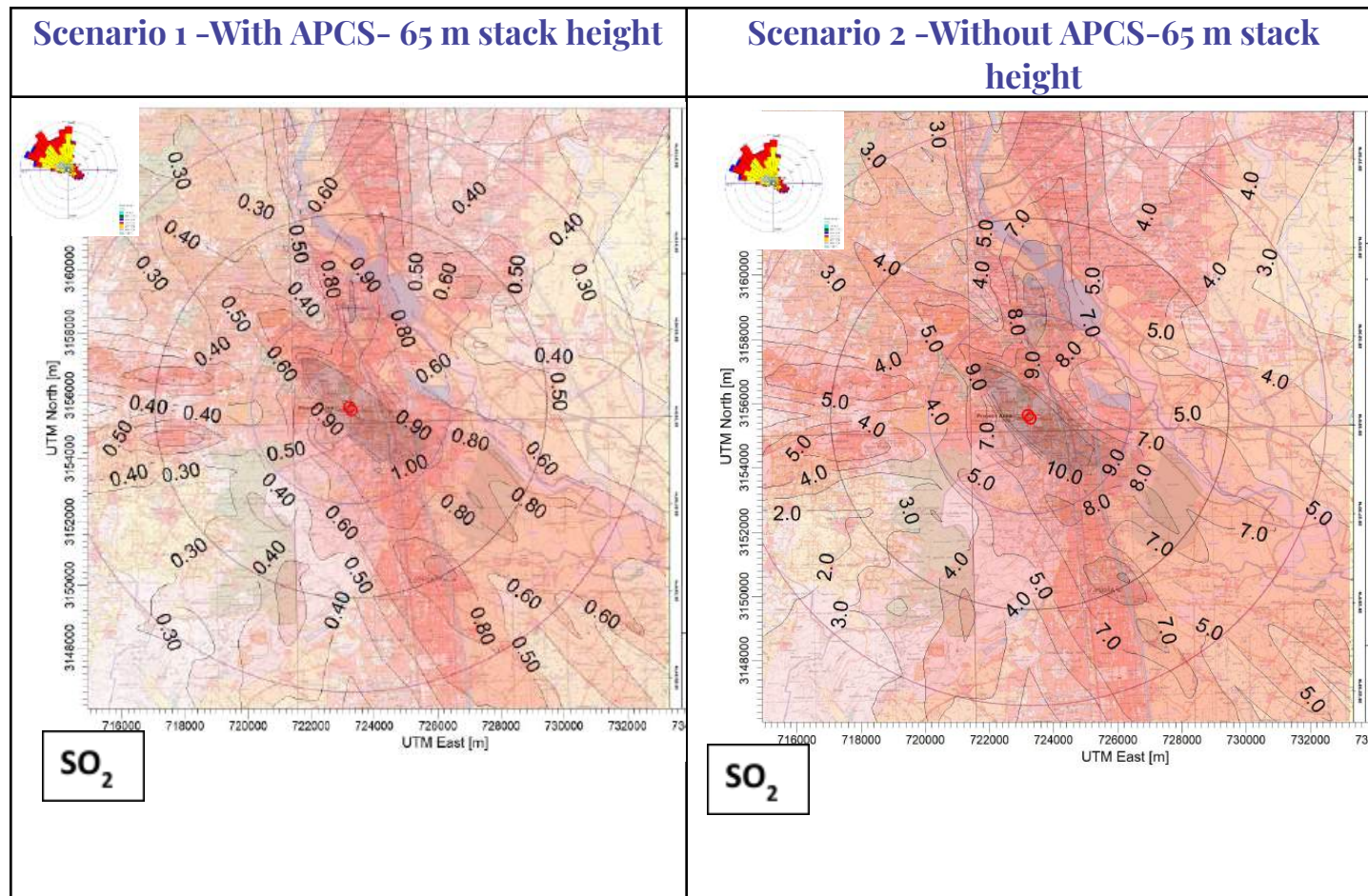


Figure 64.Output file for stack height 65 m

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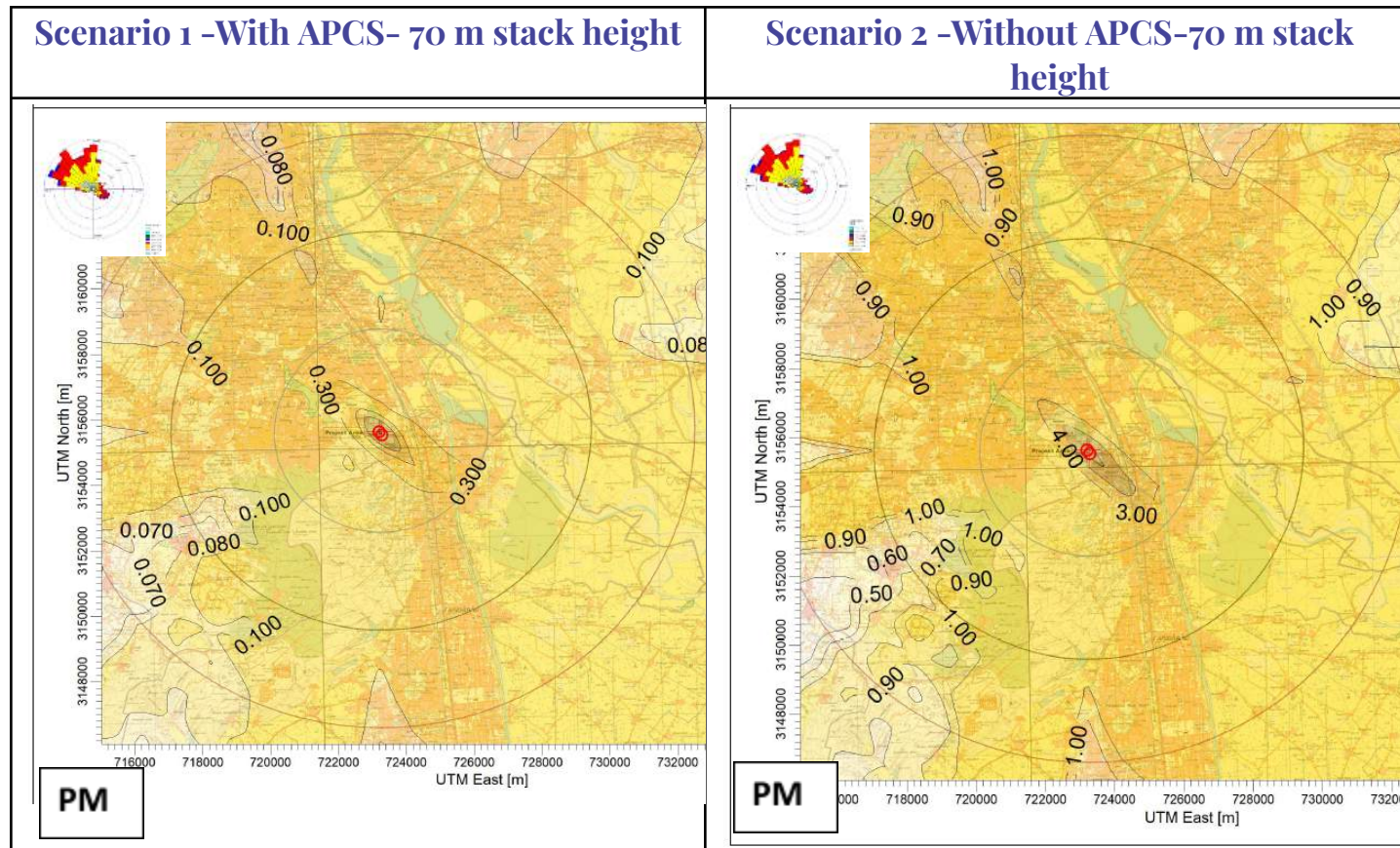


Figure 65.Output file for stack height 70 m

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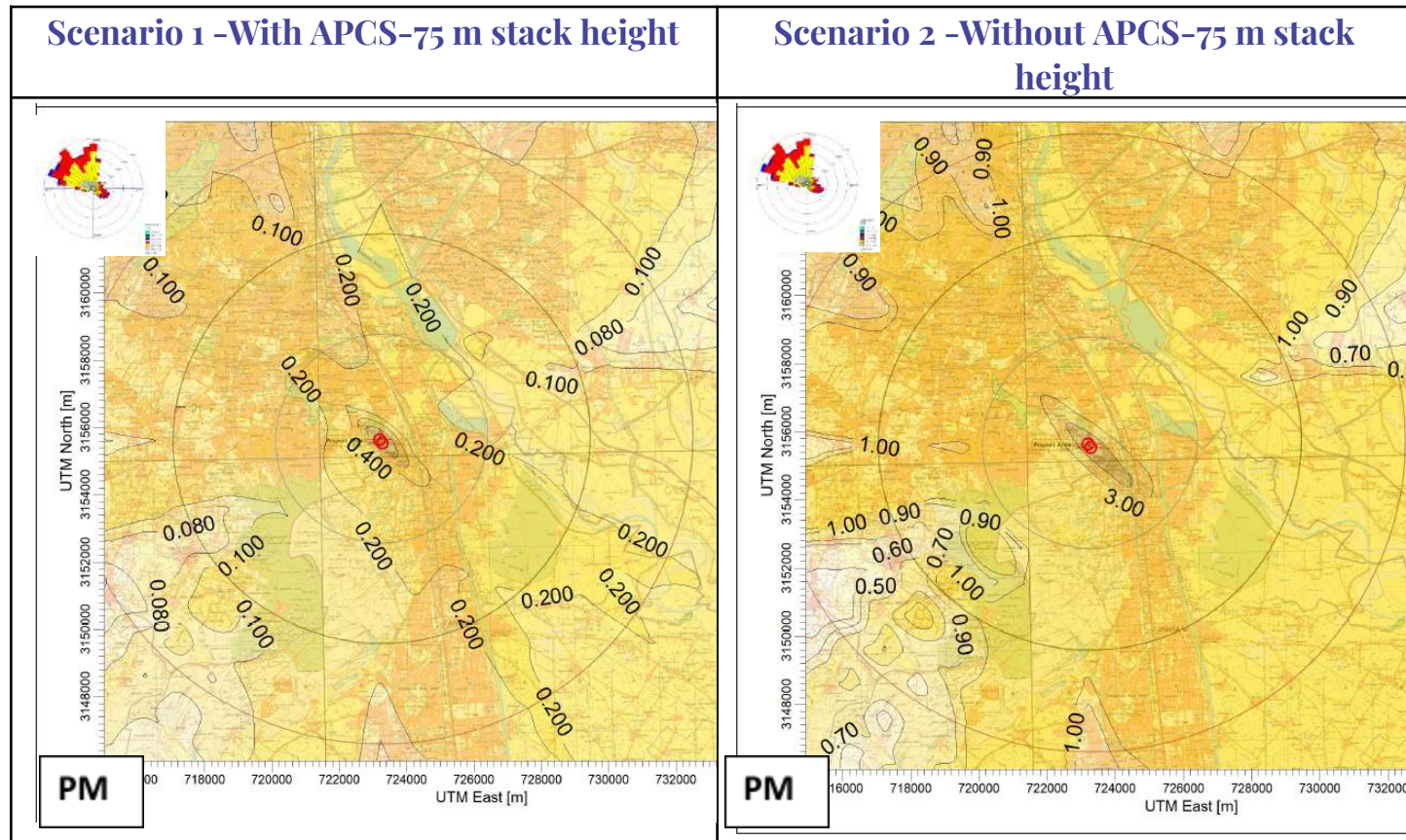


Figure 66.Output file for stack height 75 m

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4.4.2 Predicted Ambient Air Quality For PM₁₀ & SO₂

With available ambient air quality data and incremental concentrations computed through mathematical modeling the following post project ambient air quality has been predicted. The maximum GLC for PM₁₀ & SO₂ are shown here in the table with its impact on each receptor.

Location	Distance & Direction	Mean background concentration µg/m ³	60 M STACK HEIGHT NAAQS for PM10-100 µg/m ³				65 M STACK HEIGHT NAAQS for PM10-100 µg/m ³				70 M STACK HEIGHT NAAQS for PM10-100 µg/m ³				75 M STACK HEIGHT NAAQS for PM10-100 µg/m ³			
			With APCS		Without APCS		With APCS		Without APCS		With APCS		Without APCS		With APCS		Without APCS	
			Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)	Predicted Incremental Conc. PM10 (µg/m ³)	Post Project Air Quality PM10 (µg/m ³)
Project Site	--	173	0.914	173.91	6.43	179.43	0.863	173.86	5.93	178.93	0.815	173.81	5.46	178.46	0.773	173.77	5.05	178.05
Okhla Phase-1	1 km, NW	165	0.300	165.30	2.10	167.10	0.280	165.28	1.92	166.92	0.265	165.26	1.77	166.77	0.250	165.25	1.65	166.65
DayalBagh Colony	1.80 km,SE	173	0.310	173.31	2.20	175.20	0.290	173.29	2.00	175.00	0.275	173.27	1.85	174.85	0.260	173.26	1.70	174.70
Tuglakabad Village	1.87 km,NW	148	0.200	148.20	1.42	149.42	0.180	148.18	1.24	149.24	0.170	148.17	1.15	149.15	0.160	148.16	1.05	149.05
Badarpur Village	2km,E	128	0.320	128.32	2.25	130.25	0.300	128.30	2.10	130.10	0.280	128.28	1.90	129.90	0.265	128.26	1.75	129.75
Badarpur Extension	2.40 km,SE	135	0.280	135.28	1.98	136.98	0.260	135.26	1.80	136.80	0.240	135.24	1.60	136.60	0.225	135.22	1.50	136.50
Okhla phase-2	2.79,NW	194	0.180	194.18	1.25	195.25	0.170	194.17	1.15	195.15	0.160	194.16	1.05	195.05	0.150	194.15	1.00	195.00
Asola Wildlife	3.45 km,SW	109	0.170	109.17	1.20	110.20	0.100	109.10	0.70	109.70	0.095	109.09	0.65	109.65	0.090	109.09	0.60	109.60

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Location	Distance & Direction	Mean background concentration $\mu\text{g}/\text{m}^3$	60 M STACK HEIGHT NAAQS for PM10-100 $\mu\text{g}/\text{m}^3$				65 M STACK HEIGHT NAAQS for PM10-100 $\mu\text{g}/\text{m}^3$				70 M STACK HEIGHT NAAQS for PM10-100 $\mu\text{g}/\text{m}^3$				75 M STACK HEIGHT NAAQS for PM10-100 $\mu\text{g}/\text{m}^3$			
			With APCS		Without APCS		With APCS		Without APCS		With APCS		Without APCS		With APCS		Without APCS	
			Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)	Predicted Incremental Conc. PM10 ($\mu\text{g}/\text{m}^3$)	Post Project Air Quality PM10 ($\mu\text{g}/\text{m}^3$)
Jasola Sanctuary Vihar	4.5km,NE	147	0.110	147.11	0.75	147.75	0.095	147.09	0.65	147.65	0.090	147.09	0.60	147.60	0.085	147.08	0.55	147.55
Sukhdev Vihar	5.5 Km,N	139	0.100	139.10	0.70	139.70	0.090	139.09	0.60	139.60	0.080	139.08	0.55	139.55	0.075	139.07	0.50	139.50
Tilpat Village	7km,SE	132	0.180	132.18	1.25	133.25	0.160	132.16	1.10	133.10	0.150	132.15	1.00	133.00	0.140	132.14	0.90	132.90
Shahpur	8.25 km,E	104	0.150	104.15	1.10	105.10	0.140	104.14	0.95	104.95	0.130	104.13	0.90	104.90	0.120	104.12	0.80	104.80

Table 122. Village wise Impact of pollutants: PM10 with four different stack heights (60 m, 65 m, 70 m & 75 m)

4.4.3 Data Interpretation

AERMOD (Version 11.2.0) model was applied for impact assessment from the different point sources. Modeling facilitates an in-depth investigation for evaluating assimilative capacity of the air environment so as to devise appropriate air pollution control policy for the study area. For the present study, air pollution inventory was developed for point sources to establish the contribution of the project site.

The sources which are considered for air dispersion modeling are Boilers, DG set & vehicular sources with & without Air Pollution Control System (APCS). **Across all stack heights, scenarios modeled with APCS demonstrate substantially reduced GLCs compared to “without APCS.”** This underlines that APCS primarily governs the emission load at source, while stack height predominantly determines the dispersion efficiency and receptor exposure.

Represents the Maximum Ground Level Concentration (MGLC) for each parameter under different scenarios

Pollutant	60 M stack height		65 M stack height		70 M stack height		75 M stack height	
	With APCS	Without APCS	With APCS	Without APCS	With APCS	Without APCS	With APCS	Without APCS
	Max GLC (µg/m³)	Max GLC (µg/m³)	Max GLC (µg/m³)	Max GLC (µg/m³)	Max GLC (µg/m³)	Max GLC (µg/m³)	Max GLC (µg/m³)	Max GLC (µg/m³)
PM ₁₀	0.914	6.43	0.863	5.93	0.815	5.46	0.773	5.05

Table 123. Data Interpretation

The table presented above shows **Maximum Ground Level Concentration (Max GLC, µg/m³)** of pollutants **PM₁₀** and **SO₂** for different stack heights (60 m, 65 m, 70 m, and 75 m).

- **At lower stack heights (60 m)**, emissions are released closer to ground level, so dispersion is limited → moderate GLC.
- **At intermediate heights (65–70 m)**, plume may come down faster (depending on wind speed, turbulence, inversion layers), leading to localized high concentrations.
- **At higher stack height (75 m)**, plume rises above critical mixing layers and disperses more effectively over a wider area, resulting in the lowest ground-level concentrations.

The modeling clearly demonstrates that stack height of 60 m has been optimized & **provides good dispersion efficiency** with **enhanced atmospheric mixing** at higher elevation leading to lower

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pollutant build-up near ground level, **reduction in fumigation/downwash effects** compared to other stack heights the resultant GLCs of PM₁₀ remain well within permissible limits when combined with APCS efficiency.

The post-project air quality for all the pollutants is within the limits for the core zone and buffer zone as per the Ambient Air Quality standard NAAQS for all the scenarios. The maximum GLC does not have a significant impact on environment/ ambient air quality on sensitive receptors of the project. Appropriate Measures will be identified and proper installation of air control devices will be done to control the source and impact of air pollution.

4.5. SUMMARY OF IMPACT & MITIGATION

4.4.1. Air Environment

Aspects of project activities which would increase the emission of PM, SOX, NOX & CO generation, dust generation which could lead to increase in ground concentration level (GLC), respiratory problems, human death, damage to flora and fauna and aesthetic properties in the environment and increase the level of air pollutants to other aspect of environment indirectly. In the plant the main sources of emissions are/will be from stacks attached to boilers, DG. APCS i.e. FCG with bagfilter along with stack height of 60 m as per CPCB, plantation of trees, installation of water sprinkling systems and dust compression systems in the nearby areas, provision of proper nose masks to labourers, etc. is being/ will be done. Vehicles with valid PUC certificates are being/ will be used for transportation of construction material and raw material.

4.5.2 Water Environment

The activities which would probably pose a negative impact on the water environment would be, working & daily activities of staff, visitors, transportation. The aspects of the activities may be generation of waste water, and deterioration of water quality which could lead to deterioration of aquatic life, generation of water-borne diseases to nearby population. To minimise such impacts, domestic wastewater in the construction phase and operation phase is being/ will be treated in the LTP followed by Primary and secondary treatment. The unit is /will be a zero liquid discharge project.

4.5.3 Land Use

The existing Land use of the project site is Industrial. There is no change in the land use pattern of the site. As per Gazette Notification dated 12.01.2018, the land is already notified for utility purposes by the Delhi Development Authority. .

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

The proposed project is located in an area of 6.07 ha in which no forest land is involved. About 33.% of the total plant area, i.e., 2.01 ha. is being/ will be maintained as a Green Belt & Plantation Area, Covered area having area 2.68 ha., Open area 0.35 ha and Road & Drainage area 1.01 ha.

4.5.4 Soil Environment

The major activities which will have a negative impact on the soil environment would be loading & unloading of raw material (MSW), manufacturing process of product, operation of machinery, handling of raw material, transportation of raw material, finished product and waste. The aspects of the activities will be soil erosion, waste generation and spillage of hazardous wastes or chemical on the soil which could lead to permanent damage to land productivity, destabilisation of landscape, decrease in permeability, damage to fertility of soil, chemical degradation and indirect negative impact on other aspects of environment like Air, Water & Ecology and Biodiversity. To minimise such impacts, mitigation measures like proper treatment and disposal of waste, proper maintenance of equipment and storage for raw material, provision and maintenance of plantation area in the project site and nearby area is being/ will be done. Procedures for maintenance of equipment would ensure that the risk is minimised and clean-up response is rapid if any spill occurs. The tankers, HDPE drums etc., are /would be ISO approved and as per the specifications of internationally approved vendors so as to minimise any spillage, etc. therefore there would be no impact on soil after this precaution is ensured. Sump is /will be made and proper channelization of spillage shall be made.

4.4.5. Socio-economic

The activities which would probably pose a positive impact of the proposed Waste-to-Electricity (WtE) Thermal power project. The Waste-to-Electricity plant next to the Okhla landfill site reduces the volume of processed waste to the extent of 90 percent. This will result in stoppage of expansion of existing landfill at Okhla, both vertically and horizontally. The Waste-to-energy plants have a significant cost advantage over traditional coal based power plants. The employment opportunities will be for skilled, semi-skilled and unskilled workers both during construction and operation phase of the project. This will lead to generation of employment at the local level. Creation of employment opportunities for job seekers in the region. The setting up of the Waste to Energy plant at Tehkhand will definitely increase the availability of power to the DISCOMS for supply to the consumers by 45 MW.

4.5.6 Ecology & Biodiversity

The major activities which would negatively impact the Ecology and Biodiversity in the project area and the surroundings would be site preparation, excavation (For foundation purposes), operation of machinery & equipment, transportation, loading & unloading of raw material/Fuel (MSW). The aspects of the activities would be dust emission, increase in GLC, increase in noise

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level, soil erosion, noise generation, water contamination, vehicular emission and waste generation which would directly /indirectly impact in decrease in transpiration rate of flora, loss of habitat, decrease in plant/tree cover, disturbance to avi-fauna and other species, premature senescence of floral species and hence decrease in population of local faunal species in the area and the surroundings. To minimize the impacts, mitigation measures like provision of air pollution control equipment, provision and proper maintenance of plantation area, a 30 m wide green belt in the premises has been planted with local species with aesthetic appeal that will attract local bird and insect species. Tolerant tree species are /will be planted which would act as a sink for pollutants and odour, installation of water sprinkling systems and dust suppression systems, provision of noise barriers, maintenance of vehicular movement near the project site and proper disposal and treatment of wastes generated from the project site. Vehicular movement for transportation of raw material is being/will be carried out only in day-time and will try to avoid unnecessary honking with the help of sign boards. Green belt/greenery is/will be developed along most of the periphery of the project area as well as along roads.

4.5.7 Noise and Vibration

The major activities which would negatively impact the environment would be the operation of machinery (DG Sets, Boiler). The aspects of the activities would be an increase in noise level and increased noise generation which could lead to physiological and psychological problems to workers and nearby population, increased vibration in the nearby areas and an indirect decrease in the biological diversity in the nearby area. To minimize such impacts, mitigation measures like restriction of activities in the limited project area and for daytime only, proper maintenance of equipment and machinery, maintenance of noise barriers, provision of protective devices like earmuffs, compactors, silencers etc., installation of plantation area in the nearby area, provision of No-Honking Zone in the area, maintenance of vehicular and traffic movement etc. is being/will be adapted in the project site.

4.5.8 Hydrology and Geology

The major activities which will be most probable to negatively impact the hydrology and geology would be operation of machinery, transportation and daily activities. The aspects of the activities would affect water bodies, can lead to spillage of oil or chemicals, or wastewater. Improper disposal of the latter can deteriorate the quality of receiving water bodies. However, the unit is being/will be a zero liquid discharge unit. Further, to minimize impacts from spillage of oil or chemicals and wastewater, mitigation measures, proper channelization of waste water and proper disposal, and Proper treatment of Wastewater is/will be adapted in the project site.

All the waste water is being/will be treated in inhouse LTP and all the treated water is being/will be utilized within the plant premises. The rainwater is being/will be collected and ground water is being/will be harvested via 5 Nos. of RWH pts.

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4.5.9 Solid and Hazardous Waste

The main solid waste generated from the Waste to Energy plant are Fly ash and bottom ash used oil, inert waste, and domestic waste. To minimise such impact following mitigation measures is being/will be adopted.

For the utilization of fly ash, Ash Generated is being/will be Supplied to ash brick manufacturers and any unutilized material is being/will be sent to ESLF.

While bottom ash is being/will be Used for various construction activities for e.g. road and any unutilized material is being/will be sent to ESLF. Used oil is being/will be sold to registered recyclers, Inert waste is being/will be used for Use for various construction activities for e.g. road and any unutilized material is being/will be sent to ESLF. Domestic Solid Waste is being/will be incinerated in- house boilers.

4.5.10 Traffic Survey

The activities which would probably be responsible for traffic congestion would be transportation of raw material/ Fuel (MSW) for which closed trucks is being/will be used.

During the construction phase the aspect of the activities would be generation of dust from movement of vehicles are likely to cause some impacts on the working population within the immediate vicinity of the project site. In turn, it will subject existing roads to more stress. To control the impact, dust suppression systems (water spray) will be used as per requirement at the construction site. Construction materials will be fully covered during transportation to the project site by road. Vehicle flow during shift changes shall be regulated by allowing exits in a phased manner.

The present road conditions are reasonably good for proposed movement of traffic. Preventive maintenance is being /will be carried out for vehicles and pollution checks on a periodic basis will be mandatory. All the activities will be done for a limited period of time. The traffic survey for the proposed project was conducted and details are given in Chapter 3 Section 3.14.

5. ANALYSIS OF ALTERNATIVE (TECHNOLOGY & SITE)

This chapter describes the analysis of alternatives with respect to site, fuel and technology to assess their environmental compatibility. Accordingly, an environmentally compatible site, fuel and technology have been considered for the proposed project.

5.1 ALTERNATIVE FOR SITE SELECTION

The present "WtE" Expansion project at Tehkhand has been planned to address the issue of Solid waste Management (SWM) in Municipal Corporation of Delhi (MCD). The existing landfill sites of MCD have exhausted their capacities and are presently overburdened.

Most parts of the MCD area i.e. southern and western parts fall under the air funnel zone and are not suitable for establishing solid waste management facilities.

Further, because of paucity of lands in the city and ever increasing amount of solid waste, it is imperative to process the MSW to the maximum extent possible to minimize dumping at the landfill sites.

A total land of 15 Acre (6.07 hectare) has been given on lease by the Municipal Corporation of Delhi (MCD) to M/s Tehkhand Waste to Electricity Project Limited on 25.09.2018 for setting up of Waste to Energy Plant. The proposed expansion will be done on the same land, and there will be no increase in the land.

The project site has been examined for environmental consideration and cleared by Central Empowered Committee (CEC), Ridge Management Board and Hon'ble Supreme Court. The land for the project has been notified by DDA for the utility purpose (U4).

The project site does not involve any rehabilitation and resettlement issues.

5.2 ALTERNATIVE TO FUEL

Normally, a thermal power plant utilizes coal/natural gas as fuel for power generation. Coal-based thermal power plants have significant advantages in terms of **reliability and cost**, but they come with major **environmental and health disadvantages**.

Advantages of Coal	Disadvantages of Coal
Abundant and Widespread Supply: Coal is the most abundant fossil fuel on Earth, This ensures a stable and long-term energy supply for many countries, reducing dependence on foreign sources.	High Greenhouse Gas Emissions: The combustion of coal releases massive amounts of carbon dioxide responsible for climate change and global warming.

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Advantages of Coal	Disadvantages of Coal
● Cost-Effective: Coal is generally cheaper to extract and burn than other fossil fuels like oil and natural gas. This affordability translates to lower electricity prices for consumers.	● Severe Air and Water Pollution: Burning coal releases harmful pollutants like sulfur dioxide, nitrogen oxides, particulate matter, and heavy metals such as mercury and lead. These pollutants cause smog, acid rain, and are linked to a host of health problems, including respiratory illnesses, heart disease, and neurological damage.
● Reliable for Baseload Power: Coal plants can operate continuously, 24/7, regardless of weather conditions, making them ideal for providing baseload power—the minimum amount of electricity needed to keep the grid stable.	● Water and Land Use: Coal mining destroys ecosystems and habitats. The process also requires and pollutes large amounts of water, leading to contaminated groundwater and acid mine drainage.
● Job Creation: The coal industry, from mining and transportation to plant operation and maintenance, provides a significant number of jobs, particularly in coal-producing regions.	● Non-Renewable Resource: Coal is a finite fossil fuel that takes millions of years to form. It will eventually be depleted, making it an unsustainable energy source in the long term.
	● Health and Safety Risks: Beyond the public health impacts of air pollution, the coal mining industry is hazardous for workers, who face risks from accidents and chronic illnesses like "black lung disease" (coal worker's pneumoconiosis).

Table 124. Advantages & disadvantages of alternative fuel

However, the proposed project relates to the “WtE” in which municipal waste is utilized as fuel. The quality of available MSW has a direct bearing on the energy output of the plant.

At present the MSW received at the site has the following composition:

Description	Quantity (Total after expansion)	% fraction (upon expansion)
Total Waste for processing	3,000 ton	100%
Total RDF to storage	2,100 ton	70%
Inerts removal in processing	444 ton	14.8%
Leachate/Green Slurry recovered	354 ton	12%

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Moisture	96 ton	3%
Fines/Compost	2 ton	0.10%
Recyclables	4 ton	0.10%

Table 125. MSW Compositions

5.3 ALTERNATIVE “W t E” TECHNOLOGIES

There are many waste to energy technologies available in the market. Such as Mass Incineration, RDF Incineration, Biotechnology and other thermal technologies

As the waste received at the site has major combustible material with Gross calorific value of 1500 – 2500 kcal/kg. Hence the RDF incineration has been optimized for the processing of waste to generate electricity .

The RDF incineration technology has been selected because it can process MSW scientifically with economic and environmental benefits for the citizens of Delhi. There is already a “W t E” Plant operating at Okhla on RDF Incineration technology.

5.4 ALTERNATIVE TECHNOLOGIES for FLUE GAS CLEANING SYSTEM

In a Waste-to-Energy (WTE) plant, the combustion of municipal solid waste (MSW) generates high-temperature flue gas. This gas, laden with a variety of pollutants, is a key part of the energy production process and must be treated before it is released into the atmosphere. The "conventional flue gas system" refers to a multi-stage process designed to cool the gas and remove harmful substances to meet stringent environmental regulations.

Here is a breakdown of the typical steps in a conventional flue gas system for a WTE boiler:

Flue gas constituent	Selected Technology	Description
PM and other pollutants	State of art technology FGCS with bag filters	-The proposed Boiler of up to 100 TPH will be installed as the 3rd boiler with the Best available technology and State-of-the-art technology pollution control devices. -The proposed Flue Gas Cleaning System (FGCS) will be designed with 130% capacity, providing an additional margin for efficient emission control. The best available fabric filter materials will be used for the filter bags.

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NOx removal	SNCR	SCR is strictly to adhere low NOx, however, the SNCR can also meet the required level of the NOx as per MoEF&CC European norms
Gaseous contaminants removal	Dry reactor/Semi-Dry Reactor	Dry & Semi-dry are abiding the SWM 2016 rule
Removal of toxic substance dioxin and mercury	Activated carbon	Carbon is used for removal of dioxins and mercury

Table 126. Flue gas cleaning system

5.5 ALTERNATIVE CONDENSER COOLING SYSTEM

High pressure steam is expanded in the turbine and condensed in the condenser at the lowest possible pressure for extracting maximum possible work from the thermal energy contained in the steam. The project proponent is proposing the water cooled condensers are most favorable for condensing steam. Hot water is cooled by the cooling tower & heat is rejected to the atmosphere by evaporation of water. Thus, over a time span the concentration of the salt level in the cooling tower sump increases. This requires periodic blow down to maintain the concentration of total dissolved solids (TDS) within limit. Higher concentration of the TDS in circulating water will lead to the scaling on the surface of the condenser thus decreasing the performance. TDS in the circulating water is normally not allowed to exceed the range of 2,500-3,000 ppm in the circulating water. The amount of blow down is governed by the concentration of the dissolved salts in the make-up water. It is proposed to use sewage water for the power generation. It has been found that treatment cost of the sewage water for use in the cooling tower becomes non-techno viable. The comparative evaluation of air cooled condenser (ACC) and water cooled condenser (WCC) is given below:

Particulars	ACC	WCC
Cooling media	Air	Water
Vacuum at STG exhaust	>0.18	>0.10
System efficiency	Lower	Higher
Application	Scarcity of water	Abundant water
Investment	High	Low
Operating cost	Low	High
Auxiliary power	Low	High

Table 127. Comparison of ACC & WCC

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Environmental Consultant- Perfact Enviro Solutions Pvt. Ltd.

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6 ENVIRONMENTAL MONITORING PROGRAM

6.1 INTRODUCTION

The purpose of the monitoring programme is to ensure that the specified mitigation measures defined in the EMP are complied with and leads to the desired benefits for the target area and its population. To ensure the effective implementation of the EMP and gauge the efficiency of the mitigation measures, monitoring shall be undertaken both during the construction and operation period of the project.

6.1.1 During Construction Phase

Periodic monitoring of the below mentioned parameters will be done during the construction phase of the proposed expansion.

The physical, biological and social components are of particular significance to the project is as listed below:

- Air quality
- Water quality
- Noise levels

The proposed Environmental Monitoring Plan are given below:

S. No	Type of Monitoring	Frequency of Monitoring	Parameter	Location	No of samples	Unit rate (Rs)	Cost (Rs)	Responsibility
1	Ambient Air Quality	Six Monthly	Particulate Matter (PM2.5) Particulate Matter (PM10) Sulphur Dioxide (SO2) Nitrogen Oxides (NO2)	1 in Core Zone	2	5500	11,000	-EMC & External Laboratory analyst & incharge
2	Water Quality for drinking water	Six Monthly	All parameters mentioned in IS:10500	1 drinking water sample	2	7500	15,000	-EMC & External Laboratory analyst & incharge
3	STP Treated water for construction purposes	Six Monthly	Physical and chemical properties	1 in Core Zone	2	7500	15,000	-EMC & External Laboratory analyst & incharge

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S. No	Type of Monitoring	Frequency of Monitoring	Parameter	Location	No of samples	Unit rate (Rs)	Cost (Rs)	Responsibility
4	Ambient Noise Level	Six Monthly	Day and Night noise level	2 Locations	4	2000	8,000	-EMC & External Laboratory analyst & incharge
5	DG Set Room Noise Level	Six Monthly	Day and Night noise level	1 Location	2	500	1000	-EMC & External Laboratory analyst & incharge
6	Soil Quality	Six Monthly	All parameters to check soil Fertility	2 Locations in core zone	4	4000	16,000	-EMC & External Laboratory analyst & incharge
Total Cost (Rs)							66,000	

Table 128. Environmental Monitoring Plan (Construction Phase)

6.1.2 During Operation Phase

The below mentioned monitoring will be done periodically after the commencement of operation.

S. No.	Aspect	Parameters	Frequency	Location	No of Samples	Unit rate (Rs)	Cost (Rs)	Responsibility
Air & Stack								
1	Ambient Air Quality	PM10, PM2.5, SO2, NOx, O3, CO	Quarterly	2 Onsite Location in different direction and 4 Buffer location	24	5,500	1,32,000	In-house / NABL approved third party monitoring
		PM10, PM2.5, SO2, NOx	Continuous online monitoring	One at onsite		-	-	CAAQMS
2	DG Stack	PM, SO2, NOx	Yearly	Project Site	1	6,500	6,500	In-house / NABL approved third party monitoring

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S. No.	Aspect	Parameters	Frequency	Location	No of Samples	Unit rate (Rs)	Cost (Rs)	Responsibility
3	Stack Emission (Boilers)	PM, SO2, NOx, Total Dioxin & Furans, HCL,HF,CO, TOC	Monthly	Project Site	12	6,500	78,000	In-house / NABL approved third party monitoring
		PM, SO2, NOx, HCL, HF,CO,TOC	Continuous online monitoring	Project Site Flue stack		-	-	CEMS
Water Monitoring								
4	Water Quality	Monitoring for relevant parameters as per Drinking water standard IS – 10500	Six monthly	Water Source- DJB water	2	7,500	15,000	In-house / NABL approved third party monitoring
5	Water Treatment Plant	Daily-BOD, COD, TSS, TDS, pH, Oil & Grease	Six monthly - Inlet and outlet	Water Source- STP Treated	4	7,500	30,000	In-house / NABL approved third party monitoring
6	Ground water quality and surface water quality	Monitoring for relevant parameters as per Drinking water standard IS – 10500 and as CPCB Surface water quality criteria Physical, chemical and biological parameters including heavy	Twice times in a year (Pre-Monsoon, and Post Monsoon)	2 buffer locations each for groundwater & surface water	8	7,500	60,000	In-house / NABL approved third party monitoring

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S. No.	Aspect	Parameters	Frequency	Location	No of Samples	Unit rate (Rs)	Cost (Rs)	Responsibility
		metals						
7	Leachate Treatment Plant Inlet & Outlet	Physical and chemical properties	Six Monthly	Project Site	2	500	1,000	In-house / NABL approved third party monitoring
Waste Generation Monitoring / Record Keeping								
8	Records of generation, handling, storage, transportation and disposal	Daily	Hazardous, Non Hazardous, E-waste, Organic waste, recyclable waste generated	Project Site	365	500	1,82,500	Log book
9	Sludge Characteristics and Quantity	Characteristics-Monthly Quantity-daily	TCLP test and Quantity	LTP & WTP Sludge	24	5000	1,20,000	-External Laboratory analyst & incharge
10	Flyash & bottom Ash	Characteristics-Monthly Quantity-daily	TCLP test and Quantity	Fly ash from bag filter & bottom ash from boilers	24	20,000	4,80,000	In-house / NABL approved third party monitoring
Noise Levels Monitoring								
11	Ambient Noise Monitoring (Proposed)	Leq. Day & Leq. Night /	Quarterly	Single location at Project Site	4	2000	8000	In-house / NABL approved third party monitoring
Soil Analysis								
12	Soil Analysis at site	pH, Organic matter, Nitrogen,	Six Monthly	Single location at	2	4000	8000	In-house & NABL

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S. No.	Aspect	Parameters	Frequency	Location	No of Samples	Unit rate (Rs)	Cost (Rs)	Responsibility
		Potassium, Phosphorous, porosity, electrical conductivity, texture		Project Site				approved third party monitoring
Ecology and Biodiversity Monitoring								
13	Green belt & plantation monitoring	Survival rate of the planted Trees, Greenbelt development status & Green belt area in m2	Six Monthly	-	2	30,000	60,000	
Power and energy monitoring								
14	Energy savings	Annual	Energy consumption in terms of Solar harvesting		1	2,00,000	2,00,000	
		Total (Rs)					13,81,000	

Table 129. Environmental Monitoring Plan (Operation Phase)

OCEMS and CAAQMS were installed on 10.12.2022 & 17.02.2023 for stack emission & ambient air monitoring and both the systems are connected with the DPCC & CPCB Servers for online monitoring of prescribed parameters.

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Photograph of OCEMS



Figure 67. Photograph of OCEMS

The half yearly monitoring during the existing operation phase is carried out from a NABL approved third party laboratory. The same will be followed for the proposed expansion phase.

The environment management cell is responsible for timely conduct of monitoring activities. The results of the analysis are intimated to the project head. Any anomaly in test results is investigated and proper corrective actions are undertaken.

6.1.3 Work Zone Monitoring

Workzone Monitoring Arrangements

- Work zone monitoring for all the emission parameters SO₂, NO_x, PM, CO, NH₃, Pb, O₃, C₆H₆, As, Ni, baP are done from the stack.
- **Installed Online Continuous Emission Monitoring System (OCEMS)** for the continuous monitoring of stack emission.
- Ambient Air monitoring is done as per CPCB/SPCB/MoEFCC guidelines through MOEF&CC approved laboratories.

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- **The installation of “State-of-the-Art” Flue Gas Cleaning System (FGCS)** for the proposed boiler will be carried out, similarly to the existing plant, to control the particulate matter and gaseous pollutants under prescribed limit of CPCB/SPCB.
- DG stack monitoring is being done on yearly basis as due to availability of express feeder, power failure & in turn DG run hrs are less.
- Noise monitoring is being done on a six monthly basis.

6.1.2. Maintenance of Air Pollution Control Equipment

A comprehensive maintenance action plan for the air pollution control (APC) equipment is in place at the plant. The primary objective is to ensure continuous compliance with all emission standards, maximize equipment uptime, and extend the service life of critical components. The plan focuses on a proactive, preventive maintenance approach rather than a reactive, breakdown-centric model.

The following APCS are there at the site:

- **Flue Gas Desulfurization (FGD) System:** Dry or semi-dry scrubbers for acid gas (SO_x, HCl) removal.
- **Particulate Matter (PM) Control:** Baghouse filter (Fabric Filter) or Electrostatic Precipitator (ESP).
- **Nitrogen Oxide (NO_x) Control:** Selective Non-Catalytic Reduction (SNCR) or Selective Catalytic Reduction (SCR) system.
- **Heavy Metals and Dioxin/Furan Control:** Activated Carbon Injection (ACI) system.
- **Continuous Emission Monitoring System (CEMS):** For real-time monitoring of regulated pollutants.

All maintenance activities are performed by trained and certified personnel. A dedicated team is established with clear roles and responsibilities. Regular training on new equipment, safety procedures (including Lockout/Tagout - LOTO), and best practices is being done.

Maintenance Schedules and Activities

Daily (Shift-Based) Checks

- **Visual Inspection:** Walk-through inspection of all APC equipment. Look for unusual noises, vibrations, leaks (water, gas, reagent), or visible damage.
- **System Parameter Monitoring:** Log key operating data from the Distributed Control System (DCS), including:
 - Flue gas temperatures and pressures at various points.
 - Differential pressure across the baghouse.
 - Reagent (lime slurry, urea/ammonia, activated carbon) flow rates and levels.

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- Scrubber solution pH.
- **CEMS Data Review:** Verify that CEMS readings are stable and within normal operating ranges. Note any spikes or anomalies.

Weekly Checks

- **Baghouse/ESP:**
 - Check for proper operation of the pulse-jet cleaning system (for baghouses) or the rapping system (for ESPs).
 - Inspect the dust collection hoppers for any clogs or bridging.
- **Scrubber:**
 - Inspect nozzles for blockages or wear.
 - Check pumps and agitators for proper function.
- **Reagent Injection:**
 - Confirm consistent flow from injection lances.
 - Inspect for any crystallization or buildup at injection points.
- **CEMS:**
 - Perform a zero and span check of the analyzer.
 - Clean the sample probe and filter.

Quarterly Checks

- **Baghouse/ESP:**
 - Inspect bags or ESP plates for wear, tears, or misalignment. Replace as needed.
 - Check the integrity of the baghouse inlet and outlet plenums.
- **Scrubber:**
 - Inspect and clean internal packing media.
 - Check for corrosion on vessel walls and internal components.
 - Calibrate pH probes and flow meters.
- **SCR/SNCR:**
 - Inspect and clean urea/ammonia injection nozzles.
 - Check the catalyst bed for signs of fouling or degradation (e.g., excessive pressure drop).
- **CEMS:**
 - Perform a full system calibration and linearity check.

Annual (Plant Shutdown) Overhaul

- **Complete System Inspection:** A comprehensive, in-depth inspection of all APC systems.
- **Baghouse/ESP:**

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- **Bag Replacement:** A phased bag replacement program for baghouses, or a full inspection and cleaning of all ESP plates.
- **Structural Integrity:** Check all support structures and ducting for signs of fatigue or corrosion.
- **Scrubber:**
 - **Internal Refurbishment:** Replace worn nozzles, packing media, and pumps as necessary.
 - **Lining Inspection:** Inspect the internal lining of the scrubber vessel for any damage.
- **SCR/SNCR:**
 - **Catalyst Replacement:** If required, replace catalyst modules based on performance data (NO_x removal efficiency and pressure drop).
- **CEMS:**
 - **Calibration and Certification:** Perform a complete system audit and external certification as per regulatory requirements.

Documentation and Record-Keeping

- All maintenance activities, inspections, and repairs must be meticulously documented in a logbook or a computerized maintenance management system (CMMS).
- Records must include date, time, personnel involved, a description of the work performed, parts replaced, and any observed anomalies.
- All CEMS calibration and data logs must be stored for a minimum of five years.

6.2 SUBMISSION OF SIX MONTHLY COMPLIANCES

As per the standard environment clearance conditions, six monthly compliances of the conditions mentioned in the EC letter has to be submitted to various concerned officials of MoEF&CC, SPCB and Regional office of CPCB. These compliances have to be submitted in the months of June and December for the periods October to March and April to September respectively every year for construction phase until the construction is almost completed and operation phase for the life of the project.

The six monthly compliance is being submitted to the MoEF & CC on a regular basis and the same shall be followed after the proposed expansion.

Certified compliance report has been obtained from MOEF&CC Regional Office, Lucknow vide File No. V/ENV/DLI/1412/2018/220 dated 01.08.2025. Minor Non-Compliances observed. Action Taken Report for minor Non-compliances points has been submitted to IRO vide Letter Ref. No. TWEPL/EXP/2025-26/008, dated 14.08.2025.

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6.3 ENVIRONMENT AUDIT & ANNUAL RETURNS

The Annual Environment Audits with Form V statements and are being regularly conducted to check the compliance of environmental conditions for the existing operational industry to MoEF&CC Regional Office and DPCC. The Annual returns in Form-III are being submitted to the ULB and DPCC regularly and the same shall be followed after the proposed expansion.

6.4 COMPLIANCE OF ENVIRONMENTAL APPROVALS

6.3.1. Environmental Clearance & Consent

Particulars	Date	Link to Document
Environmental Clearance	26.07.2018	File No. J-13012/03/2017-IA.I(T)
EC Amendment	15.01.2019	File No. J-13012/03/2018-IA.I(T)
Consent to Establish (CTE)	31.01.2020	CTE order No.: DPCC/WMC II/2019
First Consent to Operate	07.10.2022	CTO dated 07.10.2022.pdf validity upto 06.04.2023
Commercial Operation Date	26.01.2023	Commercial operation letter No.-TWEPL/2022-23/085
Consent to Operate -CTO (Latest)	10.01.2025	CTO Order No.: DPCC/WMC-II/Tehkhand-WTE/2025/02 validity upto 06.10.2029

Table 130. List of EC & Consent

6.3.1 Authorisation

The plant has obtained Solid waste authorization from DPCC under **Solid Waste Management Rules, 2016** and the same is valid as on date:

Particulars	Dated	Validity
DPCC/WMC-II/Tehkhand WTE/2018/627-633	07-10-2022	06.04.2023
DPCC/WMC-II/Tehkhand WTE/2018/4380-4386	01-06-2023	06.10.2024
DPCC/WMC-II/Tehkhand WTE/2018/57-62	10-01-2025	06.10.2029

Table 131. Solid waste management authorization details

- Hazardous Waste will be sold to registered recyclers
- Bottom Ash Generated will be utilized in road subgrade construction and embankment. Any unutilized material will be sent to the designated ESLF site.
- Fly Ash will be supplied to ash brick manufacturers and any unutilized material will be sent to

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designated ESLF site.

- Inert Waste generated will be utilized for road construction and any unutilized material will be sent to SLF located adjacent to the project site.

The industry will have a well defined Environmental Management Cell (EMC) for communication with internal and external Stakeholders. The detailed reporting mechanism with the role and responsibilities is given in Chapter 10.

6.3.2 CGWA Clearance

Not Required, as no water abstraction is there. All the freshwater will be sourced from DJB.

6.3.3 Conservation Plan

Conservation Plan for 23 schedule I Species found in the buffer zone is attached in Section D. Conservation Plan will be submitted at _ on _, Receiving of the same is enclosed in Section D. The cost for wildlife conservation has been given below:-

Year-Wise Financial Targets (INR, in Lakhs)							
S No.	Name of the Activity	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Total
1.	Habitat Management	0.8	0.8	0.8	0.8	0.8	4.0
2.	Human – Wildlife Conflict Management	0.3	0.3	0.3	0.3	0.3	1.5
3.	Research and Wildlife Monitoring	0.4	0.4	0.4	0.4	0.4	2.0
4.	Public awareness	0.3	0.3	0.3	0.3	0.3	1.5
5.	Capacity Building	0.2	0.2	0.2	0.2	0.2	1.0
	SUBTOTAL	2.0	2.0	2.0	2.0	2.0	10.0

Table 132. Yera wise financial Target details

6.3.4 Forest Clearance

Not Applicable as there is no reserved forest in the 15 km vicinity of the project site.

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6.3.5 Annual returns

The Proponent with the help of 3rd party Environmental consultants will annually submit the Environment Audit with the Form V statement, Form 13 of Hazardous waste, CTE/CTO Compliance. Similarly six monthly EC compliance shall be submitted to MOEF&CC RO, Lucknow) after the grant of the Environmental clearances.

The industry will have a well defined Environmental Management Cell (EMC) for the communication with internal and external Stakeholders. The detailed reporting mechanism with the role and responsibilities is given in Chapter 10 .

7 ADDITIONAL STUDIES

7.1 PUBLIC CONSULTATION

The Public Hearing for the project was conducted on 21.05.2018 at the project site and was attended by about 230 persons. During the hearing, 08 participants expressed their views, queries, suggestions, and questions, while 57 written suggestions and opinion slips were received. All the queries raised were duly responded. Overall, the public expressed satisfaction and welcomed the project for effective management of solid waste in the area. At the same time, suggestions were made to ensure adequate pollution control measures. The table below shows the activities and amount spent as per suggestions received in public hearing.

S. No.	Activity	Amount Spent	Remarks
1	Noise Pollution	Approx. 0.35 lakhs annually	Regular monitoring is being done by approved NABL / MoEFCC laboratory
2	Air Pollution	Rs. 2514 lakhs (Capital Cost) Rs. 424.04 lakhs (recurring for the FY 2023-24 & FY 2024-25)	2 nos. Flue Gas Cleaning System (Bag Filter), 3 Nos. of Anti Smog Gun, Water Sprinklers etc.
3	Employment for rag pickers	Rs. 18.95 lakhs (for the FY 2023-24 & FY 2024-25)	Employment to the rag pickers (7 No's) have been provided in the TWEPL.

Table 133. Commitments

Now as per the TOR point no 7(ii) *EAC opined that proposed expansion of WTE project may be exempted from the conduct of fresh public hearing in terms of the provisions contained under para 7(ii)a of EIA, 2006. However, public consultation by obtaining responses in writing from concerned persons having a plausible stake in the environmental aspects of the project or activity shall be carried out as per the procedure prescribed under EIA, 2006.*

Now with reference to the above mentioned TOR point EIA is being submitted for Public consultation to DPCC.

7.2. RISK ASSESSMENT

7.2.1. Risk Assessment

Risk is a combination of the likelihood of an occurrence of a hazardous event or exposure(s) and the severity of injury or ill health that can be caused by the event or exposure(s).

Risk assessment is a process of evaluating the risk(s) arising from a hazard(s), taking into account the adequacy of any existing controls, and deciding whether or not the risk(s) is acceptable.

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Hazard is a source, situation, or act with a potential for harm in terms of human injury or ill health, or a combination of these.

Disaster is a natural or man-made hazard resulting in an event of substantial extent causing significant physical damage or destruction, loss of life or drastic change in environment.

Risk assessment involves the following:

- Hazard Identification
- Vulnerability Analysis
- Risk Analysis
- Hazard Identification and Risk Assessment (HIRA)
- Identification of significant risks and Mitigation
- Emergency Plan

Risk analysis provides severity of harm from particular types of hazard.

The vulnerable analysis is done on all the hazards as below:

S. No	HAZARD IDENTIFICATION	Severity (1-5)	Likelihood (1-5)	Severity x Likelihood (1-25)
Natural hazard				
1	Earthquake	4	4	16
2	Flood	5	3	15
3	Forest Fire	2	2	4
Man Made Hazard				
5	Chemical Leakage	2	2	4
6	Chemical Spillage	2	2	4
7	Mechanical Failure	4	4	16
8	Thermal	5	4	20
9	Explosion in process/ storage areas	5	3	15
10	Fire/ Explosion in boiler area	5	3	15

Table 134. Risk Analysis

(Hazards scoring 1-9 are less serious hazards & 9-25 are very serious hazards & require risk assessment)

7.2.2. Risk Assessment Methodology

The Risk Assessment Methodology is primarily based on the likelihood of occurrence of the risk identified and their possible hazard consequences based on the professional/expert judgement & hypothetical scenarios. With respect to the proposed project, major risks associated like leaks, rupture of storage tanks have been assessed qualitatively and evaluated through a risk matrix generated to combine the risk severity and likelihood factor.

Hazard identification exercise is conducted taking into consideration materials, material handling methods, and safety measures to be taken in the proposed plant. Containment failure scenarios related to storage areas are considered for hazard Analysis and consequences of such containment failures are considered in detail.

The key task of Risk Analysis is to establish the risk level of all events and whether or not the risk of the higher risk scenario, determined by consequence and probability, are acceptable. The impact of hazardous events occurring is assessed based on both damage caused and the corresponding probability of occurrence. The important step in the Risk Analysis is to conduct Consequence Analysis with reasonable accuracy and to choose the relevant parameters with a factor of safety.

The brief outline of the three tier approach is given below:

Level 1 – Risk screening

This is a top-down review of worst-case potential hazards/risks, aimed primarily at identifying locations within the plant area, which pose the highest risk. Various screening factors considered Include: Inventory of hazardous materials; Hazardous Materials properties; Storage conditions (e.g. temperature and pressure); Location sensitivity (distance to residential areas/populace). The data/information is obtained from plants. The results provide a relative indication of the extent of hazards and potential for risk exposure.

Level 2 – Major Risk Survey (Semi - Quantitative)

The survey approach combines the site inspection with established risk assessment techniques applied both qualitative as well quantitative mode. The primary objective is to identify and select major risks at a specific location in the plant considering possible soft spots/weak links during operation/maintenance. Aspects covered in the risk usually include:

- Process Hazards
- Process Safety Management Systems

This involves qualitative risk identification of scenarios involving hazardous materials and Risk reduction measures. Selection of critical scenarios and their potential of damage provide means

of prioritizing mitigative measures and allocation of the resources to the areas with highest risks are covered.

Level 3 – Quantitative Risk Assessment (Deterministic)

This is the stage of assessment of risks associated with all credible hazards (scenarios) with potential to cause an undesirable outcome such as human injury, fatality or destruction of property. The four basic elements include: Hazards identification utilizing formal approach (Level 2, HAZOP etc.); Frequency Analysis based on past safety data (incidents/accidents); identifying likely pathways of failures and quantifying the toxic/ inflammable material release. Hazards analysis to quantify the consequences of various hazards scenarios (fire, explosion, BLEVE, toxic vapour release etc.). Establish minimum value for damage (e.g. IDLH, over pressure, radiation flux) to assess the impact on the environment.

7.3. HAZARD IDENTIFICATION AND MITIGATION MEASURES

Effective management of a Risk Assessment study requires enumeration and selection of incidents or scenarios. Enumeration attempts to ensure that no significant incidents are overlooked; selection tries to reduce the incident outcome cases studied to a manageable number. These incidents can be classified under, either of the two categories:

- Loss of containment of material – steam or organic waste..
- Sudden release of energy and failure to contain it due to boiler explosion/ steam line leak
Unfortunately, there are several ways (incidents) by which loss of containment can occur in either category. For example, fire of waste materials can be of any size, from a small fire to large major fire. There can be electrical shock at the power plant and can be fatal for a limited number of workmen. The boiler explosion scenario cannot also be ruled out. The size and intensity of damage can be ascertained in terms of fire due to the storage of fuel, MSW and electrical shock due to operation and maintenance of the power plant at the said industrial facility. The data generated is as shown below.
- MSW Storage area, description, and dimensions.
- Composition / calorific value of waste materials present.
- Climatic conditions (temperature, pressure).
- Total Inventory at the site.
- Storage of Fuel (LDO).
- Boiler Hazard during operation and maintenance.

The goal of risk assessment is to limit the total number of incident outcome cases, to be studied to a manageable size, without introducing bias or losing resolution through overlooking significant incidents or incident outcomes. The purpose of incident selection is to construct an appropriate set of incidents for the study from the Initial list that has been generated by the enumeration process. An appropriate set of incidents is the minimum number of incidents needed to satisfy the

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requirements of the study and adequately represent the spectrum of incidents enumerated. From the generation of waste to its transportation and unloading at “W t E” project site, workers engaged in solid waste are exposed to substantial levels of physical, chemical, and biological toxins.

7.4 DIFFERENT HAZARDS AND ITS CONTROLS MEASURES

S. No	Types of Hazards	Consequences	Mitigation measures
Hazards During collection and Transportation to the site			
1	Vehicle	The vehicle carrying the MSW has the potential to meet with an accident during the transit due to various reasons • Road Condition • Bad weather • Drunk – driver • Vehicle condition	All the vehicles used for the project construction and MSW waste collection shall be of good quality and shall be maintained by the trained drivers lead by supervisors. The GPS system installation will support the facility to track the movement of the vehicle and drivers.
2	Health Hazards of employees / workman engaged at the MSW site	The employees/ workman get ill frequently and may cause accidents.	All the employees shall be trained and provided with adequate PPE to protect from the health hazards. “Separate care will be taken for the workmen employed for the work”
3	Biological Hazard	As the composition of MSW will be uncertain and all likelihood is there about the vector / bacterial diseases. The details control and mitigation factors are listed in this report	All the employees shall be trained and provided with adequate PPE to protect from the health Hazards. “Also periodical medical check-up shall be conducted to ensure good health and also early detection of any ailments”
Hazards During Storage of MSW at Site			

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S. No	Types of Hazards	Consequences	Mitigation measures
4	Fire	A problem called dry matter loss can result from heat generation, which in turn is related to moisture content. Safeguards include maintaining dry storage conditions and minimization of inventory levels to give relatively short storage times. A storage fire risk assessment should consider factors such as size/area of storage, occupancy and escape routes. As well as active fire systems, detection of hot spots and monitoring of carbon monoxide levels may also be employed.	Proper emergency management plan will be prepared and periodical mock drill shall be conducted to check the effectiveness of preparedness and controls. Adequate fire fighting system.
5	Other type of hazards due to MSW storage	Potential hazards associated with the feed materials themselves include fire dust explosion and toxic gas formation. For example, where feed materials such as biomass wood are stored in large piles, there is potential for self-heating. Potential toxic gas hazards should be considered, such as carbon monoxide formation in relation to self-heating, particularly in confined spaces.	The emissions from MSW Pits are directed into the Furnace. Proper emergency management plan will be prepared and periodical mock drill shall be conducted to check the effectiveness of preparedness and controls. Adequate fire fighting system.
6	Health Hazard	Health hazard to the workman handling the waste.	Maximum waste will be handled by the machines All the workmen employed will be monitored medically and clinically. Adequate hygiene measures will be provided for the workman employed at the site
7	Electrical Hazards during power generation	Electrical shock	The safe design and construction practices will be practiced and followed during the entire phase of construction and operation. All the workmen shall be trained and provided with appropriate “PPE LOTO” will be practiced.

Table 135. Different type of hazard and its mitigation measures

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7.4.1 Natural Hazard

Earthquake

The area under study falls in Zone-IV (High), according to the Indian Standard Seismic Zoning Map. Suitable seismic coefficients in horizontal and vertical directions respectively, will be adopted while designing the structure.

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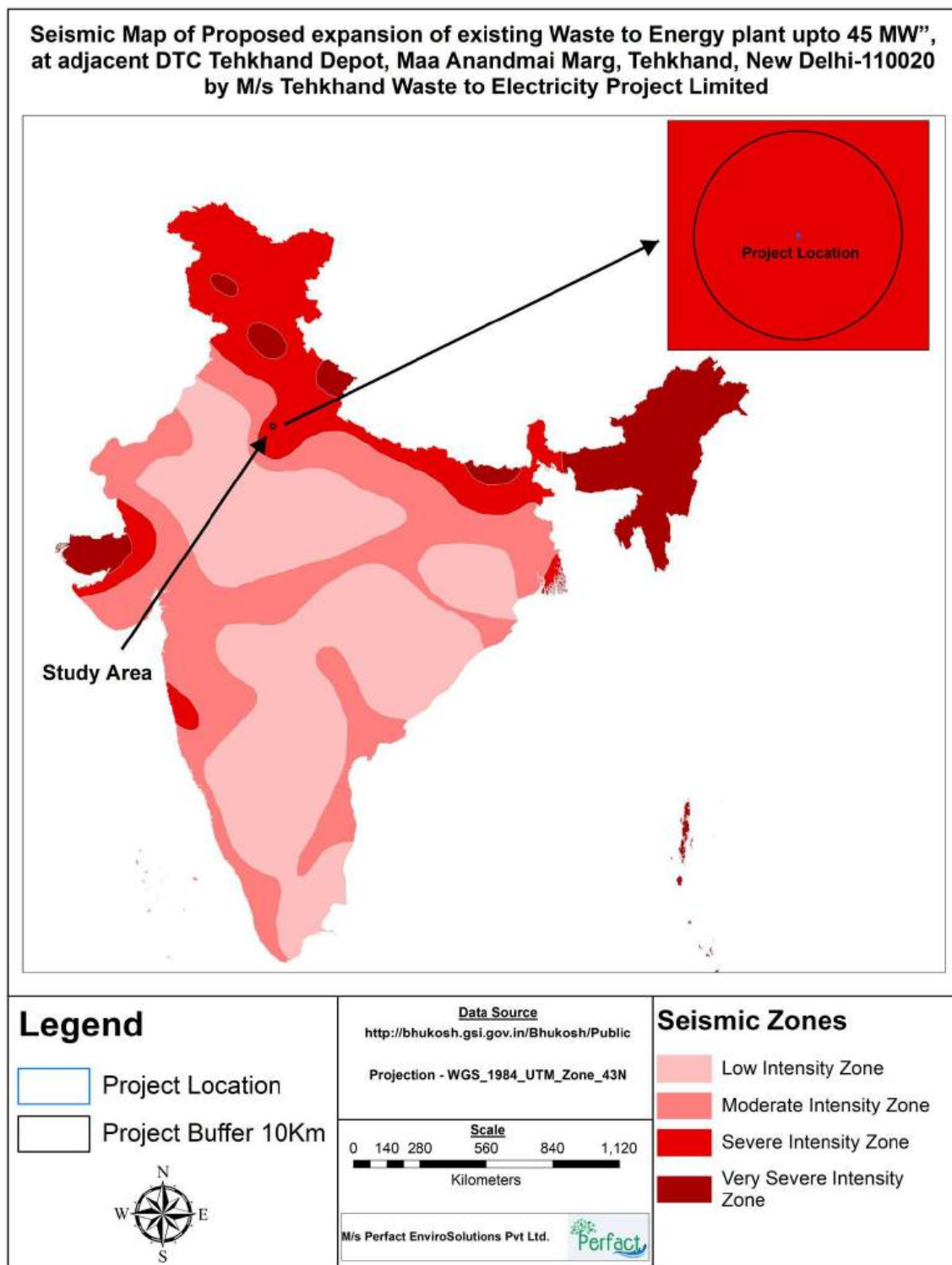


Figure 68. Indian Standard Seismic Zoning Map

Preventive Measures:

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

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- The project is situated in the Seismic zone-IV area. Special attention has been given to the structural design of foundation, elements of masonry, timber, plain concrete, reinforced concrete, pre-stressed concrete, and structural steel.
- All applicable guidelines have been followed in this regard to ensure safety of the building.

Earthquake Emergency Procedures:

During a major earthquake shaking of the earth or building is experienced. This shaking may start out as a gentle rocking motion that grows violent, or it may begin as a violent jolt. You will find it difficult to walk during the shaking during the quake.

- Stay where you are, get under a desk or table or stand in a doorway of the corner of the room. Do not seek cover under tables or benches in laboratories. Chemicals could spill and harm you. If possible, extinguish fires, flames or other sources of ignition.
- If you are outside, go into an open area away from buildings, power lines and trees.
- Do not use elevators.
- If you are driving, pull over to the side of the road and stop immediately. Avoid overpasses and power lines. Stay inside the vehicle until the shaking has stopped.

After the quake

- Gather your valuables and leave the building quickly. If necessary, provide assistance to those who have been trapped in the building, including those with mobility impairments or those who are trapped by debris. Gather at the designated meeting location.
- To expedite rescue and emergency services, a sign should be posted on the front of the building denoting that all of the occupants got out or that people may be trapped in the building. If you know someone is trapped, note the time, date, number of victims and their last known locations on the sign.
- Check for injuries, but do not move seriously injured people unless the danger in the area is greater than their injuries.
- Remember, a significant earthquake will affect the entire city and country. You may have to fend for yourself and your fellow workers for quite a long time. Render whatever aid you can provide, but remember that you are responsible for your personal safety.
- Use telephones only to report emergencies (i.e., gas, leaks, fire, injuries).
- Physical plants or other trained individuals should turn off utilities.
- Never touch downed utility poles or lines. Avoid damaged building equipment.
- Do not use your vehicle unless there is an emergency. Keep the streets clear for emergency vehicles.

Be prepared for aftershocks. Aftershocks are usually smaller than the main quake, but they may be strong enough to topple already damaged buildings.

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Flood

The project is located in Delhi at Tehkhand, which is located approx. 5 km from the Yamuna River. The HFL of Yamuna River is 207.48 m. Hence chances of flooding near the project area is less.

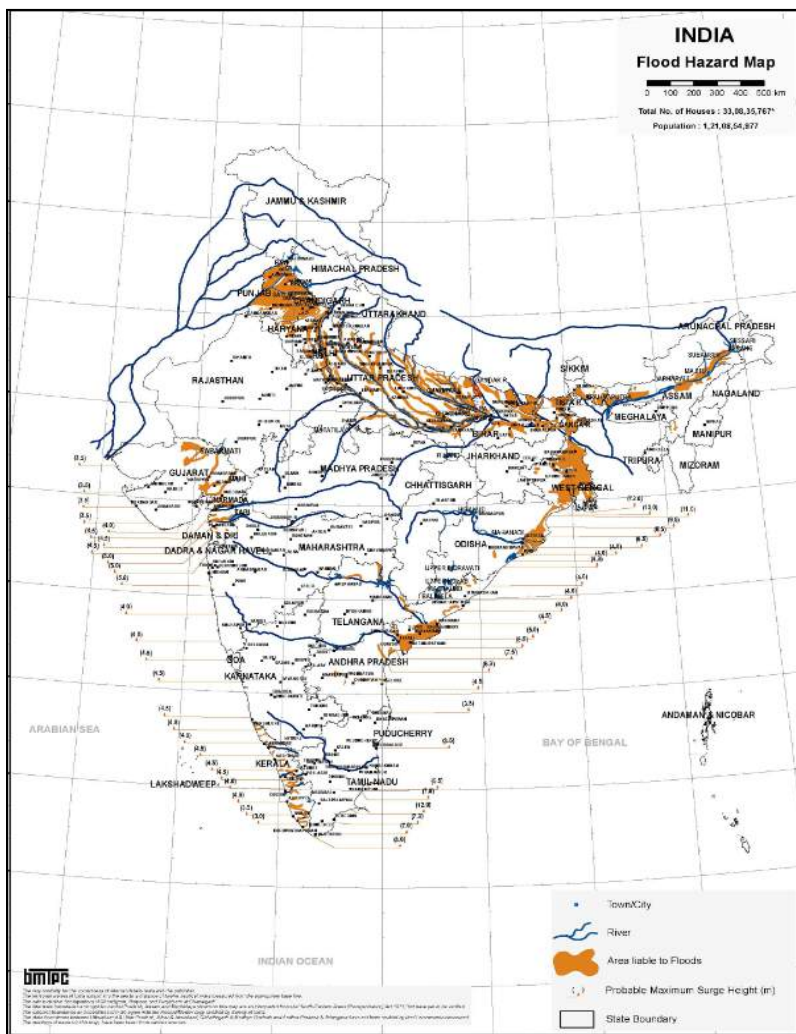


Figure 69. India Flood Hazard Map

Preventive Measures:

- Proper designing of drainage systems for domestic as well as storm water has been done.
- To control the flood following practices will be done such as planting vegetation to retain extra water, the construction of flood ways (man-made channels to divert flood water), Flood barriers, installation of Pumps for removing rainwater during flood emergency situations.

Environmental Consultant- Perfect Enviro Solutions Pvt. Ltd.

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Flood Emergency Procedures:

- Pre-cyclone season checks- to be carried out at the beginning of the cyclone season.
- Electricity Supply-Check that all trees adjacent and under the overhead power lines are trimmed and will not foul the lines.
- Storm Water Drains-Ensure that all storm water drains and guttering is free of obstruction.

7.5 RISK ANALYSIS

The risk associated with the boiler hazards and its explosion damage are given below:

7.5.1 Boiler hazards

LDO is used widely as a heating fuel in boilers and care is essential in preventing explosive pockets forming within lines and boxes particularly during start-up and shutdown. A number of explosions occurred during the warming up phase. Lighting of explosions was mostly in multi burner furnaces where operators failed to close all individual main burner gas cocks and to establish reliable pilot flames at all burners before opening the main furnace gas valve. Firing explosions were primarily caused by the following:

- Operation of burners with insufficient air for perfect combustion resulting in formation of explosive carbon monoxide air mixtures in the furnace box.
- Accidental burner flame failure with no means of automatic fuel cut-off
- Re-lighting explosions following accidental burner flame extinguishments were caused by failure to purge the furnace before reintroducing an ignition source.

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7.5.2 Boiler Explosion Damage Details

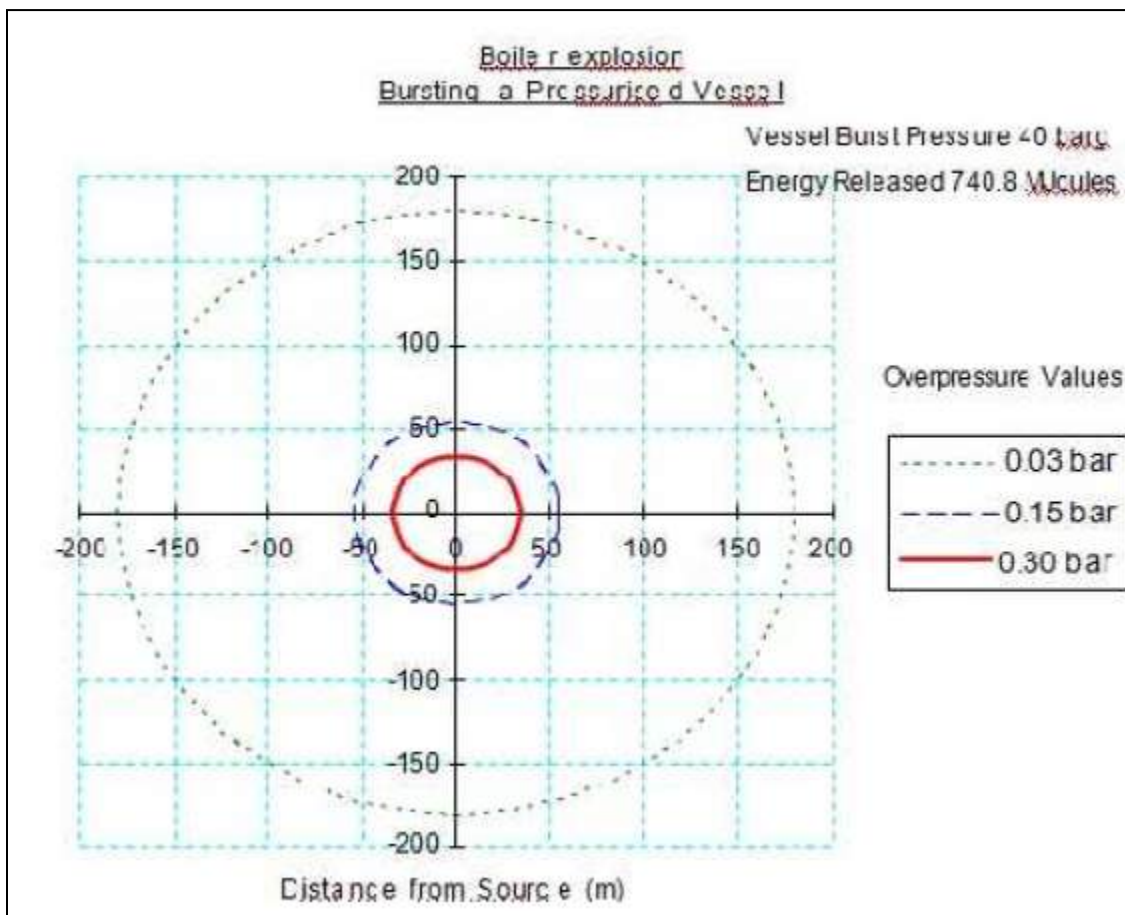


Figure 70. Boiler explosion Damage

Scenario	Damage pressure	Damage distance (Meters)
Boiler Explosion (See figure 80)	0.3 bar/pr.(heavy damage)	33m
	0.15 bar/pr.(Moderate damage)	55m
	0.03 bar/pr.(Light damage)	180m

Table 136. Boiler Explosion Damage Details

Preventive Measures:

Safety Precautions

1. Smoking should be prohibited in MSW storage and plant areas.

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2. Internal Circulation for managing the parking and traffic should be made for all the vehicles. PUC Certificate, Driver's license, etc details should be checked before giving access to the site.
3. Proper Ventilation should be made in all the areas where the chemicals are stored, handled and processed.
4. Storage tank vents to the atmosphere should be sized for fire-heated emergency vapour release.
5. Electrical equipment should be explosion-proof to meet national electrical code requirements.
6. Dry chemical extinguishers should be accessible for small fires. An adequate supply of handheld and wheeled types should be made available.
7. Hydrants should be strategically placed with adequate hoses.
8. Small spills should be remediated with sand, earth, or other non-combustible absorbent material, and the area then flushed with water. Larger spills should be diluted with water and diked for later disposal.
9. Lighting will be grounded. Tall vessels and structures should be fitted with lightning conductors that are securely grounded.

Precaution in Case of Fire

- To provide and maintain safe means of escape for all persons in the event of a fire, the necessary equipment and facilities for extinguishing fire should be provided.
- Effective measures should be taken to ensure that all the workers are familiar with the means of escape in case of fire and should be adequately trained in the routine to be followed in such cases. Also, people should be trained in firefighting operations and in operation of fire extinguishers.
- Peso certification for the storage of LDO has been obtained from the Government of India Ministry of Commerce & Industry Petroleum & Explosive Safety Organisation dated 26.11.2021. The total storage of Petroleum is not exceeding 40 KL Class C .

7.6 VECTOR CONTROL MEASURES

Some man-made container habitats produce large numbers of adult mosquitoes, whereas others are less productive. Consequently, control efforts should target the habitats that are most productive and hence epidemiologically more important rather than all types of container, especially when there are major resource constraints. The choice of approach should be effective, practicable and appropriate to local circumstances. Improvements in, and maintenance of, site infrastructure and basic services

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contribute to the reduction in available larval habitats since large vectors are often associated with poor water supply and inadequate sanitation and waste disposal services.

RISK CONTROL MEASURES SUGGESTED

The following risk control measures to be ensured, which would bring the risk to ALARP (As Low As Reasonably Practicable) limits:

- Trained workman and staff and also ensuring periodical refreshers course.
- Conducting periodical inspection, maintenance of equipment, vehicles, site conditions and ensure high degree of safety commitment.
- Fire water pumps shall be installed along with adequate water storage capacity.
- Ensure preventive maintenance schedules of product pumps are conforming to O&M Standards.
- Ensure Inspection and Maintenance of Pipelines of Boiler and other related equipment Periodical inspection and calibration of various types of electronic instruments shall be Followed. Ensure effective monitoring of the power plant safety.
- Effective house keeping.
- Gas monitoring equipment connected to the alarm (Toxic & flammable gases).

Conclusion

After the detailed study and the consequence being high in case of boiler explosion and other hazards is high, however the frequency is very-very low and in the acceptable range. Risk control measures suggested in the additional risk control measures need to be ensured to bring down the risk level to the ALARP region. All possible environmental aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Thus implementing the proposed project will not have any appreciable negative impacts. Moreover, the solid waste will be converted into usable form and only inerts (20-25%) would be sent for disposal at landfill sites. This would save upon the future requirements of the area for land filling. Generation of green power would be an added advantage.

Recommendations:

- Risk assessment has been carried out for the facility and adjoining areas. The level of risk of those contours is of 'Medium' category and is acceptable.
- No contour with high risk values due to fire and explosion of boiler / equipment extends beyond the plant area.
- Fatality risk to an individual within the plant is much less than outside. This is expected and normal to the emergency plan. Personnel in the facility are exposed to the highest risk. Proper safety measures and good engineering and maintenance (including housekeeping) go a long way in minimizing such risk.
- All safety precautions (SOP etc.) are observed in the plant.
- Flanges / other possible leakage points of pipelines are properly maintained to avoid any leakage. This is particularly applicable for hydrogen, which is the smallest size of gas.

7.7 FIRE FIGHTING SYSTEM

Fire protection systems are provided as per TAC (Tariff Advisory Committee) Guidelines and other standard norms. For every 100 m² area of the plant, one DCP type and one CO² type fire extinguisher are provided. "No Smoking" and hazard / danger warning stickers is put up at appropriate places.

All personnel deployed for the operation of MSW Power plant are given proper training for fire drills. Emergency numbers are also put up at appropriate places.

Empty fuel drums / tanks and other inflammable materials are kept at an earmarked place and are removed from the premises as soon as possible. Storage yards for chemicals and fuel lubricants are also provided with fire extinguishers and sand bucket racks.

Fire NOC has been obtained from Government of National Capital Territory of Delhi dated 08.03.2024 valid upto 3 years from the date of issuance. It comprises Electrical Control room Cum TG Block, MSW+Boiler +Furnaces Block & Admin Block owned & occupied and is being complied with fire prevention and fire safety requirements.

7.8 DISASTER MANAGEMENT PLAN

7.8.1. Onsite Disaster Management Team & Their Responsibility

On-Site Emergency Plan deals with measures to prevent and control emergencies within the factory and not affecting outside public or environment.

DMP team	Key Responsibilities
Security Personnel (Main Gate)	- Activate emergency siren - Inform Shift Engineer & Electrician - Notify key department heads - Dispatch one person to site with walkie-talkie
Site Main Controller (Plant Head)	- Lead Fire Emergency Control Center (FECC) - Implement Emergency Plan - Declare "All Clear"
Incident Controller (Head Operation / Shift Engineer)	- Take charge at emergency site - Direct shutdown if needed - Mobilize resources - Coordinate rescue & firefighting - Inform ECC & Security
Emergency Controller (Admin & Security Head)	- Control gate access - Headcount coordination - Arrange transport, communication, canteen,

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DMP team	Key Responsibilities
	medical aid - Maintain site vigilance
Maintenance Head	- Assess equipment risks - Ensure fire pump operation - Isolate power if needed - Support civil/mechanical needs - Maintain contact with ECC
Emergency Coordinator (EHS Head)	- Assess safety/fire situation - Supply emergency equipment - Advise key personnel - Lead accident investigation - Maintain ECC contact
Utility Operator	- Ensure fire pump operation - Monitor water pressure (5–7 Kg/cm ²) - Run diesel engine during power failure - Monitor water reservoir levels

Table 137. Onsite Emergency Plan

Introduction

Tehkhand Waste to Electricity Project Limited. is committed to protect its Employee, Properties and the Environment through a comprehensive emergency / disaster planning and implementation of the procedure in order to minimize hazards to human health, property, environment and the community at large.

Preventive Measures

An automatic sprinkler system has been installed at different sections (oil vapours extraction tank, Diesel Storage Tank & transformers etc.) of the plant, which is capable of quenching the fire, and operates the sprinklers (Water, Foam & CO₂ flooding) system automatically.

Adequate number of firefighting equipment have been installed at the different locations of the plant. While installing these equipment's care has been taken to match the type of equipment with the type of fire likelihood in the relevant area as per following.

Apart from above, following measures are taken for prevention of fire:

1. Board installed at the gate having statutory warning “No Smoking”. “No Smoking” has been displayed at other relevant locations also.
2. Security checks of workers coming on duty for searching cigarettes match boxes etc.
3. Maintenance of electrical panels by Electrical department as per the schedule.

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4. Fire fighting classes being taken for all newly joining personnel.
5. Hose-reels also exist to control fire.
6. Fire Proof doors are installed in different section for preventing fire from spreading to other sections in case of any miss happening.

Emergency response Structure

Action by Security Personnel at the Main Gate:

- a) On receiving confirmed information about an emergency on phone or by running the caller/PA system/Walkie-talkie (not through MCP) switch-on the local emergency siren and carry out their specified duties.
- b) Inform Shift Engineer and Shift Electrician through Walkie Talkie.
- c) Communicate Operation Head, Maintenance Head, HR- Head, Admin. & Security Head & EHS Head through Phone.
- d) One person to rush to the site with walkie talkie

Duties of Site Main Controller: Plant Head

The Site main controller (Plant Head) is responsible for overall organization and strategy of the emergency response, coordinates logistical efforts and has the authority for the final decision in any emergency action. Plant Head of TWEPL is the Main Site Controller with specific responsibilities as follows:

- a) Assume control of the Fire Emergency Control Center (FECC).
- b) Implement the Emergency Plan and plan against the escalation.
- c) Maintain contact with Local Authorities and Mutual Aid Partners.
- d) Receive updates on control measures taken by the Emergency Coordinator.
- e) Assess the situation and direct actions to minimize damage and loss of life
- f) Declare the emergency "under control" and authorize the "all clear" signal

Duties of Incident Controller: Head Operation/Alternate Shift Engineer on Duty

- a) On hearing the Emergency Siren, he will rush to the site of emergency.
- b) He will immediately take over the in- charge of the site from the Area Supervisor and instruct him to carry out other duties.
- c) Carry out the listed actions as per the need of the situation.
- d) Direct for plant shut-down operations (if needed) to control the emergency.
- e) Mobilize all resources available including man, equipment, information etc. to control the situation and prevent it from further aggravating.
- f) Instruct the First Aid, Fire Fighting & other persons at the site to carry out various tasks.

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- g) Most important of all arrange for rescue of any injured / affected / trapped persons and prompt medical aid.
- h) Control the spread of fire / further enhancement of situation –
- i) Stopping power to the area
 - By cooling the area around the site by spraying water
 - By removing the material around the fire site.
- j) Call for more supply of firefighting equipment / emergency equipment's, if required.
- k) Prevent unauthorized crowding of persons. Ensure control of other operations including isolation from the affected area.
- l) Guide the Emergency Crew in their actions for fighting fire / combating the toxic gas release and keep a close watch.
- m) Arrange for Medical aid, Stretcher, First Aid, Ambulance, and Doctor.
- n) Maintain contact with the Main Gate Control through the security guard at site and one more person stationed as messenger.
- o) If he feels the situation can turn into a major Emergency, he will contact the Emergency Controller and with his consents instruct Main Gate Security for the Major Emergency alarm (PA system).
- p) Inform Fire Brigade, Hospital etc. as per requirement through ECC / Main
- q) Gate Security.
- r) Once the emergency situation is under control, he will inform the security through walkie talkie for all clear sirens.

Duties of Emergency Controller- Admin & Security Head:

- a) Rush to Gate, ensure only the right people are allowed to enter the premises.
- b) Capture Head Count related information in consultation with the Time Office & Security Department.
- c) Arrange for transportation of personnel like firefighting personnel, plant operating personnel, security personnel and casualties /affected persons inside or outside the factory premises.
- d) Arrange to communicate adequately with the Police station, Fire brigade and other Authorities as directed by the main site controller. Attend all telephone calls from the press/govt. agencies.
- e) Arrange for canteen facilities for personnel on duty as well as in the affected area. Ensure that medical aid is rendered.
- f) In case of a need, inform the neighboring industries about the state of emergency and action required to be taken by them.
- g) Make sure that personnel required to control the Emergency situation should

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only be present there. No unwanted personnel should crowd around the affected area.

- h) Ensure security and safety of plant property during the period of emergency.
- i) Keep a watch on outsider / insider to avoid further loss of property / material.
- j) Maintain vigilance at the site of emergency for at least one hour after emergency is brought under control.
- k) Maintain constant contact with the ECC and Main Site Controller and be available for instructions.
- l) To coordinate with corporate mass communication staff to prepare a written statement, this would only be shared with the external agencies like Press, Police, other govt. agencies etc.
- m) Maintain contact with the Emergency Control Centre and be available for instructions.
- n) Will inform to all nearby hospitals for medical aid for sufferers and fire station for fire brigade.

Duties of Maintenance Head:

- a) Rush to the site & assess the gravity of the situation with a view to rendering all maintenance help as may be necessary for isolation of vulnerable equipment.
- b) Ensure starting and un-interrupted running of Fire Water pump. Provide services of Mechanic & Electrician at site.
- c) Isolate power supply to the affected area, if required.
- d) In the event of a power failure at the time of emergency, ensure running of D.G. Sets and un-interrupted supply to the firewater pump.
- e) Provide for emergency lighting, if needed.
- f) Co-ordinate any civil jobs required to be done by contractor's labour, if necessary.
- g) Maintain constant contact with the ECC and Main Site Controller and be available for instructions.

Duties of Emergency Coordinator- EHS Head:

- a) Rush to the site of emergency & assess the situation about firefighting and safety and extend help to the Main Site Controller.
- b) Arrange for supply of suitable additional Safety / Emergency and Fire equipment as may be required.
- c) Keep in touch with other “Key personnel” and render advise / assistance as required.
- d) Organize formal investigation of the accident and assist in filing reports for statutory requirements.

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- e) Maintain contact with the Emergency Control Centre and be available for instructions.

Duties of Utility Operator

- a) As soon as hear the Emergency Siren, rush to the fire pump house 3.
- b) Ensure the proper running of fire pumps and keep the constant watch on the pressure of the system it should be always in between 5 Kg/cm² to 7 Kg/cm².
- c) Keep watch on the water level of water storage reservoir.
- d) In case of power failure run the diesel driven engine.

7.8.2. Off Site Emergency Management Plan

Off-Site Emergency Plan will deal with measures to prevent and control emergencies affecting public and the environment outside the premises. The occupier should provide the necessary information on the nature, extent and likely effects of such incidents.

Preventive Measures

Training & Mock Drill

- Safety, health & environment related training are planned and organized by EHS Department.
- The On-site Emergency Plan for its validity, refinement and updation with reference to its rehearsal or Mock drills are planned & organized once in a quarter or at least once in six months.
- Objectives for testing the plan are given below:
- To familiarize emergency response personnel with their roles and duties to be performed.
- To ensure efficacy of the emergency response mechanism.
- To check coordination of reactions and response of emergency services.
- To gain experience and confidence.

Evacuation by Public Address System (P.A.)

For evacuation of personnel and for communication to large number of people during emergencies of both types, i.e. Minor & Major, Public address (P.A.) system is used. Thus, during major emergencies, evacuation announcements in particular shall be carried out through P.A. system and will be considered as evacuation warning.

7.8.3. Emergency Response Procedure

Off Site Emergency – Vehicular Accidents

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- Company Owned Vehicles
- Transport Vehicles

In-case of any vehicular Accident off site, the intimation received from any source at security gate or any other responsible person such as Head Operation, Head Admin & Security, they will immediately report Site main controller and Incident Controller. Emergency Controller (Head Admin & Security) will rush to the site and send an ambulance with first Aider for providing necessary first Aid & shifting to Injured Person/s. After reaching the site they will report to Site Main Controller and Brief about the Incident and Site Main Controller in turn will instruct the Incident Controller to inform the Local Authorities such as police, Distt. Administration, if required. In-case of Transport Vehicles, Head Admin & Security will inform concerned transporters In-charge to reach the site to provide necessary help & support to victims. All Injured Person will shift to civil Hospital for necessary Further Treatment.

ASSEMBLY POINTS

There are two assembly points:

1. Assembly Point-01 Lawn in front of TG building.
2. Assembly Point-02 Near Gate-2.

Immediately being aware of the emergency, Plant Head shall rush to the Fire Control Room to take charge of the incident. He will direct to declare an emergency based on the type of emergency. Plant Head will decide the safe close down of the plant & will check all non- essential workers; visitors & contractors are evacuated to assembly points. Further he will ask the HR Department & Admin. & Security Department to take charge of assembly points & to complete the head count & casualties assembled. Finally, he will make arrangements to transfer them to another place as per instruction.

SAFE SHUT DOWN

As stated earlier during an emergency, Plant Head (Site Main Controller) will direct the safe close down of the plant in consultation with the incident controller, if necessary. so as to activate a safe close down of the plant.

Action by personnel who notice the emergency

- Shout Fire! Fire!, Fire! Or Help! Help!
- He will inform area supervisor and Security at Gate
- Break MCP at the nearest location

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- Keep himself safe and try to mitigate the situation if he is confident to do it himself
- On hearing the emergency siren, the plant emergency key personnel should carry out the following operations immediately: -
- Area Officer/ Supervisor start the fire fighting / emergency rescue operation with the help of the firefighting team.
- Shift Engineer rushes to the site and takes the charge from Site controller.
- Site Key personnel start their action as per their responsibility.

Remedial Action in case of Fire / Explosion

- Approach the Fire in an upwind direction.
- Keep the safe distance while combating the Fire / Explosion.
- Attempt to extinguish fire with the help of appropriate Fire extinguishers and sand.
- All pipeline and tank valves should be closed and all the operations inside the Plant should be stopped. Isolate the fuel from the source of fire.
- Isolate the electrical supply, if needed.
- In-case of large fire, use the hydrant system & spray water with nozzle after ensuring complete isolation of the electric circuit in case of electrical fire.
- In case of fire in diesel use appropriate AFFF foam
- Keep the surrounding tanks / containers etc. in cool condition by using water spray system.

Remedial Actions in case of Natural Disasters

Earthquake

- Safety factor accounting for earthquakes has been considered for the design of civil foundations for the plant. To reduce earthquake risk, the unit needs to be examining its strengths and weaknesses, and systematically take actions, which reduce or eliminate the weaknesses.
- As soon as the earthquake starts, all the moving parts inside the plant should be stopped. Plant personnel should not stand near or below the tanks & should try to reach at open space & wait for next instruction from the Main Site Controller. In case of receipt of ALL CLEAR signals cautiously needs to enter in a plant as any disturbed material due to shock may fall down.

Flood or Collapse of Civil Structure

- All pipeline & tank valves should be closed & all the operations inside the Plant should be stopped. The intensity of operations should be reduced or stopped; once the weather department announces the possibility of storm or cyclone.
- All the filled tank trucks should be evacuated to safer places.
- Emergency controller / Main site Controller should contact district authorities: Collector and Police immediately for necessary help.
- Persons inside the Plant should be evacuated as soon as possible & it is also important to access at higher elevation during floods.

7.8.3.1 Roles & Responsibilities

ROLE OF EXTERNAL AUTHORITIES

On consultation with Main Site Controller, the Emergency Controller will consult with the External Agencies for further help and information. After safe close down of plant and evacuation of personnel at assembly points, he shall need to ensure search for casualties within affected areas & arrangements for hospitalization of victims or any additional help, if required, needs to be contacted with the External Authorities. Details of External Authorities with telephone numbers are presented in the table below:

CONTACTS OF EXTERNAL EMERGENCY SERVICES

Fire and Disaster Management			
S. No.	Description	Phone Number	Service/Assistance Required
1	Delhi Fire Service	101	Fire Tender, Fire Assistance
2	Okhla Phase-1 Fire Station	9868812990	Fire Assistance
3	Emergency Helpline (Disaster Management)	1077	Natural Disaster Emergency Case

Table 138. Details of Fire & Disaster Management

Hospitals and Ambulances			
S. No.	Description	Phone Number	Service/Assistance Required
1	Ambulance (General)	102	Ambulance Assistance
2	Green Line Ambulance	8045738767	Ambulance Assistance
3	Rana Ambulance	8044566826	Ambulance Assistance
4	Apollo Hospital Ambulance	1066, 011-71791090	Ambulance Assistance
5	ESIC Hospital, Okhla Phase-1	1800112526	First Aid / Treatment
6	Bansal Hospital	011-46583333	First Aid / Treatment
7	Apollo Hospital	011-26925858	First Aid / Treatment
8	Fortis Escorts Heart Institute	011-47135000	First Aid / Treatment
9	Holy Family Hospital	011-44020000	First Aid / Treatment

Table 139. Details of Hospitals & ambulance

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Police Stations			
S. No.	Description	Phone Number	Service/Assistance Required
1	Emergency Response Support System (ERSS) Pan India	112	Emergency support.
2	Police Station, Sarita Vihar	011-26825553, 011-26825554	Control of agitation, if any
3	ACP Sarita Vihar	011-26825588	Control of agitation, if any

Table 140. Details of Police station

Communication with external emergency services:

A regular liaison with external emergency is maintained by the Head Security, Admin. & liaison. He shall obtain the required assistance from these agencies in case of any emergency.

7.8.3.2 Offsite Emergency Plan Protocol

Emergency Drill

This is a disaster management simulation where hypothetical disaster situations created to check the response of the employees and identify the weaknesses by evaluating the results of the exercise and corrected by revising the plan.

Fire Control Room (FCR):

The locations where the Emergency Controller and support staff assemble to respond to an emergency. It is a centralized location for monitoring the facility response and also serves as a control center for coordinating all communications, including the allocation and distribution of information. Staff from pertinent technical and support groups assures accessibility to all required resources for an overall effective emergency response.

Emergency Siren: All Manual Call Points of Fire Alarm system relate to the Emergency. During an emergency, if anybody activates the MCP, an Emergency Siren sounds throughout the factory premises.

Intercom telephone System: The other most effective communication system inside the premises is the intercom system, which is controlled by a separate exchange panel. Also, there is a speed dialing facility provided to quite a few intercoms telephone.

Public Address System: It is used for declaring the major emergency and or evacuation of the plant personnel. Presently it relates to the Intercom Telephone facility and is given throughout the plant.

A walky-talky system or Mobile phone: These are available with Security Main Gate, shift in-charge on duty & Shift Electrician. It can be used during emergencies for emergency communication.

7.8.4 Emergency Control Team

First-Aid & Fire Fighters

Adequate nos. of trained first aiders and firefighters will be there at site to manage any emergency situations effectively.

EMERGENCY RESPONSE

A) DANGEROUS SITUATIONS

These are defined as the following:

- Earthquake
- Storm
- Any fire or explosion in the facility
- Any fire in the service buildings
- Fire or explosion in the boiler area
- Fire in the Municipal Waste storage area
- Exercise fire drill.

Even with excellent prevention measures like **good design, operation, and maintenance**, it is impossible to completely eliminate the risk of emergencies due to equipment failure or human error. Therefore, a **disaster management plan** is essential. The plan's main goal is to **mitigate the effects** of an emergency and **restore normalcy quickly** by using all available resources, both from the site and from outside services.

1. To localize the emergency and if possible eliminate it.
2. To minimize the effects of the accident on people and property.
3. Effect the rescue and medical treatment of casualties.
4. Safeguard other people.
5. Evacuate people to safe areas.
6. Informing and collaborating with statutory authorities.
7. Provide authoritative information to news media.
8. Initially contain and ultimately bring the incident under control.
9. Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency.
10. Investigating and taking steps to prevent reoccurrence.

The DMP has therefore to be related to the identification of sources from which hazards can arise and the maximum credible loss scenario that can take place in the concerned area. The plan takes into account the maximum credible loss scenario - actions that can successfully mitigate the effects of losses/ Emergency need to be well planned so as they would require less effort and resources to control and terminate emergencies, should the same occur.

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ACTUATION OF THE PLAN

All emergencies begin as small incidents that can escalate if not quickly controlled. If the incident grows, the Main Incident Controller will activate a broader on-site plan. During off-hours, security personnel will handle the situation first while contacting emergency controllers. Ultimately, a detailed organogram with specific roles and duties for key personnel will be created once the site is operational to manage emergencies effectively.

EMERGENCY RESPONSE

A) DANGEROUS SITUATIONS

These are defined as the following:

- Any fire or explosion in the facility
- Any fire in the service buildings
- Fire or explosion in the boiler area
- Fire in the Municipal Waste storage area
- Exercise fire drill.

B) ACTIONS IN THE EVENT OF FIRE

Basic actions as detailed above.

- **Extinguishing fires:** A small fire at a point of leakage should be extinguished by enveloping with a water spray or a suitable smothering agent such as CO₂ or DCP. Fire fighting personnel working in or close to un-ignited vapor clouds or close to fire, must be protected continuously by water sprays. Fire fighters should advance towards the fire downwind if possible - **Be Careful To Avoid H₂s Exposure.**
- In case the only valve that can be used to stop the leakage is surrounded by fire, it may be possible to close it manually. The person attempting the closure should be continuously protected by water sprays, fire entry suit, water jet blanket and SCBAs etc. The person must be equipped with a safety belt and a manned lifeline. In case of rapid increase in decibel level, evacuate the area, as there would have been over pressurization.

C) RESPONSE SEQUENCE FOR DANGEROUS SITUATIONS

1. Person noticing the fire should attempt to isolate and extinguish the fire with the available equipment and inform or arrange to inform the leader/ senior representative regarding the;

- Location of the fire
- What is burning?
- The extent of fire

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- Callers name and number
- Do not disconnect unless the person on the other side repeats the message or acknowledges it.

2. Security on duty coordinators will

- Respond to the scene of the incident
- Arrange to send the necessary fire fighting equipment to the scene of the incident
- Extinguish the fire with the available equipment.

3. Security Officer will:

- Sound the Siren as per the Siren Code
- Inform the Site Main / Incident Controller and act as per his instructions
- To ensure closure of gates immediately to regulate traffic in such a way that free movement of outside assistance like fire tenders, ambulance etc. is available.

4. Security should cordon off the area and local city fire fighting staff should be notified. The facility will have the firefighting water system but may not be equipped with staff to operate it. Local fire fighters may need to be notified.

5. All Other Management / Asst./ Labour Staff on hearing the siren, should STOP their operations/ work, switch off lights, fans, engines, air conditioners etc., close all doors, pipeline valves and line up in front of their working places and meet at a prearranged location. These people will assist in evacuating the residents, if necessary.

D) POST EMERGENCY FOLLOW UP

- All cases of fire occurrence, no matter how small, must be reported promptly to the coordinator for follow up.
- Under no circumstances should fire extinguishing equipment once used be returned to its fixed location before it is recharged/ certified fit by the Fire chief/ Safety Manager.
- Used fire extinguishers must be laid horizontally to indicate that they have been expended.

E) EARLY WARNING / ALARM SYSTEM

An audible electric alarm (siren) should be located in the main gate. The different sounds that should be generated by the alarm are:

- SMALL FIRE: No Siren
- MAJOR FIRE: A wailing Siren for two minutes. Sirens will be sounded three times for thirty seconds with an interval of 15 seconds in between
- EMERGENCY: Same type of Siren as in case of major fire but the same will be sounded for

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three times at the interval of two minutes.

- ALL CLEAR (For Fire): Straight Run Siren for two minutes
- TEST: Straight run Siren for two minutes.

7.8.4.1 Emergency Control Centre (ECC)

The Control Room will be nominated as the ECC. At the time of the emergency On-site Controller assisted by other designated coordinators shall take position to perform their duties. The security office at the gate shall be the standby. The Emergency Control Center will be the focal point in case of an emergency from where the overall operations to handle the emergency are directed and coordinated. It will be located outside the area of potential hazards and easily approachable.

The Emergency Control Center should have the following resources available:

- Copies of the DMP
- Layout Plan of the complex.
- Information regarding Safety Equipment, Fire Fighting material
- A list of telephones of key and essential staff of the company along with their residential numbers.
- Copies of the local Telephone Directories.
- A list of important telephone numbers like those of neighboring industries, Fire Brigade, Hospitals etc. Personal Protective Equipment.
- First – Aid Kit.
- Communication equipment – Internal and External telephones and other communication equipment.
- Requisite stationary items.
- Personnel to act as messengers.

The communication equipment is checked periodically to ensure that they are functional. The ECC is capable of being activated within a few minutes upon declaration of an emergency.

DANGEROUS SITUATIONS

These are defined as the following:

- Any fire or explosion in the facility
- Any fire in the service buildings
- Fire or explosion in the boiler area
- Fire in the MSW storage area
- Exercise fire drill.

7.8.4.2 Medical resources

The medical management for the possible emergency situations essentially consists of treatment for burns and maybe some asphyxiation cases. They could cause burns injuries. All the relevant information would also be available at the facility to enable ready treatment of any casualty, should the

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unfortunate need arise. It is also proposed to circulate any important Health and Toxicology material available through the latest research to all Doctors.

7.8.4.3 Response Evaluation, Testing and Updating of the Plan

Formulation of a Disaster Management Plan cannot possibly be an end by itself. It needs to be tested by holding periodical mock emergency simulation and drill. Any shortcomings revealed during such exercise should thereafter be corrected by amending the plan. The plan should be for times to come; hence, it must be reviewed at periodic intervals. The plan should be also reviewed and updated when:

- Major alteration or extension of plants is carried out.
- Major change in habitation or land use of the neighborhood takes place.
- Important telephone numbers used are altered, facilities are changed.

Mock drills activating the Disaster Preparedness Plan will be conducted periodically for ensuring its efficiency during emergency as well as for refinement and updation. These drills based on the plan will help achieve its objectives.

Conclusion

1. Individual Risk: Very less as centrally operated through control room automation.
2. Societal Risk: Residential dwellings around 10kms of facility due to fumes/ smokes.
3. Failure Frequency Data: All the equipments undergo periodic inspection & testing as per standards, hence chances are minimal & acceptable.
4. Additional Failure pipe lines, flange, valves: All the equipment, fittings, pipelines are inspected & tested periodically for any defeats. Any abnormality can be detected early. Hence, the chances are minimal and acceptable.

7.9 OCCUPATIONAL HEALTH & SAFETY

Action plan for the implementation of OHS standards as per OHSAS/ USEPA/ NIOSH/ ACGIH guidelines to be followed is given below:

- Occupational health surveillance programmes are being done six monthly and their records are maintained.
- Medical checkups are carried out at regular intervals.
- Safety Committee is constituted and safety, health and environmental matters/issues will be discussed in the meeting and enlighten the participants in these respects.
- Safety Posters/slogans are exhibited at conspicuous places & Instructions on emergency/ disaster are displayed.
- Vaccination programs like tetanus, hepatitis etc is regularly done for the workers at the site.
- Safety induction training modules regarding emergency preparedness, MSDS, Leakage & spillage, ERT, fire prevention, First aid etc and also some mandatory training like workplace safety & process safety are carried out periodically.
- Training effectiveness will be evaluated for operational negligence, operator fault, lack of SOPs & its awareness.

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- Flow meters, sensors, alarms measuring devices are regularly calibrated and all process parameter monitors have alert or siren systems.
- A proper system is maintained with brief of operation done in a shift, no. of batches charged, product manufactured and problems encountered or suspected during the operations to reduce probability of accidents.
- Proper medical facility arrangements are provided in case of any accidental release.
- Emergency plans are prepared and a mock drill of the on-site emergency is conducted.
- Provisions of First Aid Box and trained person in first aid.
- Onsite emergency response team trained in chemical, biological, and fire emergencies.
- Monitoring of pathogens and chemical contaminants.
- Training in mechanical injury prevention, Safe operation of heavy machinery (loaders, compactors, conveyors).
- Waste reception protocols ensuring safe dumping practices.
- Waste sorting areas equipped with sanitation and washing facilities.
- Disinfection protocols for tools and surfaces.
- Monitoring systems for CO, SO_x, NO_x, dioxins, furans, etc.

Personal Protective Equipment

The level of risk of exposure to particular chemicals dictates the appropriate level of personal protective equipment (PPE) required such as side shielded safety spectacles and appropriate gloves, footwear, face shields, respiratory protection, fire-resistant clothing or chemical suits.

- **Respirators:** A complete respiratory protection program will be instituted. It includes evaluations of workers' abilities to perform tasks while wearing CPC, Regular training of personnel, Fit testing, Periodic environmental monitoring, Regular maintenance, inspection, and cleaning.
- **Clothing:** Workers wear appropriate protective clothing to prevent skin exposure.
- **Skin Protection:** Workers wear resistant gloves and clothing.
- **Eye Protection:** Workers wear splash proof chemical goggles and face shield when working with liquid, unless full face piece respiratory protection will be worn.
- **Eyewash facility and a safety shower:** Common workplaces will be equipped with Eyewash facilities and a safety shower.

Safety In Work Environment For Worker Health

Worker Health Checkup Plan

M/s Tehkhand Waste to Electricity Project Limited is committed to take care of the health of its employees. The company conducts pre-employment and post-employment medical tests for its employees besides various educational and awareness programs on health and safety. A full time medical assistance center is always available to its employees to carry out any first aid.

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Pre-Employment Tests: Any employee who joins the plant will go under company prescribed pre-employment medical examination tests. The medical fitness reports will be required to be submitted on or before joining the organization. If some new employee reports for his/her joining without a Medical Examination and fitness report; he/she will not be allowed to join until the Medical Examination and fitness report will be produced to the HR department. Such incidents will also be reported to the HR Head.

Annual/Bi-annual Medical Tests: Annual/Bi-annual medical tests will be conducted periodically.

Plan and Budget for Occupational health and Safety & Public Health

S.No	Description	Total Budget. in Lacs per year
1	Workers will be subjected to primary health check-up. Regular Medical check-up & First Aid facility will be organized. Workers will be provided with PPE like masks, gloves, goggles & ear muffs. Health Safety provisions & fire safety provisions.	5
2	Sign Boards	2
3	EHS training will be provided, Conduct of Mock drills, Training programme on health & Safety etc	3
Total (in Lacs)		10

Table 141. Plan and Budget for Occupational Health and Safety & Public Health

Public Health & Safety

The total annual budget for organizing health check-up camps and supporting the primary health center is **Rs. 5 lacs**. This amount is allocated specifically for these two measures.

8 PROJECT BENEFITS

The expansion is propped to an existing Municipal Solid Waste (MSW) to Electricity Generating Plant at Tehkhand, Okhla, Delhi, with a view to reduce the problem associated with disposal of unprocessed municipal waste as landfill, thereby complying with the various regulations of scientific management of MSW of Delhi as well as the objective and goal set for the country under the Swachh Bharat Mission (SBM).

The Existing Municipal Solid Waste (MSW) to electricity-generating project is one of the most efficient and environmentally friendly solutions for tackling the municipal solid waste management problem. This proposed expansion of the project has been envisaged by M/s

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Tehkhand Waste to Electricity Project Limited to address the issue of increasing the quantum of municipal solid waste generated within its municipal boundaries. This project is a green initiative of MCD with the main objective of reducing the problem associated with the disposal of municipal solid waste.

The major benefits of the Project are given below:-

8.1. ENVIRONMENT BENEFIT

- The Unit is currently operating, abiding by the environmental norms.
- The proposed expansion is planned in the existing land available, as the provision of expansion was given in the earlier layout itself. Hence, there is no requirement for additional land area for the proposed expansion.
- A Waste-to-Energy plant provides significant environmental benefits by reducing the volume of municipal solid waste going to landfills, thereby conserving land and minimizing leachate generation. It converts waste into renewable energy, reducing dependence on fossil fuels and lowering greenhouse gas emissions.
- The expansion will cater to a 1000 TPD quantity of MSW and convert the same into electricity, which will reduce the quantity of waste from the landfill.
- Green Area will be maintained the same, i.e., 33 % of the total plot area.
- There will be no significant impact on the surrounding area due to the proposed expansion.
- The wastewater generated from the project is treated within the plant in the Leachate Treatment plant of 360 KLD and the treated water is reused within the plant in processes, like boiler, FGCS Gas cooling, road cleaning, housekeeping purposes etc.. No water is discharged from the premises, and maintains ZLD.
- The Biogas is generated from the aerobic digestion process, which will be captured and sold to distributors.
- The controlled combustion process with advanced pollution control systems ensures minimal air emissions, while the by-products such as bottom ash and fly ash are being utilized in brick manufacturing construction and road works, promoting resource recovery.
- Recovery and processing of the recyclable content. Recovery of metals.

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Overall, WTE plants contribute to cleaner waste management, energy recovery, and a reduction in environmental pollution

8.2. ECONOMIC BENEFIT

Waste-to-Energy plants reduce landfill disposal costs and generate revenue through power and material recovery. They create local employment, support industrial growth, and ensure long-term savings in urban waste management.

8.3. SOCIAL BENEFIT

- The project will be utilized approximately. 3000 $\pm$ 20% TPD of MSW. Utilization of such a huge quantum of MSW in the “W t E” plant will improve the sanitary and hygiene conditions of residents of the MCD area. Further, it will enhance environmental aesthetics due to the avoidance of the landfill mound.
- During the construction and operation of the project, unskilled, semiskilled and skilled people would be required. Thus creating new job opportunities. Other sections of people will benefit indirectly from the project through their businesses to supply the materials required in the project. This will improve the living standard of society and will provide safe & hygienic surroundings.

8.4 OTHER TANGIBLE BENEFITS

The tangible and intangible benefits of the proposed project are as follows:

1. This project will improve the power situation of Delhi by adding 45 MW to the grid.
2. Regular environment compliance & strict adherence to guidelines and conditions of EC.
3. Pollution from dumpsite/open burning of MSW remains an area of high concern both for the regulators and society at large. There is a high level of dissatisfaction with the current status of waste management in India.
4. Ensures only unavoidable process rejects are sent to sanitary landfill, generally not more than 20% of the received MSW

9 COST BENEFITS ANALYSIS

Environmental Cost Benefit Analysis (ECBA) is the application of Cost Benefit Analysis (CBA) to projects or activities or policies that have a clear aim of environmental improvement or action that somehow affect the natural environment as an indirect consequence. CBA is a tool which financial analysts now adopt before considering a commercial activity involving a huge investment having substantial impact on the environment. An environment to be clean & safe is the prime concern and need of society. CBA is a set of practical procedures for guiding “No Go” or “Go” decisions. There can be the most efficient resource distribution with maximum net benefit. Project benefits include Use and Non-Use values to man and environment, bequest values, option values.

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Environmental components broadly include living organisms, air, water & amp; soil. Environmental costs include pollution prevention cost, pollution damage cost, welfare damage cost and cost for environmental mitigation measures and environmental management plans. It is a decision-making process that guides the decision maker to compare all possible and foreseeable direct and indirect beneficial and adverse impacts of the proposed project.

9.1 Applicability of CBA and Summary

During the scoping/ TOR stage, no recommendation of environmental cost benefit analysis was suggested by the appraisal committee. Hence a specific environmental Cost Benefit Analysis is not carried out in preparation in this EIA report. Environmental cost-benefit analysis (CBA) is the application of CBA to projects or policies that have the deliberate aim of environmental improvement or actions that somehow affect the natural environment as an indirect consequence. Cost benefit Analysis (CBA) is a tool used either to rank projects or to choose the most appropriate option. The ranking or decision is based on expected economic costs and benefits. The rule is that a project should be undertaken if lifetime expected benefits exceed all expected costs. It is now widely accepted, both in theory and in practice, that economic welfare is deeply dependent and interlinked with the environment and wider human wellbeing in general. It is now well established that environmental impacts are crucial to consider the full welfare implications of a project.

Methodology

- Step 1: Define the scope of analysis.
- Step 2: Identify all potential physical impacts of the project.
- Step 3: Quantify the predicted impacts.
- Step 4: Monetize impacts.
- Step 5: Discount to find present value of costs and benefits.
- Step 6: Calculate net present value.
- Step 7: Perform expected value and/or sensitivity analysis.
- Step 8: Make recommendations

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9.2 Economic Details of Proposed Project

Particulars	Costs & Benefits	Unit
Products Considered for CBA	6310.6 x 10 ⁶	KWH
Total CAPEX of the Project	900	₹ in Cr
Total OPEX of the Project	2466.45 (approx.)	₹ in Cr
Total Duration of the Project	25	Years
Average Market Price of the Product	6.96 (approx.)	₹/KWH
Total Number of Direct Employees for the Project	103	Number
Average Salary of Direct Employees	718776	₹/annum
Total Number of Indirect Employees for the Project	103	Number
Average Salary of Indirect Employees	350040	₹/annum
Total Taxes to be paid by the Project	132.04	₹ in Cr
No. of saplings	6219	Number
Cost of total saplings	15	Lakhs ₹
Total amount of fresh water to be used within the project from supply water	10	KLD
Auxiliary Power Consumption	1113.6 x 10 ⁶	KWH
Total savings from CSR	303312500000	₹/Annum
Air management cost (Capital + Recurring)	2530.52 + 500.94	Lakhs ₹
Total Volume of Wastewater to be discharged	0 (ZLD)	MLD
Cost for WasteWater Treatment (Existing + Expansion)	1580 + 98	Lakhs ₹
Total amount of rejects handled by the project	201000	tonnes/annum
Total amount paid for handling rejects	6.03	₹ in Cr
Total hazardous waste handled by the project after expansion	7	MT/annum

Table 142. Economic details of proposed project

Criteria of acceptance BCR

0-1	Low
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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

1.1-5	Moderate
5.1-10	High

Table 143.

As per Criteria of acceptance BCR, the proposed project falls under category “Moderate”.

Conclusion

Based on the Benefit–Cost Ratio (BCR) criteria, where values between 1.1 and 5 are considered *Moderate*, the proposed project’s BCR of 4.8 places it in the *Moderate* category. This indicates that the anticipated benefits of the project are expected to outweigh the associated costs, demonstrating economic feasibility and justifying the project’s implementation.

10 ENVIRONMENT MANAGEMENT PLAN

10.1 INTRODUCTION

The Environment Management Plan (EMP) is a site-specific plan developed to ensure that the project is implemented in an environmentally sustainable manner where all stakeholders including the project proponents, contractors and subcontractors, including consultants, understand the potential environmental risks arising from the proposed expansion project and take appropriate actions to properly manage that risk. Adequate environment management measures need to be incorporated during the entire planning, construction and operating stages of the project to minimize any adverse environmental impact and assure sustainable development of the area.

The Environment Management Plan presented below will be followed and regular monitoring of relevant parameters as stated in the post – project monitoring schedule will be carried out. The Environment Management Plan will be proactive in nature and will be upgraded if new facilities or modification of existing facilities, with environmental concerns, come up at a later stage.

10.2 ORGANIZATIONAL ROLE AND RESPONSIBILITY

HSE Management Policy

The company has a written policy for the safety, Health and Environment Management. Through this policy, the company management commits itself to the following objectives.

- Meet all the relevant laws, regulations and international agreements
- Conduct its activities safely, protecting the health of all employees and the products users
- Reduce the adverse environmental impacts to a practicable minimum at an acceptable cost to the company and society
- Encourage continuous improvement in safety, health and environmental performance.

The Environment Policy of M/s Tehkhand Waste to Electricity Project Limited is given below:.

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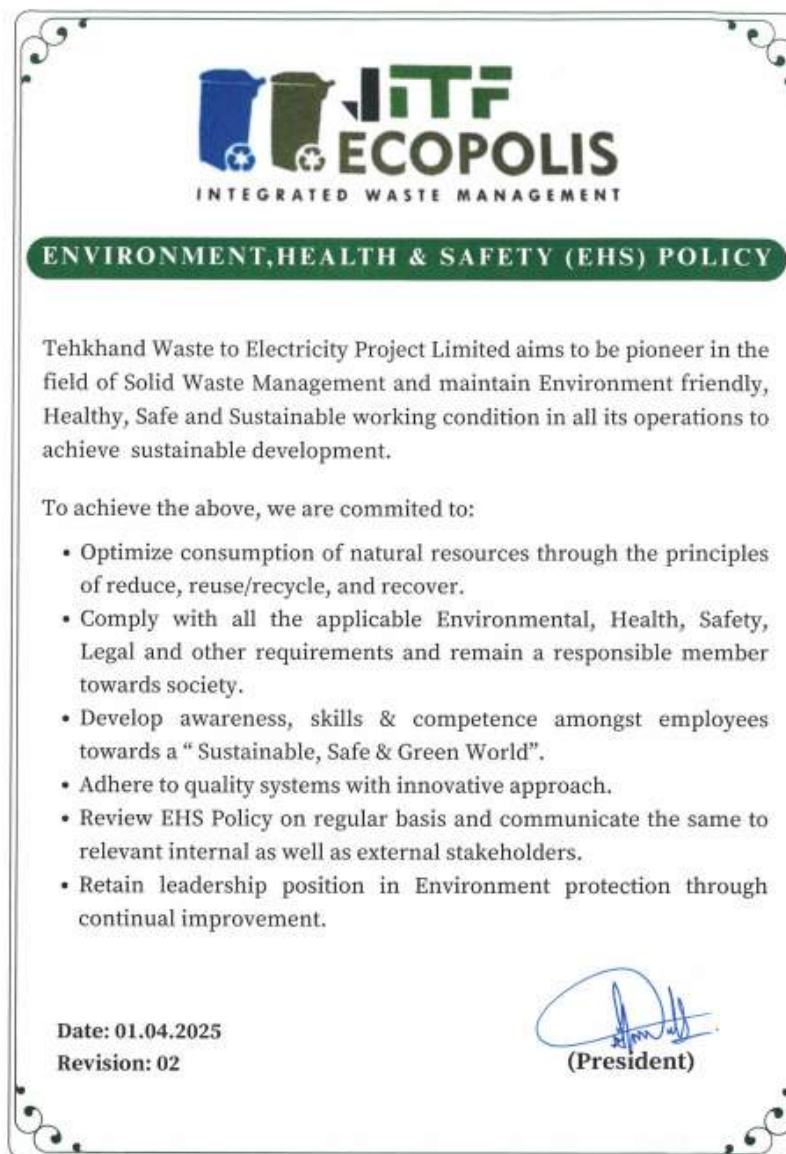


Figure 71. Environmental Health & Safety Policy

10.2.1. Role of Project Proponent

M/s Tehkhand Waste to Electricity Project Limited will have ultimate responsibility for implementing the provisions of the EMP. The proponent will also ensure that the activities of its contractors during the construction phase are conducted in accordance with good practice measures, implementation of which will be required through contractual documentation.

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The organizational structure is presented below:



Figure 72. EHS Team Structure

10.2.2. Role of Contractor

Contractors will also be expected to demonstrate commitment to the environmental monitoring programs at all levels in the contractor’s management structure. It will ensure the following:

- The Contractors involved in the project will be responsible for implementation of and adherence to, all the mitigation measures outlined in the EIA;
- Appropriate experienced and qualified personnel are employed as the Contractor’s Environmental Manager.
- All the environmental incidents to be reported at the plant site at the earliest;
- To maintain records of all the inspection conducted;
- A program of regular self-inspection and audit will be developed and implemented and results reporting will be done on a regular basis.

10.2.3 Inspection, Monitoring and Audit

This will increase the effectiveness of the EMP. Through this process proponents will ensure the conditions stipulated in the Environmental Clearance (EC), other consents etc are complied with. The Audit will be conducted by the team for the implementation of the management system. The

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entire process of inspection and audit will be documented and findings of the above will be implemented by plant.

Same is being followed for the existing unit.

10.2.4 Monitoring, Reporting and Documentation

- Reporting of environmental, health, safety and social performance reports or check list, incident record register etc. will be developed and implemented through a program of reporting and reviewing throughout the project.
- Reports from inspection, audits and other improvement program will be regularly communicated;
- All complaints and enquiries will be addressed with records maintained in an assigned register by the safety officer of each contractor;
- Internal and external reporting mechanisms will be developed, internal reporting will comprise the concerned officials from the Environment management team, the representatives of the contractors and the top management.
- The internal reporting will be undertaken on quarterly basis while the external reporting will be undertaken half yearly.
- Annual environmental report known as ‘Environment statement’ as per FORM V of the EPA Rules, 1986, six monthly compliance reports as per EC of MoEFCC, compliance reports as per CTE/CTO etc. will be submitted to the regulatory authorities.

All the above reports will be documented in the documentation system as per the requirement of MoEFCC and other relevant regulatory authorities and the same is being followed in the existing unit.

10.3 INTERNAL MONITORING, REPORTING AND COMMUNICATION

The EHS head will be responsible for the internal monitoring. Inspection and audit findings along with the improvement program will be reported to the senior management regularly. Records should be maintained for regulatory, monitoring and operational issues.

It is the most important step in the implementation of the Environment Management plan. The plant has a well established record keeping and management system as per the requirement. Responsibilities are assigned to the relevant personnel ensuring that the EMP documentation and records are maintained. Typical record keeping requirements for the proposed project are summarized below.

- Master Environment Management System document
- Legal register

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- Operation Control Procedures
- Work Instructions
- Incident reports
- Emergency preparedness and response procedure
- Training records
- Monitoring reports
- Audit reports
- Compliance Report
- Safety Committee meeting record.
- Complaints/Suggestions register and issue attended/closed
- Hazardous waste generation, Handling and Disposal
- Quantity of wastewater and Treated water generated and its quality
- Survival rate/ratio of the Trees planted.
- Environmental Permits / Consents from MoEFCC & concerned authorities
- Employee environmental, health and safety records
- Equipment inspection and calibration records, where applicable
- Vehicle maintenance and inspection, PUC record.

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10.4 EMP REVIEW & AMENDMENTS

The EMP is being reviewed periodically to update it addressing any changes in the organization, process or regulatory requirements. The EHS Head has all the mandate for coordination of the actions required for environment mitigation and management and monitoring the progress of the proposed management plans and various action plans to be implemented for the project.

10.4.1 Environment Management Plan

An Environment Plan has been developed following the identification of impacts and mitigation measures. The mitigation measures suggested will be as according to the monitoring schedule.

The EMP includes the following:

- Mitigations suggested for adverse environmental and social impacts and associated risks;
- Personnel responsible for implementing the mitigation measures at various stages of the project;
- The mitigation measures suggested in Chapter 4 would be implemented. This will reduce the impact on the environment due to the expansion of the project. To facilitate easy implementation, the recommendations suggested are grouped in different phases.

10.4.2 Air Emission

10.4.2.1 Flue Gas Stack

S. No.	Stack attached to	No. of Stack	Fuel Name	Stack Height (m)	APCM	Emission limit/Concentration of each Parameter
1	Boiler 2 x 65 TPH (Existing)	1	RDF	60	Lime scrubber and activated carbon injection followed by Bag Filter	PM - 30 mg/Nm ³ NO _x -350 mg/Nm ³ SO ₂ - 100mg/Nm ³ CO _x -100 mg/Nm ³
2	Boiler of ≤100 TPH (Proposed)		RDF	60	Lime scrubber and activated carbon injection followed by Bag Filter	PM - 30 mg/Nm ³ NO _x -350 mg/Nm ³ SO ₂ - 100mg/Nm ³ CO _x -100 mg/Nm ³
3	DG Set (1x750 KVA(Existing))	1	Diesel	16.5	Stack Height	PM - 30 ppm SO ₂ - 100 ppm NO _x - 50 ppm
4	DG Set (1x750 KVA(Proposed))		Diesel	16.5	Stack Height	PM - 30 ppm SO ₂ - 100 ppm NO _x - 50 ppm

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Table 144. Flue Gas stack and emission limits

10.4.2.2 Vehicular emissions from Transportation

Raw Material	Quantity (TPD)	Distance from source & transportation mode in Km	Capacity of each Truck used for transportation (in T)	No. of trucks used per Day	No. of trips/day	Total Trip Distance in Km	Total S content in fuel used mg/l	SO2 emission generated in Kg/day
MSW as fuel for generation of power - Existing	2000 ±20%	15	13	154	308	4615	50	0.092
MSW as fuel for generation of power -Proposed	1000 ±20%	15	13	77	154	2308	10	0.009

Table 145. Vehicular emissions

10.4.2.2 Fugitive Emission & Control Measures

- The pneumatic ash handling unit will be covered.
- Sprinkling of treated water, especially in the ash handling area.
- Proper ventilation system in the enclosed dusty areas & foul smelling areas.
- Installation of leakage detection and alarm system for critical equipment.
- Dust suppression system will be installed
- All internal roads will be concrete/black topped & Vacuum Road dust sweeping/cleaning system shall be used.

10.4.3 Water Requirement & Source

At present the water of 490 KLD is required for the plant which is met by the Okhla STP and the domestic water requirement is 5 KLD which is supplied by Delhi Jal Board (DJB).

Approximate 625 KLD of water will be needed for plant operation after expansion which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB).

10.4.4 Wastewater and its Management

The existing 244 KLD (240 KLD-leachate + 4 KLD-Sewage) leachate is being treated in a leachate treatment plant of capacity up to 360 KLD.

After expansion, it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants.

10.4.4.1 Details of Leachate Treatment Plant

The waste water from process and leachate is treated in Leachate Treatment Plant for the Tehkhand Waste to Electricity Project Ltd.

- Leachate collected from storage pits is first passed through Oil & grease Tank, equalization tanks and screening units, followed by primary clarification and treatment in digesters.
- The sludge generated is processed separately.
- The clarified leachate then undergoes multiple stages of biological treatment through aeration, secondary and tertiary clarifiers, and advanced treatment steps including activated carbon filters, multi-grade filters, and tertiary treatment units.
- The aerobic treatment leads to generation of Biogas from Biogas plant. This systematic sequence ensures that the leachate is effectively treated and stabilized before safe disposal or reuse, thereby minimizing environmental impact from the Waste-to-Energy facility.

10.4.5 RAIN WATER COLLECTION & STORMWATER MANAGEMENT

5 number of rainwater harvesting/percolation pits have been constructed at the site for collecting storm water and recharging the groundwater table with a total capacity of 150 m³. RWH systems have been installed in the plant premises, duly approved by DJB.

Objectives:

- Maximize rooftop water collection and reuse to reduce freshwater withdrawal.
- Channelize excess rooftop runoff.
- Promote percolation in open areas, with surplus directed to recharge or disposal.
- Provide stormwater drainage to prevent waterlogging during heavy rainfall.

Groundwater Recharge Scheme:

Rooftop runoff will be transported through pipes, filtered via sand-gravel-pebble layers, and directed into recharge pits. First flush, carrying pollutants, will be bypassed before filtration.

Benefits:

- Rooftop harvesting reduces dependence on freshwater.
- Runoff from paved areas will be channelized.
- Structured stormwater drains will prevent flooding in low-lying areas.

10.4.6 Hazardous, Non-Hazardous, Solid waste & other wastes identification, quantification, storage and disposal.

The following Non Hazardous waste is generated from the existing project. The quantity of existing waste generation and proposed waste are given below:

Type of Waste	Unit	Existing	Proposed	Total After Expansion	Disposal Method
Biodegradable waste	Kg/day	10	2.8	12.8	Will be handled in-house Biogas digester
Non-Biodegradable waste	Kg/day	15	4.2	19.2	Will be sent to incinerator/in house -boiler
Battery waste	TPA	0	0.11	0.11	Will be sold to registered recyclers or buy-back
E-waste	TPA	0	0.01	0.01	Will be sold to registered recyclers

Table 146. Inhouse Solid waste generated

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Type of Waste	Unit	Existing	Proposed	Total After Expansion	Disposal Method
Recyclable(Ferrous waste)	MT/day	2.5	1.5	4	Will be sold to registered recyclers
Manure /Sludge from digester (from composting)	MT/day	0	2	2	Used as compost/soil conditioner
Bottom Ash	MT/day	230	80	310	Ash Generated is utilized in road subgrade construction and embankment. Any unutilized material will be sent to ESLF.
Fly Ash	MT/day	27	20	47	Supplied to ash brick manufacturers and any unutilized material will be sent to ESLF.
Inert (C& D waste)	MT/day	300	144	444	Used for road construction and any unused material will be sent to ESLF.

Table 147. Other Non Hazardous waste detail

Hazardous waste						
Type of Waste	Category	Unit	Existing	Proposed	Total After Expansion	Disposal Method
Used Oil	5.1	MT/year	4	3	7	Will be sold to registered recyclers
Sludge (WTP)		kg/day	6	2	8	Sludge will be filter pressed and sent to incinerator in-boiler
Chemical Sludge (LTP)		kg/day	2	1	3	Will be sold to registered recyclers

Table 148. Hazardous waste detail

10.4.7 Noise Pollution

Impact During the operation phase - The main noise generating sources are turbines, generators, boilers, feed pumps, air compressor, cooling tower etc. These equipment are housed in cluster/single buildings of different dimensions made of different materials or installed in open or under sheds. The material of construction implies different attenuation co-efficient.

Mitigation Measures

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- The noise levels are less than 85 dB (A) limit at a distance of 1 m, except at turbine and boiler feed pump area. Persons handling noisy equipment or working in noisy places are provided with ear plugs and earmuffs.
- All rotating items have been well lubricated and provided with enclosures as far as possible to reduce noise transmission. Vibration isolators have been provided to reduce vibration and noise wherever possible.
- In general, noise generating items such as fans, blowers, compressors, pumps, motors etc. have been so specified as to limit their speeds to generate minimum noise levels. Static and dynamic balancing of equipment are insisted upon and are verified during inspection and installation.
- The insulation provided for prevention of loss of heat and personnel safety shall also act as noise attenuator. Layouts of equipment’s foundations and structures have been designed keeping in view the requirement of noise abatement.
- The central control room(s) provided for operation and supervision of plant and equipment are air- conditioned, insulated and free from plant noise. Necessary enclosures have been provided on the working platforms/areas to provide local protection in high noise level areas. In addition, 20- 30m green belt is provided to further attenuate noise level.

10.5 Environment Management Plan

10.5.1 during Construction Phase

The Environment Management plan is designed for expansion project as follow:

S. No.	Parameters	Mitigation Measures
1.	Air Environment	• Regular water sprinkling to mitigate fugitive emissions at the project site. • Use of 3 Nos. of Anti-Smog Gun/Fog Cannon for nebulized water spray to control fine dust. • Transportation of construction material in covered vehicles and proper packing conditions to avoid pollution due to transportation. • Storing of construction material in covered condition at project site. • Proper route management of the traffic for smooth ingress and egress of traffic. • Monitoring of Ambient Air Quality at periodical intervals. • Continuous Ambient Air Quality Monitoring Station (CAAQMS) already installed. • Thick Plantation around the plant periphery has been done. • Strict checking of PUC certificate compliance for all vehicles entering project/plant site • Plantation of indoor fragrant plants & extensive green belt.
2.	Water	• During construction Phase, 50 KLD of water will be required will be sourced from Okhla STP (STP treated water).

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S. No.	Parameters	Mitigation Measures
3.	Noise	- During the construction stage, expected noise levels will be in the range of 80-100 dBA, which decrease with increase in distance. Hence all the activities will be carried out during the day time. - There will be some noise generation due to movement of vehicles carrying materials during the construction phase and as this will only be a temporary phenomenon it was managed by properly regulating the movement of vehicular traffic so that the ambient air quality with respect to noise was adversely affected. - To prevent any occupational hazard, earmuffs/earplugs will be given to the workers working around or operating plants/machinery emitting high noise levels. Use of plants or machinery will be strictly prohibited during night hours. Careful planning of machinery operation and scheduling of operation will be done to minimize such impact.
4.	Solid Waste Management	Total 39 kg/day solid waste will be generated from laborers. Out of which, 15 kg/day biodegradable waste will be incinerated in- house boilers & 24 kg/day Recyclable waste (Plastic, paper, wood, glass etc) will be sent to registered recyclers.

Table 149. EMP During Construction Phase

10.5.2 Environment Management Plan during Operation Phase

The Environment Management plan is designed for expansion project as follow:

S. No.	Parameters	Mitigation Measures
1	Land Environment	- To ensure against any chances of soil pollution, it is imperative to establish a well-planned solid waste collection, storage and segregation system at site. - Only covered trucks will be allowed to enter the premises for unloading of materials, good housing keeping will help to control contamination of soil. - The quenched bottom ash will be led to a bottom ash processing plant which is similar to C&D plant. The process involves segregation, size reduction and screening for fine recovery. This will reduce the amount of inert bottom ash to landfill. After the processing which is not recyclable will be sent to sanitary land fill.
2.	Air Environment	Regular water sprinkling to mitigate fugitive emissions at the project site and outside the premises. - Use of Anti Smog Gun/Fog Cannon for nebulized water spray to control fine dust and polluted particles. - Transportation of construction material in covered vehicles and proper packing conditions to avoid pollution due to transportation. - Storing of construction material in covered condition at project site. - Proper route management of the traffic for smooth ingress and egress of traffic.

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S. No.	Parameters	Mitigation Measures
		- Monitoring of Ambient Air Quality at periodical intervals. The installation of “State-of-the-Art” Flue Gas Cleaning System (FGCS) for the proposed boiler will be carried out, similarly to the existing plant, to control the particulate matter and gaseous pollutants under prescribed limit of CPCB/SPCB. Installed Online Continuous Emission Monitoring System (OCEMS) for the continuous monitoring of stack emission. Thick Plantation around the plant periphery has been done. - Strict checking of PUC certificate compliance for all vehicles entering project/plant site Use of consortium of bacterial inoculum in the MSW pit for faster decomposition of organic matter. - Maintaining MSW pit under negative pressure to mitigate escape out the odour from MSW Pit. Sprinkling of fragrance liquid through a fogging nozzle. - Plantation of indoor fragrant plants & extensive green belt.
3	Water	- After the proposed expansion 625 KLD of water will be needed for plant operation which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB). - The complete water treatment system is designed as a zero discharge concept. The treated water shall be reused within the plant premises. - The treated leachate from the leachate treatment will be used for bottom ash quenching, housekeeping etc.. Blow down water from the boiler and cooling system will be neutralized and after treatment will be utilized for various purposes in the plant. Sewage of the plant premises will be channelized to the primary treatment (biological) section of leachate treatment plant. - The leachate will be treated in a leachate treatment plant using aerobic and anaerobic technologies. The treated leachate of this plant will be used for bottom ash quenching, FGCS gas cooling, and housekeeping. - The same is followed for both existing operation phases and will be followed for the proposed expansion phase.
4	Noise	- During the operation phase the main noise generating sources are turbines, generators, boilers, feed pumps, air compressor, cooling tower etc. - The various machines have been designed to keep noise level at 85 dB at a distance of one meter. - High noise generating machinery has been provided with a proper enclosure to attenuate noise level. Persons handling noisy equipment or working in noisy places have been provided with ear plugs and earmuffs. - To achieve the far field noise, various noise generating equipment have been fitted with appropriate devices to control the noise levels e.g. steam vent pipes have been fitted with silencers. Up to 30m width

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S. No.	Parameters	Mitigation Measures
		green belt has been provided to provide noise attenuation. The same shall be maintained for the proposed expansion phase.
5	Waste Management	- Ash is the main solid waste generated from the plant during the operation phase. - Approx. 47 TPD of fly ash, 310 TPD of Bottom ash will be generated from this plant after the proposed expansion. Fly Ash is being Supplied to ash brick manufacturers and any unutilized material will be sent to ESLF. - Bottom Ash Generated is given to for construction of Highway embankment and any unutilized material will be sent to ESLF. - The quenched bottom ash will be led to a bottom ash processing plant which is similar to C&D plant. The process involves segregation, size reduction and screening for fine recovery. This reduces the amount of inert bottom to landfill. - The sludge from the leachate treatment plant will be handled in the boiler.
6	Occupational Health & Safety Management Plan	Physical Hazards: Use PPE, acoustic enclosures, fire detection/suppression systems, insulation, ventilation, and Permit-to-Work (PTW) procedures. Chemical Hazards: Enclosed ash handling, respirators, safe chemical storage, emergency showers, and continuous emissions monitoring. Biological Hazards: Mechanized waste handling, protective gear, worker vaccination, and regular disinfection of waste areas. Ergonomic Hazards: Mechanized lifting systems, ergonomic tools, safe lifting training, and job rotation. Electrical Hazards: Insulated switchgear, grounding, arc-flash protection gear, preventive maintenance, and Lockout-Tagout (LOTO). Emergency Preparedness: On-site Emergency Plan (ERP), first-aid, trained response teams, evacuation routes, and regular mock drills. Health & Hygiene: Periodic medical check-ups, hygienic canteen facilities, sanitation, and health records. Training & Awareness: Safety induction, specialized training for operators, toolbox talks, and refresher courses.
7	Socio-Economic Management Plan	The plant will require skilled and unskilled laborers. The laborers will be hired from the local area. Due to increasing industrial activities, it will boost the commercial and economical status of the locality, to some positive extent.
8	Wildlife Conservation measures	There are 23 schedule-I species found in the buffer zone. Accordingly, a detailed conservation plan for the scheduled species is prepared and submitted in the department of forest.

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No.	Parameters	Mitigation Measures
9	Greenbelt Development Plan	2.0142 Ha (total 33.2 %) of Green area on the ground has been developed.

Table 150. EMP-Operation Phase

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

10.6 EMP IMPLEMENTATION BUDGET

S. No	Particulars	As per EC in lakhs		Actual expense incurred in lakhs	Proposed expansion in lakhs		Total after expansion in lakhs	
		Capital Cost	Recurring Cost per annum	Capital Cost incurred	Capital Cost	Proposed Recurring Cost (lakh)	Capital Cost	Recurring Cost
1	Air Pollution Control	1,355.00	500.00	2,514.08	16.44	0.94	2530.52	500.94
2	Water Pollution Control	1,040.00	80.00	1,580.00	-	18.00	1580.00	98.00
3	Noise Pollution Control	No extra capital cost is required for noise pollution control as equipments to be purchased would be in accordance with noise compliance.	10.00	-	No extra capital cost is required for noise pollution control as equipment to be purchased would be in accordance with noise compliance.	0.01	-	10.01
4	Environment Monitoring & Management	120.00	40.00	158.00	-	1.00	158.00	41.00

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No	Particulars	As per EC in lakhs		Actual expense incurred in lakhs	Proposed expansion in lakhs		Total after expansion in lakhs	
		Capital Cost	Recurring Cost per annum	Capital Cost incurred	Capital Cost	Proposed Recurring Cost (lakh)	Capital Cost	Recurring Cost
5	Occupational Health & Safety	40.00	20.00	19.30	-	10.00	19.30	30.00
6	Green Belt Development	100.00	15.00	-	-	0.20	-	15.20
7	Others (Odour control management, Sanitization)	50.00	5.00	0.70	-	0.20	0.70	5.20
8	Solar Panel & Solar Lights (through third party)	-	-	-	175.00	3.00	175.00	3.00
9	Rainwater Collection & Harvesting	-	-	14.50	6.00	0.30	20.50	0.30
Total		2,705.00	670.00	4,287.00	197.44	33.64	4484.02	703.64

Table 151. Capital & Recurring Cost

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

10.7 CORPORATE ENVIRONMENT RESPONSIBILITY

The total **expenditure of Rs. 78.38 lakhs** have been done under CER during the period FY 2018-19 to 2024-25 over various activities.

An action plan for the proposed cost along with activities under CER of **Rs. 43.2 lakhs** for the period FY. 2025-26 to 2026-27. Details of activities with action plan are given below-

FY. Period	CER Activities	Expenditure (Rs in Lakhs)	Remarks
2018-19	1. Medical Health Checkup for locals	0.3	CER activities were initiated after the grant of EC in the month of July 2018.
2019-20	1. Medical Health Checkup for locals	0.3	
2020-21	1. Water Facility for Public	3.1	Major CER activities were restricted due to the COVID-19 pandemic, as per the government guidelines; however, minor activities were carried out where possible.
2021-22	1. Swatch Bharat Mission (Awareness Campaign in nearby residential areas) 2. Drinking Water Facility for Public (Annual Maintenance)	7.6	
2022-23	1. Monthly rent payment of land for MCD public toilet (Ladies & Gents) 2. Drinking Water Facility for Public (Annual Maintenance) 3. Swatch Bharat Mission (Awareness Campaign in nearby residential areas)	14.73	Commercial operation of the TWEPL was started on dated 26-Jan-2023.

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

FY. Period	CER Activities	Expenditure (Rs in Lakhs)	Remarks
2023-24	1. Medical Health Checkup for local 2. Monthly rent payment of land for MCD public toilet (Ladies & Gents) 3. Drinking Water Facility for Public (Annual Maintenance) 4. Swachh Bharat Mission (Awareness Campaign in nearby residential areas) 5. Development of Dog Park with ash bricks utilization in Jangpura for MCD. 6. Training & Indirect Employment to the rag pickers	37.08	The total expenditure of Rs. 52.35 (Rs. 37.08 lakhs + Rs. 15.27) was made over the period FY. 2023-24 and 2024-25.
2024-25	1. Monthly rent payment of land for MCD public toilet (Ladies & Gents) 2. Drinking Water Facility for Public (Annual Maintenance) 3. Swachh Bharat Mission (Awareness Campaign in nearby residential areas) 4. Training & Indirect Employment to the rag pickers	15.27	
Sub Total (A) CER Expenditure (Rs. in Lacs)		78.38	

Table 152. Expenditure done till date under CER Activities

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

FY. Period	CER Activity	Proposed (Rs. in lakhs)
2025-26	1. Monthly rent payment of land for MCD public toilet (Ladies & Gents) 2. Drinking Water Facility for Public (Annual Maintenance) 3. Swachh Bharat Mission (Awareness Campaign in nearby residential areas) 4. Training & Indirect Employment to the reg pickers	20.22
2026-27	1. Monthly rent payment of land for MCD public toilet (Ladies & Gents) 2. Drinking Water Facility for Public (Annual Maintenance) 3. Swachh Bharat Mission (Awareness Campaign in nearby residential areas) 4. Training & Indirect Employment to the reg pickers	23
Sub Total (B) CER Expenditure (Rs. in Lakhs)		43.2
Grand Total (A+B) (Rs. in Lakhs)		121.58

Table 153. Proposed Action Plan for CER Activities

Action Plan for distribution for indoor plant saplings in nearby residential area

Action Plan for distribution of Indoor Plant saplings			
Activity	Year 1	Year 2	Year 3
Indoor Plant sapling will be ditributed to nearby residential areas like, railway colony, Tehkhand village, Tughlakabad area, Prem Nagar, Sarita Vihar Etc.	4000	3000	3000

Table 154.

"Proposed Expansion of Existing waste to Energy Plant up to 45 MW" at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Tentative list of Indoor plants are given below:

List of indoor plants	
Common Name	Scientific Name
Snake Plant (Mother-in-Law's Tongue)	Dracaena trifasciata
Pothos (Devil's Ivy)	Epipremnum aureum
Spider Plant	Chlorophytum comosum
Peace Lily	Spathiphyllum
Areca Palm	Dypsis lutescens (syn. Chrysalidocarpus lutescens)
ZZ Plant	Zamioculcas zamiifolia
Aloe Vera	Aloe barbadensis miller
English Ivy	Hedera helix
Rubber Plant	Ficus elastica
Weeping Fig	Ficus benjamina
Chrysanthemum (Florist's Chrysanthemum)	Chrysanthemum morifolium

Table 155.

S. No.	Particulars	Period (FY.)	Expenditure (Rs. in Lakhs)	Remark
1	Ongoing Program for differently abled people and paralympic sports	2024-25	10.5	Implementation Agency-Svayam

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

Table 156. CSR Expenditure till now

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

10.8 ENVIRONMENTAL COST SUMMARY

S.No.	Cost Summary	Cost (in Lakhs)	% of the project Cost
1	Project Cost	90000.00	-
2	Capital cost for Environment Management Plan	4484.02	4.98
3	Recurring cost for Environment Management Plan	703.64	0.78
4	Recurring Occupational Health and Safety	10.00	0.01
5	Public Health Recurring	5.00	0.01
6	Wildlife Conservation Plan	10.00	0.01
	Total	5212.66	

Table 157. Cost Summary

10.9 Carbon Footprint

A carbon footprint measures total GHG emissions from individuals, organizations, or products, considering their entire life cycle - from raw material extraction to disposal. Life-cycle assessment (LCA) is a key tool for evaluating environmental impacts.

Its importance is driven by government regulations enforcing life-cycle accountability, business sustainability initiatives like ISO 14000, and consumer demand for eco-friendly products. These factors make LCA essential for reducing environmental impacts across industries.

Emission Load Cumulative			
Source	PM (kg/year)	SO ₂ (kg/year)	NO ₂ (kg/year)
Utility	104072.0	454818.5	305287.4
Process	167.14	657.0	9.46

Table 158. Cumulative emission load- Air

Effluent Load Cumulative		
Effluent Stream	COD in kg Removed per year	BOD in kg Removed per year
HCOD/HTDS	0.0	0.0
LCOD/LTDS	2584.2	529.8

Table 159. Cumulative emission load- Effluent

Transport Load Cumulative		
	Type of Transport	Total km per year
Raw Material To Plant	Truck	1095000.00

Table 160. Cumulative emission load- Transport

Electricity Load Cumulative per Year		
	Source	Total kWh per year
Electricity for Production & Other Uses	DISCOM	49152360
	Renewable Energy (Solar)	6035640

Table 161. Cumulative emission load-Electricity

Green Area Carbon Sequestration

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No	Common name	Species	No. of Trees	Total Carbon Sequestered by Species in Tonnes
1	Silver Snake	<i>Sansevieria trifasciata</i>	131	2.73
2	Firebush	<i>Hamelia</i>	166	4.77
3	Gudhal	<i>Hibiscus</i>	174	5.03
4	Bougainvillea	<i>Bougainvillea glabra</i>	55	2.55
5	Peepal	<i>Ficus religiosa</i>	136	7.10
6	China Palm	<i>Livistona chinensis</i>	15	0.43
7	Shahtoot	<i>Morus alba.</i>	53	2.20
8	Neem	<i>Azadirachta indica</i>	243	12.69
9	Ficus	<i>Ficus benjamina</i>	561	16.07
10	Kanak Champa	<i>Pterospermum acerifolium</i>	204.	5.84
11	Tekoma	<i>Tecoma stans</i>	217	7.74
12	Harshringar	<i>Nyctanthes arbor-tristis</i>	26	0.90
13	Papaya	<i>Carica papaya</i>	2	0.03
14	Raatrani	<i>Cestrum nocturnum</i>	48	1.00
15	Lasoda	<i>Cordia myxa L.</i>	21	0.48
16	Papdi	<i>Holoptelea integrifolia</i>	190	5.44
17	Jamun	<i>Syzygium cumini</i>	4	0.21
18	Pakar/Pilkhan	<i>Ficus virens</i>	95	2.72
19	Serissa	<i>Serissa foetida</i>	127	3.65
20	Sheesham	<i>Dalbergia sissoo</i>	329	17.19
21	Kikar	<i>Vachellia nilotica</i>	162	7.50
22	Molshree	<i>Mimusops elengi</i>	85	4.39
23	Panda Ficus	<i>Ficus benjamina</i>	247	7.08
24	Arjun	<i>Terminalia arjuna</i>	245	12.80
25	Chandni	<i>Tabernaemontana divaricata</i>	22	0.64
26	Rose	<i>Rosa Rubiginosa.</i>	33	0.69
27	Bottle Brush	<i>Callistemon citrinus</i>	77	3.20
28	Jatropha	<i>Jatropha curcas</i>	331	11.80
29	Kandel	<i>Kandelia candel</i>	85	2.14
30	Kachnar	<i>Bauhinia variegata</i>	64	2.66
31	Marod phali	<i>Helicteres isora</i>	114	2.24
32	Buttonwood	<i>Conocarpus erectus</i>	1,349	62.48

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“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

S. No	Common name	Species	No. of Trees	Total Carbon Sequestered by Species in Tonnes
33	Balam kheera	<i>Kigelia africana</i>	116	2.92
34	Amaltas	<i>Cassia Fistula</i>	13	0.33
35	Ber	<i>Ziziphus mauritiana</i>	1	0.04
36	Chilbal	<i>Holoptelea integrifolia</i>	16	0.46
37	Bargad	<i>Ficus benghalensis</i>	9	0.26
38	Semal	<i>Bombax</i>	12	0.56
39	Gulmohar	<i>Delonix regia.</i>	27	1.12
40	Shami	<i>Prosopis cineraria</i>	2	0.05
41	Cassia Semia	<i>Senna siamea</i>	44	1.83
42	Ashok	<i>Saraca asoca</i>	90	2.27
43	Bottle Palm	<i>Hyophorbe lagenicaulis</i>	41	1.03
44	Khajur	<i>Phoenix dactylifera</i>	23	0.66
45	Amla	<i>Emblica officinalis</i>	9	0.23
46	Bael	<i>Aegle marmelos</i>	6	0.14
47	Fish Palm	<i>Caryota urens</i>	20	0.50
48	Alii ficus	<i>Ficus maclellandii</i>	16	0.40
49	Guava	<i>Psidium guajava</i>	16	0.51
50	Anaar	<i>Punica granatum</i>	5	0.16
51	Mango	<i>Mangifera indica</i>	8	0.42
52	Chukrasia	<i>Chukrasia tabularis</i>	62	1.78
53	Kadam	<i>Neolamarckia cadamba</i>	19	0.79
54	Imli	<i>Tamarindus Indica</i>	2	0.10
55	Guldar	<i>Gliricidia sepium</i>	50	1.78
56	Lemon	<i>Citrus limon</i>	1	0.04

Table 162. List of trees

“Proposed Expansion of Existing waste to Energy Plant up to 45 MW” at adjacent DTC Tehkhand Depot, Maa Anandmai Marg, New Delhi-110020 by M/s Tehkhand Waste to Electricity Project Limited.

10.9.1 Results

The results of the analysis done are given below:

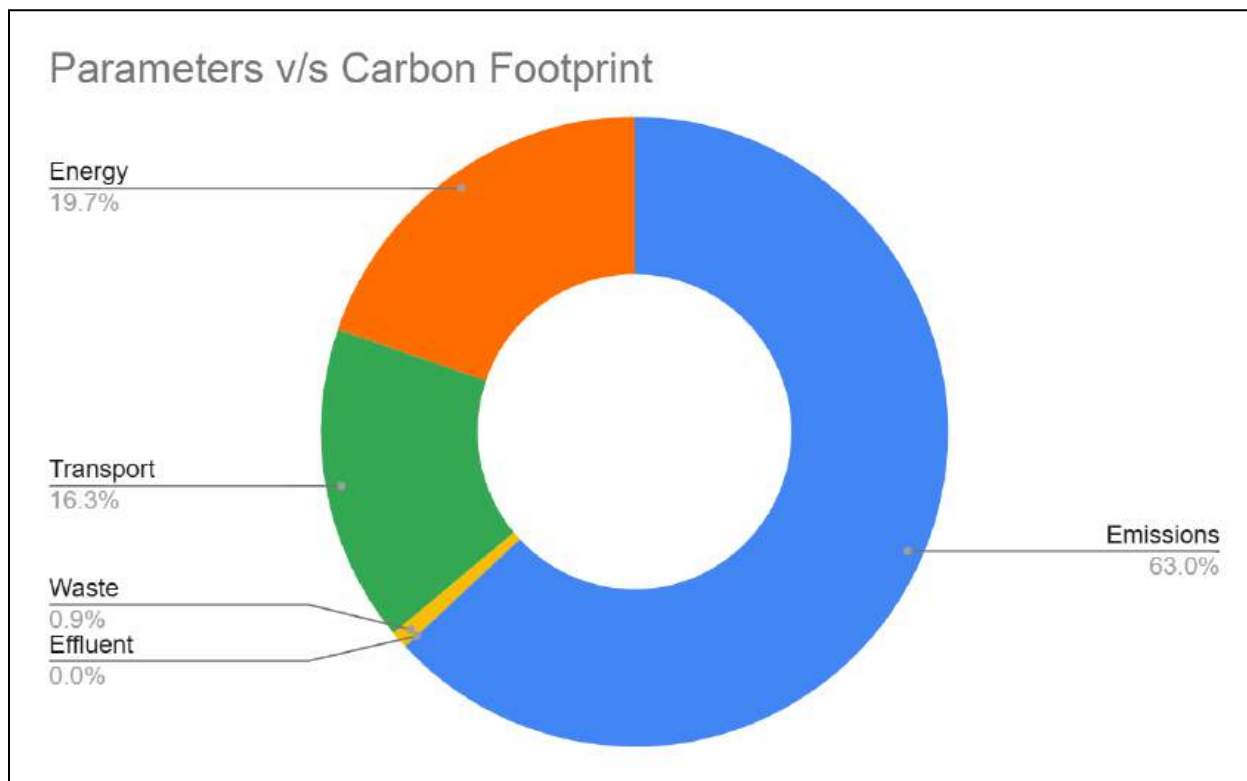


Figure 73. Parameters v/s Kg CO2 Eq.

Carbon Footprint		
Parameters	Kg CO2-eq.	Tonnes CO2-eq.
Emissions	128,732,045.36	128,732.05
Effluent	3,782.946	3.78
Waste	1,852,740.00	1,852.74
Transport	33,288,000.00	33,288.00
Energy	40,304,935.20	40,304.94
Carbon Sequestered through Plantation	75,218.58	75.22
Carbon Avoided through Renewable Energy	427,444.02	427.44

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Total w/o Offset	204181503.5	204181.5
Total Residual Emissions	203,678,840.90	203,678.84

Table 163. Carbon Footprint

Life Cycle Impact Potential		
Acidification Potential	1,485,751.43	kg SO ₂ -eq
Eutrophication Potential	46,451.36	kg PO ₄ -eq.
Climate Change Potential	203,678,840.90	kg CO ₂ -eq.
Photochemical Smog Potential	1,588,105.44	kg C ₂ H ₄ -eq.
Human Toxicity	2,046,897.22	kg 1,4 C ₆ H ₄ CL ₂ -eq

Table 164. Calculated Life Cycle Impact Potentials

10.9.2 Conclusion

The projected annual CO₂ emissions during peak operations are substantial, at 204181.5 MT, translating to 0.19 tonnes of CO₂ equivalent per tonne of production. However, the establishment of a green belt covering an area of 2.01 ha, which will be 33.2% of total land area with trees has been planted as per CPCB norms which enables natural CO₂ sequestration.

The company aims to offset 75.22 MT of CO₂ equivalent annually, which is 0.04% of the total emissions by green area and 427.44 MT of CO₂ equivalent annually, which is 0.21% of the total by renewable energy (solar) within the plant's premises. **Consequently, the net residual CO₂ emissions at full capacity are expected to be 203,678.84 MT of CO₂ equivalent per annum, or approximately 0.186 tonnes of CO₂ equivalent per tonne of production.**

10.10 Sustainable Development Goals

The proposed project aligns with several key Sustainable Development Goals 2050:

SDG 6: Clean Water and Sanitation

SDG 7: Affordable and Clean Energy: The project generates clean energy from waste, increasing the availability of power and reducing reliance on traditional, more polluting energy sources.

SDG 9: Industry Innovation and infrastructure

SDG 11: Sustainable Cities and Communities: By reducing the volume of waste at the Okhla landfill by 90%, the project helps manage urban waste effectively, preventing the expansion of the landfill and creating a more sustainable urban environment.

SDG 12: Responsible Consumption and Production: The project promotes responsible waste management by converting waste into energy and by-products like bricks from fly ash, minimizing landfill waste and conserving natural resources.

SDG 13: Climate Action: By converting waste into energy, the project mitigates greenhouse gas emissions that would otherwise be released from decomposing waste in a landfill.

11. SUMMARY & CONCLUSION

11.1. PROJECT DESCRIPTION

Tehkhand Waste to Electricity Project Limited is a special purpose vehicle promoted by Jindal Urban Infrastructure Limited (JUIL) for implementing waste management in the south zone of Delhi. Currently, the plant is handling $2000 \pm 20\%$ TPD of MSW and converting it into 25 MW of energy, for which environmental and other statutory clearances have been obtained. Now, it is proposed to expand the existing capacity by 20 MW from an additional 1000 TPD of MSW. The total capacity of the plant after expansion will be 45 MW with waste processing capacity of $3000 \pm 20\%$ TPD. The proposed project is expected to generate by-product (Biogas up to 20,000 Nm^3/day) from biodegradable waste streams such as leachate and green waste slurry. The by-product will be channelized to Biogas purification plant to produce Bio-CNG/CBG up to 8 TPD.

The current project is interlinked to the Sanitary Landfill site at Tehkhand, which has obtained Environmental Clearance letter F. No.10-8/2018-1A-III dated 29.10.2018. It is being operated by Municipal Corporation of Delhi and it is located adjacent to the site.

11.2. DESCRIPTION OF THE ENVIRONMENT

The ambient air quality monitoring was done to assess the ambient air quality. Monitoring was carried out at Twelve stations for the month of March 2024 - May 2024. A comparison between baseline data collected during Dec 2017 to Feb 2018 & March to May 2024 are also provided.

The Ambient Air Quality results (December 2017 to February 2018) are summarized and the results are discussed below:

Core zone 2018: The mean value of PM_{10} at core zone location is $386.7 \mu\text{g}/\text{m}^3$ & $\text{PM}_{2.5}$ is $176.9 \mu\text{g}/\text{m}^3$, SO_2 is $17.7 \mu\text{g}/\text{m}^3$, NO_2 is $66.7 \mu\text{g}/\text{m}^3$ & CO is $1.99 \text{ mg}/\text{m}^3$.

Buffer zone 2018: The mean value of PM_{10} in buffer zone locations ranges from 246.2 - $391.4 \mu\text{g}/\text{m}^3$ & $\text{PM}_{2.5}$ ranges from 104.5 - $179.4 \mu\text{g}/\text{m}^3$, SO_2 ranges from 6 - $16.9 \mu\text{g}/\text{m}^3$, NO_2 ranges from 23.1 - $64.7 \mu\text{g}/\text{m}^3$, CO ranges from 0.94 - $2.44 \text{ mg}/\text{m}^3$,

Conclusion 2018: The data shows that all the parameters in the core are within the Standards except $\text{PM}_{2.5}$ & PM_{10} which are slightly higher than the National Ambient Air Quality Standards (2009 CPCB) & in buffer zone all parameters are within the National Ambient Air Quality Standards (2009 CPCB) except $\text{PM}_{2.5}$ & PM_{10} which are slightly higher. As per the Air Quality Index by CPCB, the air quality of the Buffer zone is found to be Very poor during the sampling period from December 2017 to February 2018.

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The Ambient Air Quality results (March to May 2024) are summarized and the results are discussed below:

Core zone 2024: The mean value of PM_{10} at core zone is $173 \mu\text{g}/\text{m}^3$ & $PM_{2.5}$ is $121 \mu\text{g}/\text{m}^3$, SO_2 is $15 \mu\text{g}/\text{m}^3$, NO_2 is $136 \mu\text{g}/\text{m}^3$ and CO is $0.76 \text{ mg}/\text{m}^3$.

Buffer zone 2024: The mean value of PM_{10} in buffer zone locations ranges from $104\text{-}194 \mu\text{g}/\text{m}^3$ & $PM_{2.5}$ ranges from $84\text{-}132 \mu\text{g}/\text{m}^3$, SO_2 ranges from $13\text{-}21 \mu\text{g}/\text{m}^3$, NO_2 ranges from $61\text{-}142 \mu\text{g}/\text{m}^3$, CO ranges from $0.53\text{-}0.79 \text{ mg}/\text{m}^3$.

Conclusion 2024: The data shows that all the parameters in the core are within Standards (2009 CPCB) except $PM_{2.5}$, PM_{10} & NO_2 which are slightly higher than the National Ambient Air Quality Standards (2009 CPCB) & in buffer zone all parameters are within the the Standards (2009 CPCB) except $PM_{2.5}$, PM_{10} & NO_2 are slightly higher than the National Ambient Air Quality Standards (2009 CPCB). As per the air quality index by CPCB, the air quality of the buffer zone ranges from moderate to very poor during the sampling period from March to May 2024.

Ambient Noise Quality:

The Ambient Noise Quality results (December 2017 to February 2018) are summarized and the results are discussed below:

Core Zone (Industrial area): N1, : The ambient noise level during day time at the project site is 57.11 dB (A) which is within the day time standard limit of industrial area ~ 75 dB (A). During night the noise level at the project site is 50.40 dB (A) which is also within the night time standard limit of industrial area ~ 70 dB (A).

Buffer Zone:

N2: The ambient daytime noise level at **Okhla Phase 01** is 61.93 dB (A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 (A). During night the noise level was recorded at 55.27 dB (A) which is also within the noise standard limit of ~ 70 dB (A).

N3: The ambient daytime noise level at **Dayal Bagh** is 60.29 dB (A) which is higher than the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded as 51.31 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A).

N4: The ambient daytime noise level at **Tughlakabad** is 57.26 dB (A) which is slightly higher than the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded as 51.52 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A).

N5: The ambient day-time noise level at **Badarpur Village** is 60.96 dB (A) which is higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level

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was recorded at 52.40 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A).

N6: The ambient day-time noise level at **Badarpur** is 60.96 dB(A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded 54.16 dB (A) which is also within the night-time noise standard limit of ~ 70 dB (A).

N7: The ambient day-time noise level at **Okhla Phase 02** is 65.80 dB (A) which is within the day time noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded at 53.91 dB (A) which is within the night-time noise standard limit of ~ 70 dB (A).

N8: The ambient day-time noise level at **Asola wildlife sanctuary** is 55.43 dB (A) which is higher than the day time noise standard limit of the **Silence Area** of ~ 50 dB (A). During night the noise level was recorded at 46.41 dB (A) which is slightly higher than the night-time noise standard limit of ~ 40 dB (A).

N9: The ambient daytime noise level at **Jasola Vihar** is 59.14 dB (A) which is slightly higher than the daytime noise standard limit of the **Residential area** of ~ 55 dB (A). During night the noise level was recorded as 51.90 dB (A) which is higher than the night-time noise standard limit of **residential area** ~ 45 dB (A).

N10: The ambient daytime noise level at **Sukhdev Vihar** is 61.52 dB (A) which is higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 53.18 dB (A) which is higher than the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N11: The ambient daytime noise level at **Tilpat Village** is 59.28 dB (A) which is slightly higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 52.73 dB (A) which is higher than the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N12: The ambient daytime noise level at **Shahpur Govardhanpur Bangar** is 55.49 dB (A) which is slightly higher than the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 51.62 dB (A) which is higher than the night-time noise standard limit of **Residential area** ~ 45 dB (A).

Reason for Increased Noise Levels: The increased noise levels are due to nearby residential and commercial areas Also due to increased heavy vehicular movement during night.

The Ambient Noise Quality results (March to May 2024) are summarized and the results are discussed below:

Core Zone (Industrial area): N1, : The ambient noise level during day time at the proposed project site is 66.2 dB (A) which is within the day time standard limit of industrial area ~ 75 dB (A). During night the noise level at the project site is 60.2 dB (A) which is also within the night time standard limit of industrial area ~ 70 dB (A).

Buffer Zone:

N2: The ambient daytime noise level at **Tughlakabad** is 52.4 dB (A) which is within the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded 45.8 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A).

N3: The ambient day-time noise level at **Badarpur Extension** is 64.5 dB(A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded 57.9 dB (A) which is also within the night-time noise standard limit of ~ 70 dB (A).

N4: The ambient daytime noise level at **Okhla Phase 01** is 62.1 dB (A) which is within the daytime noise standard limit of the **Industrial Area** of ~ 75 (A). During night the noise level was recorded 59.4 dB (A) which is also within the noise standard limit of ~ 70 dB (A).

N5: The ambient day-time noise level at **Badarpur Village** is 50.6 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 46.5 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A).

N6: The ambient daytime noise level at **Dayal Bagh** is 53.3 dB (A) which is within the daytime noise standard limit of the **residential area** of ~ 55 dB (A). During night the noise level was recorded 46.2 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A).

N7: The ambient day-time noise level at **Okhla Phase 02** is 63.7 dB (A) which is within the day time noise standard limit of the **Industrial Area** of ~ 75 dB (A). During night the noise level was recorded at 56.7 dB (A) which is within the night-time noise standard limit of ~ 70 dB (A).

N8: The ambient daytime noise level at **Jasola Vihar** is 49.3 dB (A) which is within the daytime noise standard limit of the **Residential area** of ~ 55 dB (A). During night the noise level was recorded 43.1 dB (A) which is within the night-time noise standard limit of **residential area**~ 45 dB (A).

N9: The ambient daytime noise level at **Sukhdev Vihar** is 47.1 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 42.1 dB (A) which is within the night-time noise standard limit of **Residential area** ~ 45 dB (A).

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N10: The ambient day-time noise level at **Asola wildlife sanctuary** is 42.3 dB (A) which is within the daytime noise standard limit of the **silence Area** of ~ 50 dB (A). During night the noise level was recorded at 38.4 dB (A) which is within the night-time noise standard limit of ~ 40 dB (A).

N11: The ambient daytime noise level at **Tilpat Village** is 46.3 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 41.8 dB (A) which is within the night-time noise standard limit of **Residential area** ~ 45 dB (A).

N12: The ambient daytime noise level at **Shahpur Govardhanpur Bangar** is 47.6 dB (A) which is within the daytime noise standard limit of the **Residential Area** of ~ 55 dB (A). During night the noise level was recorded at 42.6 dB (A) which is within the night-time noise standard limit of **Residential area** ~ 45 dB (A).

Reason for Increased Noise Levels: The increased noise levels are due to nearby residential and commercial areas also due to increased heavy vehicular movement during night.

Groundwater Quality:

The Groundwater Quality results (December 2017 to February 2018) are summarized and the results are discussed below:

The water quality of the buffer zone shows that

- The Total Dissolved Solids (TDS) of the sampling locations ranges from 536 mg/l to 1044 mg/l. TDS of all sampling locations are within permissible limits.
- The Total Hardness of the sampling locations ranges from 324 mg/l to 680 mg/l. The hardness of all sampling locations are within permissible limits. Except GW 2 location.
- The Alkalinity of the sampling locations ranges from 190 mg/l to 600 mg/l. All sampling locations are within permissible limits.
- The Calcium Concentration of the sampling locations ranges from 80 mg/l to 160 mg/l. The Calcium levels of all sampling locations are within permissible limits.
- The Chloride Concentration of all the sampling locations ranges from 98 mg/l and 240 mg/l. The Chloride levels of all locations are within permissible limits.

The Groundwater Quality results (March to May 2024) are summarized and the results are discussed below:

The water quality of the buffer zone shows that:

- The Total Dissolved Solids (TDS) of the sampling locations ranges from 447 mg/l to 606 mg/l. The TDS of all the sampling locations are within permissible limits.

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- The Total Hardness of the sampling locations ranges from 278 mg/l to 383 mg/l. The hardness of all sampling locations are within permissible limits.
- The Alkalinity of the sampling locations ranges from 198 mg/l to 312 mg/l. All sampling locations except Badarpur village are within permissible limits.
- The Calcium Concentration of the sampling locations ranges from 71.6 mg/l to 99.2 mg/l. The Calcium of all sampling locations are within permissible limits.
- The Chloride Concentration of all the sampling locations ranges from 84 mg/l to 168 mg/l. The Chloride levels of all locations are within permissible limits.

Surface water quality:

- Surface water samples were collected from 06 locations namely Nallah Up stream, Nallah Down stream, Nallah Center, Canal (Near Molarband), Bhuriya Nallah (Near DLF industrial area) and Yamuna River.
- As per the samples collected and analyzed the pH ranges from 7.29 to 7.89 and Electrical conductivity ranges from 1201 $\mu\text{mhos/cm}$ to 1824 $\mu\text{mhos/cm}$. This shows that the surface water quality of all the sampling locations can be placed in class "E" of Surface Water Designated Best Use by CPCB.

Interpretation of Baseline data of March to May 2024

- Surface water samples were collected from 06 locations namely Nallah Up stream, Nallah Down stream, Nallah Center, Canal (Near Molarband), Bhuriya Nallah (Near DLF) and Yamuna River.
- As per the samples collected and analyzed the pH ranges from 7.26 to 7.92 and Electrical conductivity ranges from 987 $\mu\text{mhos/cm}$ to 1393 $\mu\text{mhos/cm}$. This shows that the surface water quality of all the sampling locations can be placed in class "E" of Surface Water Designated Best Use by CPCB.

Soil Quality:

The Soil Quality results (December 2017 to February 2018) are summarized and the results are discussed below:

Core Zone (S1): The samples collected from the site - S1 shows that the soil moisture content is 3.43%, pH is 7.47. The amount of primary nutrients like Organic matter is 0.03507%, the available nitrogen content is 542.5 mg/kg is high, available Potassium from 21.01 mg/kg is low while the available Phosphorus is 37.6 mg/kg is high. Therefore, the Primary nutrient profile shows that soil is low to medium fertile due to high concentration of available nitrogen, low concentration of potassium and High concentration of phosphorus.

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Buffer Zone (S2- S10): The samples collected from the site S2- S10 shows that the soil moisture content in the buffer zone is between 1.68 -8.6 %, pH is 7.3 - 8.3. Amount of primary nutrients like Organic matter is 0.038 - 0.111 %, the available nitrogen 356 - 742.5 mg/kg is high, available Potassium 7.75 - 112.8 mg/kg is low-medium while the available Phosphorus 29.8- 65.2 mg/kg is in higher range. Therefore, the Primary nutrient profile shows that soil is Low to Medium fertile in the buffer zone due to the availability of high amounts of nitrogen, low-medium amount of potassium and higher concentration of phosphorus.

The Soil Quality results (March to May 2024) are summarized above. The results are discussed below:

Core Zone (S1): The samples collected from the site - S1 shows that the soil moisture content is 3.5%, pH is 7.32. The amount of primary nutrients like Organic matter is 0.68%, the available nitrogen content is 16.5 mg/kg is very low, available Potassium from 5.0 mg/kg is very low while the available Phosphorus is 22.6 mg/kg is very high. Therefore, the Primary nutrient profile shows that soil is low fertile due to low concentration of available nitrogen, potassium and High concentration of phosphorus.

Buffer Zone (S2- S10): The samples collected from the site S2- S10 shows that the soil moisture content in the buffer zone is between 2.4 -6.3 %, pH is 7.15 - 7.53. Amount of primary nutrients like Organic matter is 0.57 - 0.95 %, the available nitrogen 13.4 - 20.4 mg/kg is low, available Potassium 4.0 - 8.0 mg/kg is low while the available Phosphorus 19.3 - 26.4 mg/kg is in medium to higher range. Therefore, the primary nutrient profile shows that soil is low fertile in the buffer zone due to the availability of low amounts of nitrogen, potassium and medium to higher concentration of phosphorus.

Biological Environment:

Based on both our primary and secondary surveys, as well as the compiled table above, we have identified a total of 23 species listed under Schedule I of the Wildlife Protection Act.

Socio-economic Environment

The parameters selected for the baseline information on socio-economic components were demographic structure, infrastructure base in the area, economic structure, health status, and cultural attributes, socio-economic status in relation to quality of life and public awareness & public concern about the project. Relevant information was collected from randomly selected villages. No rehabilitation and resettlement are required. Employment opportunities will be generated for the local population during the construction/installation phase as well as the operational phase. It will provide direct and indirect employment to local youth.

11.3. ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

11.3.1. Air Environment

The baseline condition of air with respect to particulate parameters is already the worst in the city of Delhi. Emission modelling results show that increment value due to proposed projects is insignificant. The stack emission will be controlled through a flue gas cleansing system to comply with emission Standards. All the mitigation measures are given in chapter 4 of the EIA report.

11.3.2. Water Environment

During Operation Phase- The water will be used in activities - domestic purpose, Industrial Boiler make-up water, cooling tower, CBG, SNCR.

625 KLD of water will be needed for plant operation which will be met by the Okhla STP and the domestic water requirement will be around 7 KLD which will be supplied by the Delhi Jal Board (DJB).

The existing 244 KLD (240 KLD-leachate + 4 KLD-Sewage) leachate is being treated in a leachate treatment plant of capacity up to 360 KLD. After expansion, it is estimated to generate approximately 360 KLD (354 KLD-leachate + 6 KLD-Sewage) of liquid leachate during the operational phase which will be treated in existing leachate treatment plants.

No fresh water will be drawn from the natural water body. STP treated water from Okhla, DJB will be utilized during the construction and operation phase. The proposed project is designed on zero discharge concept. The wastewater will be reutilized in the plant premises after adequate treatment and there will be no effluent discharge from the plant.

11.3.3. Land Use and Soil Quality

The existing Land use of the project site is Industrial. There will be no change in the land use pattern of the site as the proposed expansion is within the same plot area. As per Gazette Notification dated 12.01.2018, the land is already notified for utility purposes by the Delhi Development Authority. During the operation phase, the soil may get contaminated due to littering of municipal waste, leachate leakage, and fly ash. To avoid soil contamination, a well-planned solid waste management system is established. Only covered trucks are allowed to enter the premises to prevent spillage. The leachate is collected in a concrete pit, and the fly ash is utilized in a brick-making plant. Furthermore, the ash handling system is of covered pneumatic type to minimize the spread of fly ash.

11.3.4. Noise Levels

Some amount of noise is being /will be generated from vehicular movement and operation of machinery during the installation and construction of the Waste-to-Energy plant. Green belts developed along the periphery of the project site will serve as an effective noise barrier. High-standard, low-noise machines and equipment will be deployed to ensure minimal levels of noise and vibrations, with excavators equipped with vibration isolators. Silencers installed in machinery will be regularly inspected and maintained for effectiveness. For controlling noise pollution, D.G. sets will be placed in acoustically treated enclosures. Noise-generating units such as the turbine hall, boiler area, and auxiliary equipment will be adequately insulated with enclosed structures and doors. Workers in high-noise zones will be provided with personal protective equipment such as earmuffs. In addition, stationary machinery and equipment will be fitted with proper enclosures and vibration-dampening pads to minimize noise from operational vibrations.

All the mitigation measures mentioned above will be followed for the expansion .

11.3.5. Solid and Hazardous Waste

The domestic solid waste generated from the unit is about 25 kg/day, with an additional 7 kg/day expected after expansion, totaling 32 kg/day. This waste will be incinerated in the in-house boilers, ensuring safe and efficient disposal.

The hazardous waste generated from the unit mainly comprises used oil, with an existing quantity of 4 MT/year. After the proposed expansion, an additional 3 MT/year will be generated, making the total 7 MT/year. The entire quantity of used oil will be handled in accordance with regulatory guidelines.

11.3.6. Non Hazardous Waste

The unit generates various wastes. Recyclable waste amounts to 4 MT/day (post-expansion) and will be sold to registered recyclers, while 2 MT/day of manure from composting will be used as compost/soil conditioner. Bottom ash, about 310 MT/day, will be supplied for highway embankment construction & any surplus sent to ES&LF. Fly ash, totaling 47 MT/day, is given to ash brick manufacturers & unutilized quantities sent to ES&LF. Inert waste of 444 MT/day will be used in road construction, and any excess will also be disposed of at ES&LF.

11.3.7. Flora and Fauna

Approximately 6219 numbers of trees have already been planted at the site. The list of trees planted at the site are given in chapter 3.

A comprehensive study of the local fauna within the study area was conducted through both primary and secondary surveys, with a focus on birds, mammals, and herpetofauna. Given that the study was limited to a single season and data was extensive, secondary sources were also utilized

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to enhance our ecological biodiversity assessment. This included an extensive review of existing literature, such as research papers, recent articles, dissertations, topographical maps, and textbooks, to identify critical corridors and the presence of any endangered species near the project buffer zone. A detailed Fauna list is given in chapter 3.

11.3.8. Socio-Economic Environment

Overall benefit and impact are summarized below:-

1. Impact on Ever Increasing Volume of Municipal Waste at Okhla Landfill Site.
2. Reduction of wastes going to Landfill and the associated costs.
3. Cost effectiveness
4. Alternate Uses of Land
5. Impact on Aesthetic Beauty of the Area
6. Employment Opportunities for Job Seekers
7. Impact on Health
8. Impact on Demographic Scenario of the Project Area.
9. Increase In Availability of Power
10. Increase in Revenue to the DISCOMs as well as to the local body

11.4. ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring is important in terms of evaluating the performance of pollution control equipment installed in the project during operation. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB. Following attributes will be covered in the environmental monitoring as per stipulation of DPCC:

1. Stack Emission
2. Air quality
3. Water and wastewater quality;
4. Noise levels;
5. Greenbelt Development

11.5. ADDITIONAL STUDIES

Hazard Identification and Risk Management

Potential risks such as leaks, fire, ash handling accidents, and equipment failures were identified and evaluated using a **risk matrix**, based on their likelihood and severity. The assessment considered factors like waste handling, fuel storage, combustion processes, and potential containment failures to identify hazards and their consequences.

Type of Hazards

The project site falls under **Seismic Zone-IV**, hence the design of structures and equipment will comply with seismic-resistant standards. To avoid flooding or waterlogging from nearby water

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sources, the site will be developed above the existing road level with proper stormwater drainage. Being a Waste-to-Energy facility, hazards mainly include fire, explosions from combustible gases, and ash/dust exposure. To mitigate risks:

- Flammable materials and chemicals (e.g., used oil, Chlorine, lime) will be stored in dedicated, well-ventilated storage areas, away from ignition sources.
- Firefighting systems including hydrants, sprinklers, and extinguishers will be installed across the plant.
- Boilers, turbines, and waste handling systems will be provided with automatic safety interlocks to prevent accidents.

General Safety Measures

- Occupational health surveillance will be carried out every six months, and records will be maintained.
- An on-site medical room with first-aid, a bed, and a qualified doctor will be available.
- Regular health check-up camps will be organized for workers and to assess exposure to air pollutants and ash.
- Workers will receive training on safe waste handling, ash management, chemical storage, and interpretation of Material Safety Data Sheets (MSDS).
- Proper medical facilities will be available for handling any accidental release or occupational injury.
- Emergency response plans will be prepared, and mock drills will be conducted regularly.
- Employees will be educated about the hazardous properties of emissions, ash, and chemicals used in Air Pollution Control Devices (APCDs).
- Annual inspections and compliance reports will be prepared to ensure adherence to safety standards.
- A dedicated Environment, Health & Safety (EHS) Manager will oversee all safety measures related to personnel, machinery, and materials.
- Clearly demarcated emergency assembly areas/refuge zones away from process units will be designated for safe evacuation.

11.6. PROJECT BENEFITS

The proposed project has been planned to manage the MSW of South Delhi and convert the waste to Electricity.

- Waste-to-Electricity (WtE) projects are considered one of the most economical and environment friendly solutions for tackling the problem of municipal waste.
- This will reduce the air, water and soil contamination and odor also.
- This will improve the quality of life of society and will provide safe & hygienic surroundings.

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- Development of the project will provide employment opportunities to local unskilled and semiskilled people during both construction & operation phases. Indirect employment will also be generated during the construction phase of the project.

11.7. ENVIRONMENTAL MANAGEMENT PLAN

An Environment Management Group has been set up which is responsible for managing following activities related to the environmental function of the proposed project. Co-ordinate and manage the EMP implementation during construction and operation phase and co-ordinate environmental monitoring and pollution control system operation. Co-ordination with government agencies in relation to environmental management Activities Implement and monitor greenbelt development and plantation activities Safety officers will ensure safe working practices in all the sections of the plant.

A well-defined environmental monitoring program will be implemented with trained and qualified staff. For environmental protection measures, the proponent has allocated about Rs. 4484.02 lakhs as capital investment during operation of the project.

11.8. CONCLUSION

“WtE” is an important part of an integrated solid waste management system. By means of adopting modern and efficient technology, effective implementation of EMP and by implementation of industrial best practices, the marginal impacts on Air, water, land and noise is being/will be reduced to negligible levels. The proposed expansion of waste to electricity plant is likely to generate direct and indirect employment opportunities for both unskilled and semi-skilled workers living in the area. This “WtE” project will reduce the problem associated with the disposal of unprocessed waste as landfill and meet the objective and goal set for the country under the Swachh Bharat Mission (SBM).

12. DISCLOSURE OF CONSULTANTS ENGAGED

About Environmental Consultant

Perfact Enviro Solutions Pvt. Ltd, established by experienced environmental and related experts, provides specialized services in the field of Environment and Pollution Control for all types of Industrial, Construction, Nuclear Sciences, Biodiversity Mining, Aerial Ropeway and other related fields. Our transparent and professional approach, commitment to excellent quality and service, and timely deliveries have contributed to create a name in the field of environment. We have a core group of highly qualified experts from various fields like Environment, Forestry, Chemistry, Civil Engineering, Geology, Social Sciences, Electronics and Telecommunication with rich and diversified experience in the field of environment and pollution control. Perfact Enviro Solutions Pvt. Ltd management, experience, excellence, professionalism and ultimate satisfaction has helped in achieving the heights of success in their specialized field of environment.

Core Team

S. No.	Name of the Expert	Qualification	Experience (yrs)
1	Mr. Praveen Bhargava, Managing Director	Pursuing Ph.D , M.Sc (Chemistry), M.Phil (Chemistry),	36
2	Mrs. Rachna Bhargava, Director & CEO	Pursuing PhD, M.Sc. (Environment Sc.) Advanced EMS Auditor	31
3	Dr. Nipun Bhargava	Ph.D, M.Phil (Chem) M.Tech Chemical Engineering, B.E (Hons) Chemical Engineering	12
4	Mr. Santosh Pant, Director	M. Tech	44
5	Mrs. Rachna Dogra, Director	M Phil Chemistry	12
6	Dr. Anil Kumar	PhD(Chem)	42
7	Ms. Neha Aggarwal, VP - Environment	BE Environment	14

Table 165. Details of Core Team

ACCREDITATIONS OBTAINED

- ISO-9001:2015 Certification
- ISO-14001:2015 Certification
- QCI – NABET Scheme for Accreditation of EIA Consultant Organizations

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List of FAEs Involved (Cat A)

S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)
1.	EIA Coordinator	Dr. Suresh Chandra Jain	I had visited the site with the FAEs to assess the project site and the study area. Coordinated With the experts and prepared the impact assessment methodology. Identification and Prediction of the impact assessment, Formulation of the Environment Management Plan, Technical Review. Period of Involvement: July 2025 - September 2025
2	AP (Air pollution monitoring, prevention, and control)	Dr. Nipun Bhargava	I had visited the site to assess the site conditions in the surrounding area. After assessing the Air pollution sources. Made Sampling plan & conducted monitoring; based on the results and the site specific details along with Project Specific Details obtained , I have prepared the Impact Mitigation measures Period of Involvement: July 2025 - September 2025
3	AQ (Meteorology, air quality modeling, and prediction)	Dr. Nipun Bhargava	I had visited the site for the assessment of the sources and the emissions. After studying, I calculated the model input data related to the proposed emissions and micrometeorology interpretation of modeling results and development of EMP. Period of Involvement: July 2025 - September 2025
4	WP (Water pollution monitoring, prevention, and control)	Dr. Nipun Bhargava	I had visited the site to assess the water sources and its water quality in the study area. After studying the Water pollution sources have prepared Sampling plan & collected samples ; based on the results from the lab and the site specific details along with Project Specific Details obtained, I have prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025
5	RH (Risk Assessment and hazard management)	Dr. Nipun Bhargava	I had visited the site to assess the site conditions in the surrounding area and identified hazards. After assessing the risk and hazard, I prepared the Impact Mitigation measures.

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S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)
			Period of Involvement: July 2025 - September 2025
6	SE (Socio-Economics)	Mrs. Rachna Bhargava	I had visited the site to collect the baseline status of socio-economic conditions and studied Villages in study areas using Topographical maps and extracted Secondary data from Census of India. Then was involved in preparing a socio economic study report using the primary survey and secondary data which includes impact and mitigation measures. Period of Involvement: July 2025 - September 2025
7	NV (Noise and Vibration)	Mr. Praveen Bhargava	I had visited the site to assess the site conditions in the surrounding area. After assessing the Noise pollution sources have prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025
8	SHW (Solid and hazardous waste management)	Mr. Praveen Bhargava	I had visited the site to assess the Solid waste sources and status in the study area. After studying the sources have prepared the Impact report and suggested Mitigation measures and development of EMP. Period of Involvement: July 2025 - September 2025
9	HG (Hydrology, groundwater water and water conservation)	Mr. Santosh Pant	The physical observation of the study area including Ground water sources and its water quality was made. After studying the Water pollution sources, the Impact report was prepared and Mitigation measures were suggested Period of Involvement: July 2025 - September 2025
10	Geo (Geology)	Mrs. Saloni Sharma	I had visited the site to assess the geology of the study area. After studying I have prepared the Impact report and suggested mitigation measures Period of Involvement: July 2025 - September 2025
11	SC (Soil conservation)	Mrs. Rachna Dogra	I had visited the site to assess the site conditions in the surrounding area. After assessing the type of soil and need of Soil Conservation, Prepared the Impact Mitigation measures accordingly. Period of Involvement: July 2025 - September 2025
12	LU (Land use)	Mr. Rajneesh Maurya	I was involved in preparing a Land Use map using Satellite Imagery, Google maps after primary survey. Period of Involvement: July 2025 - September 2025
13	EB (Ecology and biodiversity)	Mrs. Tulika Rawat	I had visited the site to assess the various forest areas, Ecological and Biodiversity sources in the study area. After studying the various floral and faunal species, assisted FAE in preparing the Impact report and suggested Mitigation measures

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S. No.	Functional Areas	Name of Expert(s)	Involvement (Period & Task)
			Period of Involvement: July 2025 - September 2025

Table 166. List of FAE involved in the project. (Category A)

List of FAA Involved

Table 166. List OF FAA Involved

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)
1.	SHW (Solid and hazardous waste management)	Ms. Navneet Kaur	I had studied the project to assess the Solid waste sources and status in the study area. After studying the sources have prepared the Impact report and suggested Mitigation measures and development of EMP. Period of Involvement: July 2025 - September 2025
2.	WP (Water pollution monitoring, prevention and control)	Ms. Sakshi Tripathi	I had visited the site to assess the water sources and its water quality in the study area. After studying the Water pollution sources, I have prepared a Sampling plan & collected samples ; based on the results from the lab and the site-specific details, along with Project Specific Details obtained, I have prepared the Impact Mitigation measures. Period of Involvement: July 2025 - September 2025
3.	AP (Air pollution monitoring, prevention, and control)	Ms. Tanya Thakur	I had visited the site to assess the site conditions in the surrounding area. After assessing the Air pollution sources. Made Sampling plan & conducted monitoring; based on the results and the site specific details along with Project Specific Details obtained , I have prepared the Impact Mitigation measures Period of Involvement: July 2025 - September 2025
4.	AQ (Meteorology, air quality modeling, and prediction)	Ms. Tanya Thakur	I had visited the site for the assessment of the sources and the emissions. After studying, I calculated the model input data related to the proposed emissions and micrometeorology interpretation of modeling results and development of EMP. Period of Involvement: July 2025 - September 2025
5.	SE (Socio-Economics)	Mr. Pramod Kumar	I had visited the site to collect the baseline status of socio-economic conditions and studied Villages in study areas using Topographical maps and extracted Secondary data from Census of India. Then was involved in preparing a socio economic study report using the primary survey and secondary data which includes impact and mitigation measures. Period of Involvement: July 2025 - September 2025

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Table 167.

List of TM Involved

Table 167. List of Team Members Involved

S. No	Functional Areas	Name of Expert(s)	Involvement (Period & Task)
1.	LU (Land Use)	Mr. Deepak Kumar	I was involved in preparing a Land Use map using Satellite Imagery, Google maps and Toposheet after primary survey. Period of Involvement: July 2025 - September 2025
2.	HG (Hydrology, ground water and water conservation)	Mr. Deepak Kumar	I have visited the site and assessed the hydrology of the area. After studying the hydrology and pollution sources the impact and mitigation have been identified. Period of Involvement: July 2025 - September 2025
3.	AP (Air pollution monitoring, prevention, and control)	Mrs. Sadaf Akhtar	I had visited the site to assess the site conditions in the surrounding area. After assessing the Air pollution sources. Made Sampling plan & conducted monitoring; based on the results and the site specific details along with Project Specific Details obtained , I have prepared the Impact Mitigation measures Period of Involvement: July 2025 - September 2025
4..	WP (Water pollution monitoring, prevention and control)	Mrs. Sadaf Akhtar	I had visited the site to assess the water sources and its water quality in the study area. After studying the various WP sources, assisted FAE in preparing the impact report and suggested mitigation measures. Period of Involvement: July 2025 - September 2025
5.	SHW (Solid and hazardous waste management)	Ms. Sreeja Sreekanth	I had studied the project to assess the Solid waste sources and status in the study area. After studying the sources have prepared the Impact report and suggested Mitigation measures and development of EMP. Period of Involvement: July 2025 - September 2025

Table 168.