

PRE-FEASIBILITY REPORT

Of

250 MW Proposed Solid Waste to Energy Facility

(Using Cold Plasma Gasification Technology to convert Solid Waste into Green Power, Purified Water and Zero Carbon Fuel)

S. No 1(d) Schedule, Category 'A' of Schedule of EIA Notification, 2006

Plant Capacity: Processing of 500 TPD of Municipal Solid Waste and converting into 250 MW of Green Power, 112 KLD of Purified Water and 112 KLD of Zero Carbon Fuel

at

Moradabad Landfill Site, (Ramnagar Mazra Ahatmali) , Tehsil & District- Moradabad
Uttar Pradesh

Developed By
A.G. Dauters Waste Processing Private Limited
B-2, Dhawan Deep Building, 6, Jantar Mantar Road, New Delhi-110001

Application prepared:
In House

EXECUTIVE SUMMARY OF THE PROJECT

EXECUTIVE SUMMARY

AG Dauters Waste Processing Private Limited is planning to set up a Solid Waste to Energy Facility for Moradabad Municipal Corporation and the plant will have a capacity of approx. 500 Tons per Day waste (legacy as well as fresh) based on Cold Plasma Gasification Technology to convert Solid Waste into 250 MW of Green Power, 112 KLD Purified Water and 112 KLD Zero Carbon fuel. The land is designated for solid waste disposal / landfill site. Now, a part of existing Landfill site has been allotted by Moradabad Municipal Corporation for setting up proposed project.

As per the EIA Notification 2006, the proposal falls under Schedule 1(d), Category 'A' as the energy generation is ≥ 50 MW i.e. 250 MW.

For the city of Moradabad, the most advanced Solid Waste to Energy Facility is proposed and the salient features of are:

- No segregation of waste will be required
- Any levels of moisture will be accepted
- Calorific value has no concern
- No emissions from the plant will be generated
- No residues / ash from the plant
- Entire waste will be converted into 250 MW green power, 112 KLD purified water and 112 KLD fuel.
- The processing of legacy waste lying at landfill and fresh waste being received at the landfill shall be used for converting into power, drinking water and Zero Carbon fuel.

Since, the technology used for the Solid Waste to Energy Facility is entirely sustainable in nature as there will be no added pollutants in the environment due to the project hence, it is requested to consider the project as a White Category Industry and environment friendly project and environment clearance may be exempted, if possible.

Table 1: Project Details

Particulars	Total Details
Type of project	Solid Waste to Energy Facility at Ramnagar Mazra Ahatmali, Moradabad Landfill Site (using Cold Plasma Gasification Technology to convert 500 tpd solid waste and 850 KLD wastewater into 250 MW green power, 112 KLD purified water and 112 KLD zero carbon fuel)
Location	Ramnagar Mazra Ahatmali, Landfill Site, Moradabad
Plot area (in sqm)	12,150
Capacity of plant- (in TPD)	500 TPD of Municipal Solid Waste
Plant Area (in sqm)	3000
Road Area/ Parking Area (in sqm)	2400
Utilities/ Office (in sqm)	500

Green Area (in sqm)-30%	3645
Freeland (in sqm)	2605
Technology for Waste treatment	LT Cold Plasma Gasification
Products	250 MW Green power, 112 KLD Purified Water and 112 KLD zero carbon Fuel
Method of collection of waste (proposed)	Legacy Waste—lying at the Landfill site will be transferred to plant through special flexible conveyor belt and the waste on the conveyor belts will be loaded by means of hopper and JCBs and fresh waste through compactor from secondary collection points.
Category of waste along with quantity	Legacy Waste and fresh waste with no segregation of waste
Manpower	37
Power Load	Source: No external power is required Load used within plant: 500 KW/hr
Water requirement	Total water required: 850 KLD 10 KLD Purified Water for green belt, floor washings, etc. Freshwater: 10 KLD Municipal Supply. Waste water from nearby nalla in process: 850 KLD
Cost of the project	Rs 2125 Crores

INTRODUCTION OF THE PROJECT /BACKGROUND INFORMATION

Identification of project and project proponent:

Moradabad is a city, Commissionary, and a Municipal Corporation in Uttar Pradesh. It came into existence in 1625 and has grown exponentially and currently facing the problem of management of its solid waste. It is also a district headquarters and Caters to population of approx. 8.9 Lakhs (2011-Census). About 500 tonnes of solid waste per day is generated in Moradabad city and being disposed —off at Ramnagar Mazra Ahatmali landfill site. The infrastructure of Moradabad has been able to keep pace with economic development, population growth but, poor collection and management of MSW, improper disposal of solid wastes over several decades and open burning of garbage here and there have led to environment pollution and health problems. Given its increasing population and scarcity of land, Moradabad needs a solution to its burgeoning solid waste management problem which should be sustainable, effective; cost minimizes public health risk, ecological, and climate change impacts.

This “Solid Waste to Energy Facility at Moradabad Landfill site (using Cold Plasma Gasification Technology to convert Solid Waste into zero carbon fuel, Water and Energy) will be developed by AG Dauters Waste Processing Private Limited. The land has been allotted by Moradabad Municipal Corporation to AG Dauters Waste Processing Pvt. Ltd for development of pilot project of Solid waste to Energy Plant (legacy waste as well as fresh waste). There is a Concession Agreement between Moradabad Municipal Corporation and AG Dauters Waste Processing Private Limited (India and SAARC Partners and on behalf of Langenburg Technologies LLC, USA).

As per the EIA Notification 2006, the proposal falls under *Schedule 1(d)*, Category 'A' and general condition is applied on the project.

Brief description and nature of the Project:

Solid Waste/Municipal Solid Waste:

Municipal Solid Waste is defined as waste or refuse from households, hazardous solid waste from industrial and commercial establishments, refuse from institutions, market waste, yard waste and street sweeping. However, According to Solid Waste Management Rules, 2016, notified under the Environment (Protection) Act, 1986 term 'Solid Waste' means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical and e-waste, battery waste and radio- active waste.

I) Classification and Composition of Solid Waste:

Waste can be classified into different types. Commonly wastes are classified on the basis of their physical, chemical and biological characteristics. On broader terms two type of classification of the Solid Waste viz.

- a) Source based classification
- b) Type based classification

a) Source based Classification:

The solid waste includes the material of organic and inorganic in composition. The source- based classification includes the waste classification on the basis of place of generation or source. The major classes are as follows:

- i. Residential wastes refer from dwellings, apartments, societies etc. and consists of residual of food, vegetable, plastic, clothes, ashes, metals, etc.
- ii. Commercial wastes are consisting residual of food, glasses, ashes, metals generated from hotels, markets, stores, garages etc.
- iii. Institutional generally have the combination of paper, plastic, glasses, packaging material, canes etc generated from public buildings, offices, colleges, institutional and administrative buildings etc.
- iv. Municipal wastes consist dust, building debris, sludge, vegetables, park and garden wastes generated from construction and demolition, market places, street sweeping, gardens, etc.
- v. Industrial wastes include the waste generated from industrial activities.
- vi. Agricultural consists mainly agricultural residuals, litter, food grains etc generated from fields, orchards etc.

b) Type based Classification:

Type based classification includes the waste type by its physical, chemical and biological composition which is as follows:

- a) Garbage waste
- b) Ashes and residues waste
- c) Combustible and Non-Combustible waste
- d) Bulky waste
- e) Street waste
- f) Biodegradable and Non-biodegradable waste
- g) Dead animals
- h) Abandoned vehicles
- i) Construction and demolition waste

- j) Farm waste
- k) Hazardous waste
- l) Sewage waste
- m) E-waste

Elemental Composition of Municipal Solid Waste:

S. No	Component	Wet weight	Dry weight	COMPOSITION					
		in kgs	in kgs	C	H	O	N	S	Ash
1	Food Waste	9	2.7	1.3	0.17	1.02	0.07	0.01	0.14
2	Paper	34	32	13.9	1.92	14.06	0.1	0.06	1.92
3	Cardboard	6	5.7	2.51	0.34	2.54	0.02	0.01	0.29
4	Plastic	7	6.9	4.16	0.5	1.58	0	0	0.69
5	Textiles	2	1.8	0.99	0.12	0.56	0.08	0	0.05
6	Rubber	0.5	0.5	0.39	0.05	0	0.01	0	0.05
7	Leather	0.5	0.4	0.24	0.03	0.05	0.04	0	0.04
8	Yard Wastes	18.5	6.5	3.1	0.39	2.46	0.22	0.02	0.29
9	Wood	2	1.6	0.79	0.1	0.68	0	0	0.02
	TOTAL	79.5	58.1	27.38	3.62	22.95	0.54	0.1	3.49

Note: Remaining 20.5 % is silt /inert material

REFERENCE: Waste Management Practices (Municipal, Hazardous and Industrial), John Pichtel, 2005 by Taylor & Francis, LLC)

II) Prevailing Practices/ disposal methods used for Solid Waste Management:

a) **Recycling:**

One of the management practices is the implementation of 3Rs concept in MSW Management is combinations of components such as paper, plastic, glass and metal which can be recycled and reused certain times. However, high upfront capital cost, unhygienic, unsafe & unsightly conditions of recycling sites, durability of product, etc are some of disadvantages. It is not a solution for legacy waste.

b) **Composting:**

Regulated decomposition of organic matter to produce a final product called compost. It is used in Waste management as a method to recover organic waste. It is done by 3 methods- Composting by Trenching, Open Windrow Composting and Mechanical Composting. However, windrows and aerated composting require relatively large area and odour is a common problem. It should be sited far away from residential areas.

c) **Incineration:**

Waste treatment process that involves the combustion of organic substances at high temperature contained in waste materials. Leftover ashes, glass, metals and unburned combustibles amount to 25% of original waste. Sufficient quantity of air is needed in order to oxidize the feed stock or fuel. Incineration is not a desirable alternative due to high incineration plant costs, emission of toxic pollutants such as Dioxins & Furans and opportunity costs. It cannot take legacy waste.

d) **Energy recovery:**

- **Traditional WTE facility:** Combustion of MSW is undertaken to generate steam to reduce volume of the waste, generate electricity and recover metals. The most common type of facility is grate combustion of (as received) MSW, also called “mass burning”. MSW to be so combusted in WTE facilities is pre-shredded and partially sorted to Refuse Derived Fuel (RDF generally refers to the processed MSW). This kind of facility is equipped to recover some recyclables (metals, cans, glass) in first stage, and in second stage to shred the combustible fraction prior to incineration. RDF is basically the fraction of segregated high calorific waste. The vast majority of facilities have not worked effectively due to various operation and design problem.
- **Land fill gas capture:** waste in landfills is anaerobically digested (bacteria breakdown organic material in oxygen-deprived environment). This process emits biogas, which can be captured from 60 to 90% via a series of wells. The methane so captured can be transformed to renewable natural gas or used for heat or electricity generation on site. However, to give significant product, a large amount of landfill space is needed, and some methane still would escape. Area around landfills become heavily polluted apart from problem of odour, and insects and rodents.
- **Gasification/Pyrolysis:** MSW is heated in a chamber by partial oxidation using industrial grade oxygen at a temperature 750°C-2000°C. Syngas, a mixture of Hydrogen and Carbon Monoxide, is generated and can be burnt for heat, power generation or, else used in a gas turbine or used as chemical feedstock. Lower amounts of SO_x, NO_x, Dioxins and Furans are emitted. It is a high risk and low yield process for MSW Management.
- **Plasma Arc Gasification:** Due to the high temperatures, thermal plasma can melt and destroy any chemical bound and thus all the waste is ionized. The vitrified residue is inert and can be used in road construction. The main issues for this technology are energy consumption, capital and operating costs since, Plasma torch is replaced quite frequently which is a costly affair.
- **Cold Plasma Gasification Technology (LT):** The proposed project will use Cold Plasma Gasification process for conversion of waste into energy, good quality water and zero carbon fuel. Cold plasma is the ideal alternative for all the above-mentioned conventional process of solid waste treatment including legacy waste. The key features of our technology and process are:
 - Zero Emission and Zero Residue technology – nothing in air and nothing on ground.
 - No waste water or effluents generated.
 - Constituents of the waste do not matter, including inert and C&D.
 - Segregation of the waste is not required
 - Calorific value of the waste has no meaning.
 - Any level of moisture in waste is acceptable.
 - Any kind of hazardous & toxic waste / effluent is acceptable.

Need for the project and its importance to the country or region

With rapid urbanization, the country is facing massive waste management challenge. Over 377 million urban people generate 62 million tonnes of municipal solid waste per annum. Only 43 million tonnes (MT) of the waste is collected, 11.9MT is treated and 31MT is dumped in landfill sites. The progressively improving standards of living, rapid urbanization and the wasteful consumer attitudes have resulted in the increase of quantities of municipal wastes to be-handled. Moradabad city generates about 500 TPD of solid waste which currently is thrown at the landfill area and vacant plots in the city. Improper disposal of solid waste over several decades and open burning of garbage have led to environmental pollution and health problems.

The proposed project will help to cater the need of ever-increasing legacy municipal waste, since it will be built taking into considerations of the initiatives taken by the Moradabad Municipal Corporation that would meet the city's needs for the present and future. The electrical output of 250 MW Green Power will curb the dependence on coal consumption and diesel gensets and will check the shortage of electricity in the area. The proposed project will eventually solve the problem of availability of power.

Demand supply Gap

Rapid growth of industries and commerce in Indian necessitates uninterrupted power supply. Therefore, all options need to be explored to generate power from conventional and non- conventional sources. MSW provides an opportunity of tapping potential energy to meet part of the energy demand of the country.

Domestic Markets

The 250 MW power will be generated from the proposed project plant which will be available to the consumers through grid system.

Employment Generation (Direct and Indirect) due to the Project

During construction phase, approx.150 labours will be hired at local level and during operation phase, around 37 people, a majority of them local will get direct employment at proposed project once project is commissioned.

PROJECT DESCRIPTION

Type of Project including Interlinked and Independent Projects, if any

The proposed project is a Solid Waste to Energy Facility at Ramnagar Mazra Ahatmali Landfill Site, Moradabad (using Cold Plasma Gasification Technology to convert into green power, purified water and zero carbon fuel).

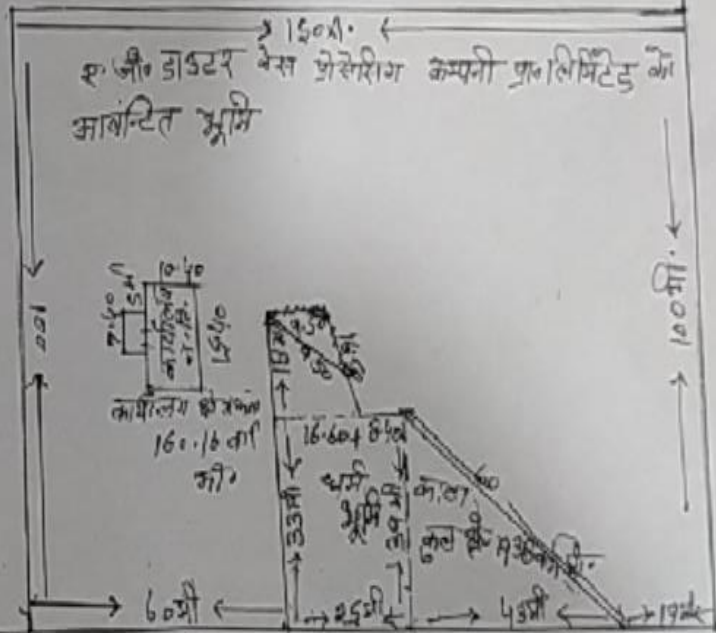
Location (Map showing general location, specific location, project boundary and project site layout) with coordinates

The site is located at 27°52'27"N - latitude and 79°54'06"E - longitude (Ramnagar Mazra Ahatmali Landfill Site, Moradabad).

Fig 1: Location of the Project

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भूमि की दूरी 1496 मीटर है।
Baroda

ट्रैनिंग ग्राउंड
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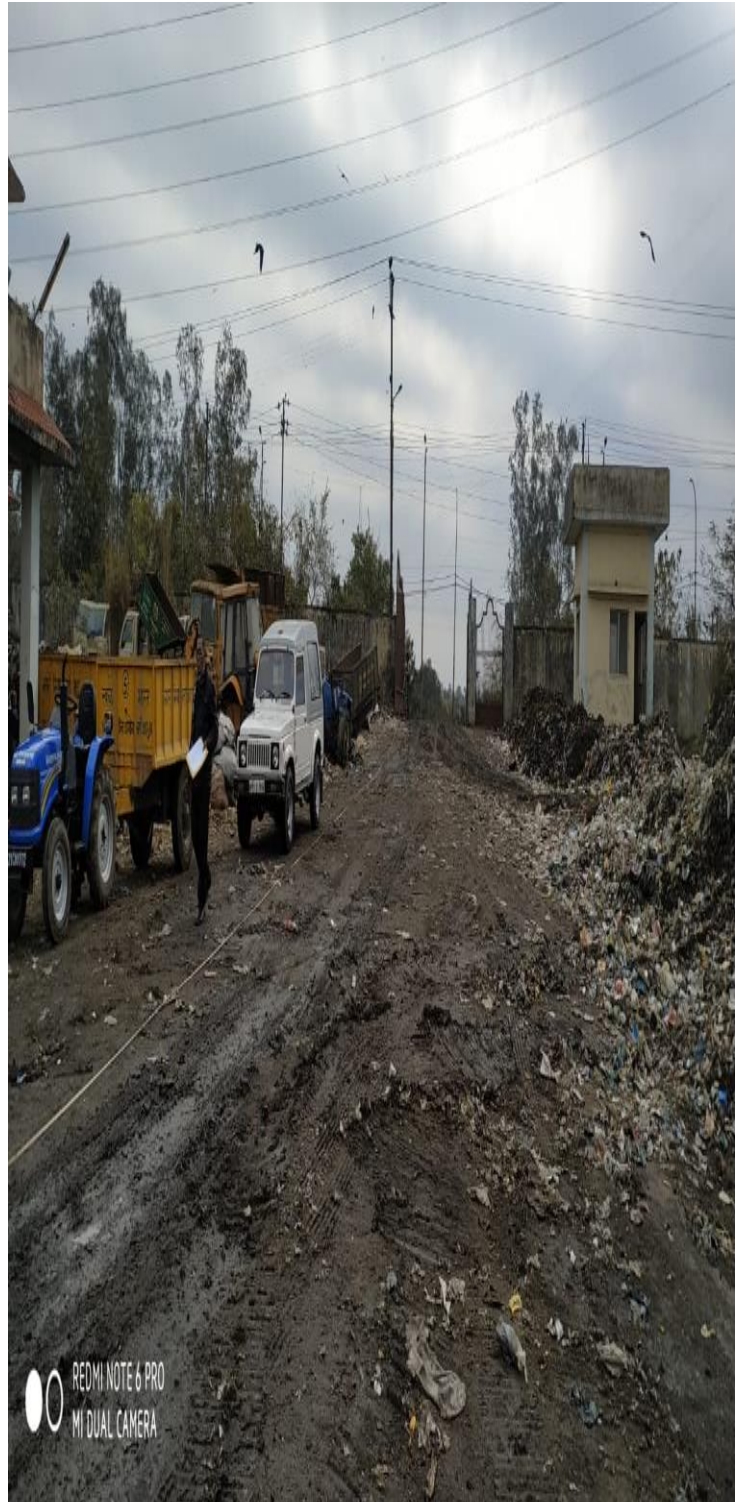
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Existing Landfill Site (View – 1)



Existing Landfill Site (View – 2)

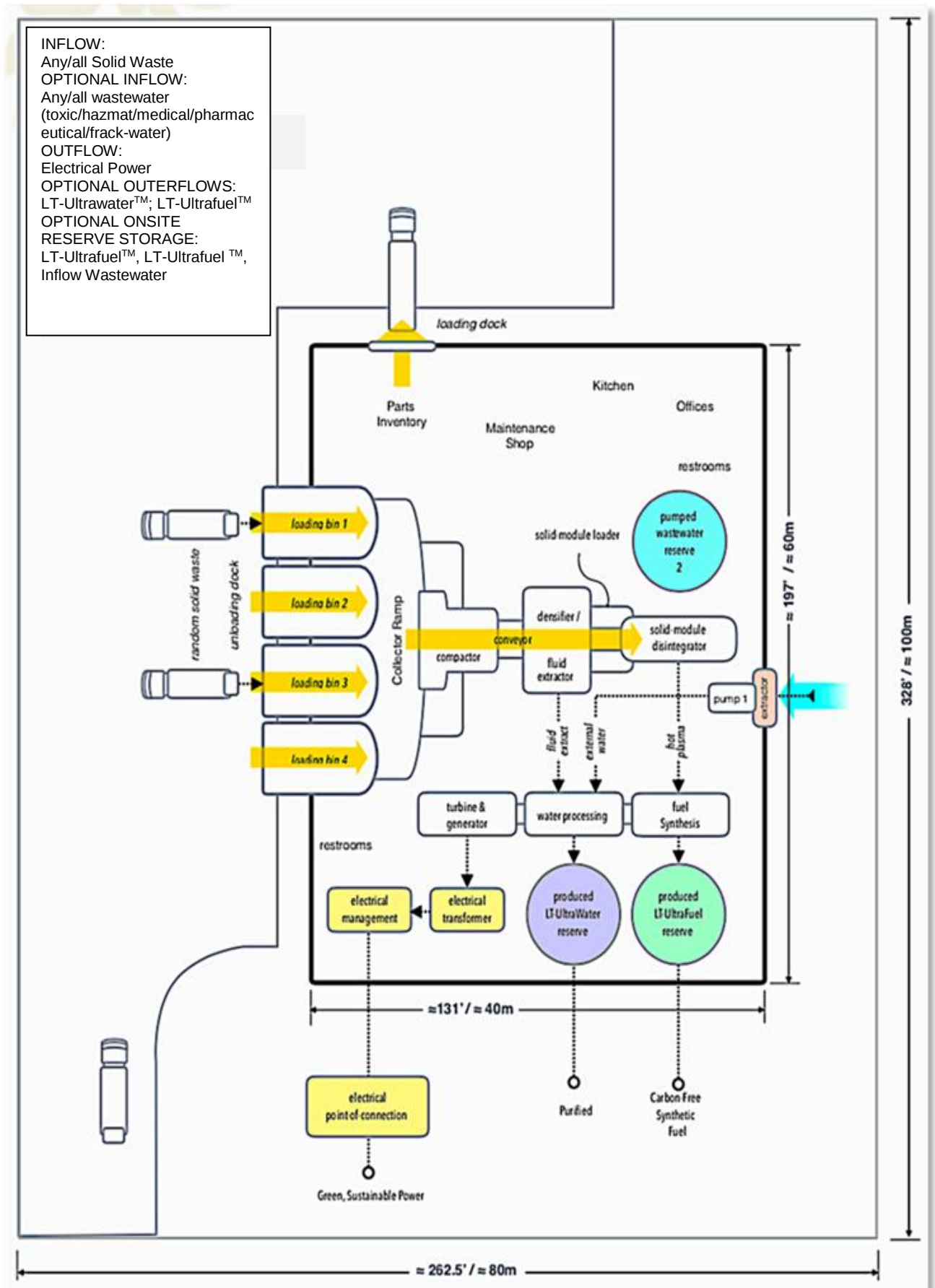


Figure 2: Site layout

Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.

No alternative sites were considered since, MMC offered only one site. The proposed project will be developed and operated within the existing landfill facility only.

Size or Magnitude of Operation

The proposed Solid Waste to Energy Facility at Moradabad Landfill site using Cold Plasma Gasification Technology to convert Solid Waste into gas, water and energy is proposed at 12,150 sq.m. of plot area. The products from the proposed project will be 250 MWh green power, 112 KLD purified water and 112 KLD zero carbon fuel.

Project Description with Process Details

Table: Annual MSW processing capability

Description	Quantity
MSW to be processed every day at Moradabad	500 Tonnes
Average working days in a year	330 days
Annual MSW@ that can be processed	165,000 Tonnes

Mixed MSW received at Landfill facility has high level of moisture content and composition is also heterogeneous in terms of content and size. Raw solid waste also contains metals and inert in various sizes in addition to organic matter. The most advanced waste management technology is proposed for the plant and the salient features of the technology are:

- No segregation of waste will be required
- Any levels of moisture will be accepted
- Calorific value has no concern
- No emissions from the plant will be generated
- No residues: Inert or residue from the plant
- The processing of legacy waste lying at the present landfill site shall be used for converting into power, drinking water and fuel.
- 500 tonnes solid waste will be converted into 250 MW power, 112 KLD purified water and 112 KLD zero carbon fuel every day.

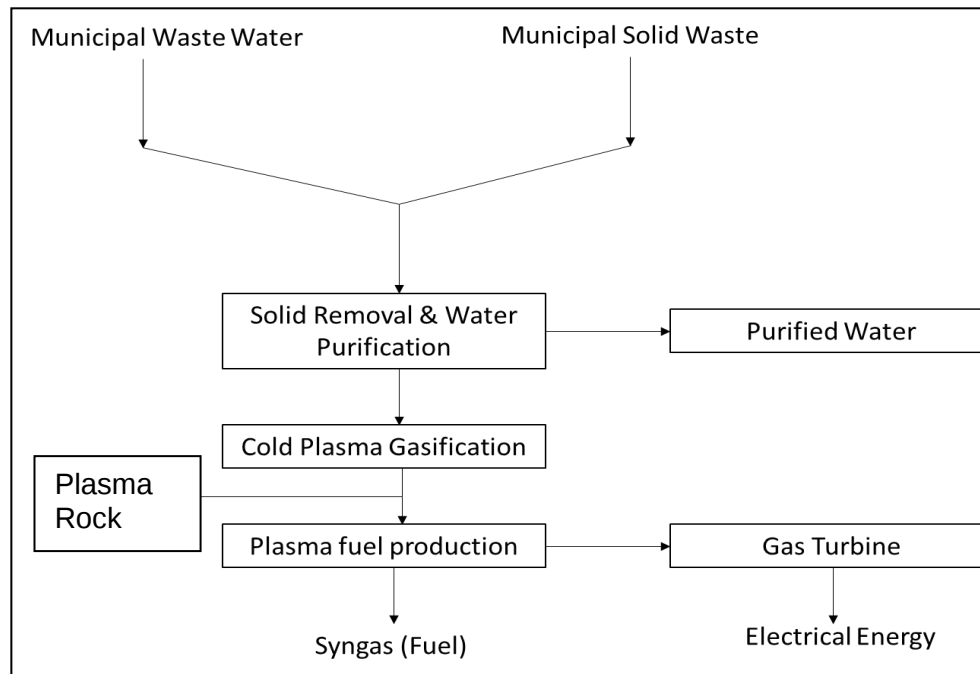
About Technology:

Plasma is an elastically conducting medium in which there are roughly equal number of positively and negatively charged particles produced when the atoms in get ionized. It is called the 4th state of matter. Cold plasma is achieved by ionization of atoms using electricity. Cold Plasma gasification is a novel gasification technology which offers a promising treatment of low heating/ calorific value fuels like MSW, BMW and other types of wastes (slags) including effluents and sewage. It is a two- stage process. Gasifier converts MSW/BMW into hydrogen rich Syngas.

Traditionally typical Syngas generated by any of three other methods namely Fischer- Tropsch Conversion, Methanol to Gasoline conversion or Direct Coal Liquefaction consists of Hydrogen, Carbon monoxide, Carbon dioxide and small amount of Sulphur and Nitrogen compounds. However, LT UltraFuel™ is Langenburg proprietary hydrogen syngas fuel derived from MSW/BMW waste water effluent and its formulation has hydrogen with non-detectable level of carbon and/or other compounds used in certain industrial processes. Traditional thermal plasma process collect heat as benefit while LT process makes its own hydrogen enriched Syngas for powering the plasma field and also derive energy from the atoms (by converting heavier atoms to lighter atoms) which no other process is achieving. LT UltraFuel™ is energy enriched stable form of hydrogen i.e. non-flammable, non-toxic and non-combustible at room temperature and normal pressure. Through proprietary energy enrichment process, LT UltraFuel™ concentrates latent heat density to about 100- fold beyond natural as or typical Syngas (produced by above three processes) with heat of combustion being 135000 BTU per gallon

(approx.). Typical/other syngas has heat of combustion as 15000 BTU/gallon and here lies the difference.

Process flow chart:



Each LT Waste to Energy System has multiple configuration to meet the output requirements:

- i) **Waste Water Treatment:** As municipal waste of 500 TPD enters the system with 850 KLD of wastewater from nearby drain and 8-10 KLD in house waste water generated from the domestic purposes, physical and chemical characteristics of mixture will be identified, recorded and tracked in real time, allowing the master control unit to modify/ monitor subsequent processing, including feedback loops to continually meet the output requirements. The waste stream is re-screened and separated into solids and liquids. The solids are processed through multiple stages including grinding and liquefaction and further extraction of water/ fluids. All particulate constituents are reduced, gasified and /or converted into LT fuels within the LT Plasma Unit.
- ii) **Waste Water Purification:** In the LT water purification process, liquid constituents are clarified through heat, pressure and proprietary processes leading to pure sterilized water. The remaining solids (down to microscopic level) are routed through the plasma unit. The resulting water is recirculated through a range of temperatures, pressure and processes that introduce and infuse oxygen from the LT Gas Extraction Unit, balance pH and refine output. Heat and electric power for this process comes from the LT turbine generator. Purified water is thus obtained.
- iii) **Gas Extraction:** A fraction of the water is sent to the LT gas extraction system where a proprietary low-input-energy form process is used to develop hydrogen and oxygen. These gases are stabilized using proprietary processes—made available on demand to the LT water treatment unit, the LT Cold Plasma gasification process and the LT Turbine.
- iv) **Turbine Generator:** The turbine powers up in 60 seconds or less. It includes multiple modifications from standard turbines allowing the use of LT fuels (from gas extraction and plasma fuel synthesis). It is also modified to recapture and recirculate much normally wasted energy (turbulence and heat) allowing cooler operation, reduced heat distortion and vibration resulting in minimal wear& tear of components for safe

long-term performance. The LT generator is uniquely designed (materially mechanically and electrically) to neutralize the negative loads and resistance that standard generators encounter. Thus, it has a higher power density than any other systems and in tandem with the proprietary LT transformer it produces typical 3-phase alternating current (AC) at 50Hz which is fully compatible with international performance & power standards.

- V) **Plasma/Fuel Synthesis:** LT plasma is fully integrated into the treatment of all wastes and the production of proprietary, high energy, clean, hydrogen-based zero carbon fuels. Effectively, the inorganic waste is vitrified in solid-like glass materials that are used to manufacture aggregates for the construction industry (Magmafication process) and the organic materials (plastics, paper, oil, bio-materials, etc.) are converted into Syngas with calorific value, fuel that is used on the Heavy-duty advanced gas turbines for the generation of electrical power (Gasification process).

Raw material required

The raw material for the proposed project will be legacy and fresh MSW at Moradabad Landfill site. 500 TPD of MSW and 850 KLD of wastewater will be used as raw materials and would be converted into 250 MW of green power, 112 KLD of purified water and 112 KLD zero carbon fuel.

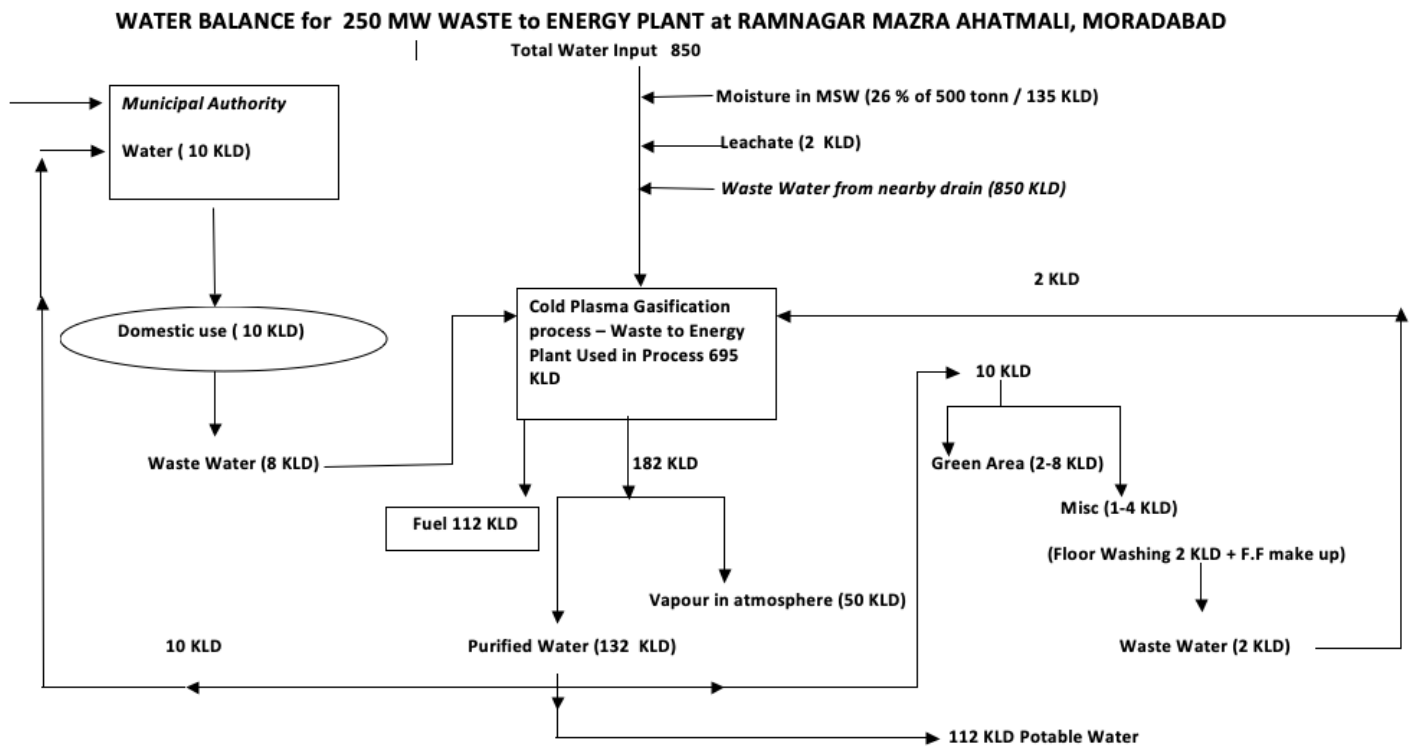
Resource optimization / recycling and reuse envisaged in the project, if any, should be briefly outlined.

The proposed project is based on the reuse of the Syngas within the process and the part of purified water generated from the process will be used for potable purpose, development and maintenance of green belt, floor washing, etc.

Availability of water its source, Energy / power requirement and source

The process water requirement for the proposed project is 850 KLD waste water and 10 KLD freshwater. 850 KLD wastewater from nearby nalla and 8 KLD sewage at plant will be fed in the system. 10 KLD of in-house generated purified water will be reused at the plant for Misc. purpose.

Detail Water Management and Balance given in Below Table:



Quantity of wastes to be generated (liquid and solid) and scheme for their management /disposal.
No wastewater will be generated from the process. Approx. 8KLD of Sewage will be generated from domestic use and will be reused in the process.

Solid Waste Generation

Municipal Solid Waste generated from the Site:

Category	Type of Waste	Disposal Method	TotalWaste(Kg/day)
Bio Degradable	Organic Waste	Onsite Solid Waste to Energy Facility	3.88 kg/day
Non-Biodegradable	Recyclable Waste		1.62 kg/day
Total			5.5 kg/day say 5.0 to 10.0 kg

Hazardous Waste Management:

No hazardous waste will be mixed or disposed within the landfill facility. No hazardous waste from Cold Plasma Gasification technology will be generated.

Odour Management:

Fresh MSW from secondary collection points in the city of Moradabad will be transported using specially designed compactors with no issue of odour. Legacy waste lying at Sanitary landfill is already seasoned which will be processed at the plant. Green belt/cover developed at the plant will help in attenuation of odour and protection of receptor. Proper masks will be provided by the project authority to workers to address odour issue.

Bird Foraging

As the storage of MSW will be outside the project premises which is on existing landfill facility thus, following steps can be taken or suggested to MMC for prevention of bird foraging:

- i) Avishock: It will deliver a small amount of electrical shock to deter birds from settling and will not harm the birds.
- ii) Spring Wire-A wire attached to small posts by springs so that when a bird lands the wire springs back, preventing the bird from settling; used on ledges, sills and beams.

Noise Environment

To reduce Ambient Noise level the following measures will be adopted --

- Noise generating units like machinery area, plant area etc. shall be properly insulated. Earmuff will be provided to workers.
- Maintenance of vehicles and machinery will be done in a sustainable manner to ensure best performance.
- Maintenance and servicing schedules for machines and vehicles will be adhered to.
- Vehicle and people flow during shift changes shall be regulated.
- The green belt will help in reducing noise levels in the complex.

Air Environment

No external power is required. Out of generated power of 250 MWH, 500 KWH will be used in house. The products generated from the process are green in nature. No emissions from the plant are envisaged.

Site Analysis**Connectivity**

The site is well connected with all the transportation facilities from the nearby places. Table is showing the site connectivity.

S. No.	Accessibility	Description	Distance & Direction
1.	Highway/ Road	SH - 78, SH- 49, NH- 9, NH- 509/ SH-43, (Agra – Moradabad),	19 km, East 6 km, SW 5 km, NE 14.8 km, SW
2.	Railway Station	Moradabad Junction Kathghar Railway Station GOT Railway Station Dalpatpur Railway Station	7.8 km, NW 4.5 km, SW 5.0 km, NE 8.4 km, SE
3.	Airport	IGI International Airport, Delhi, Hindon Domestic Airport	184 kms (SW) 169 kms (S/SW)

Land form, Land use and land ownership

A plot measuring 12,150 sq metre has been allotted to project proponent on long term lease, at taken amount, by Moradabad Municipal Corporation at existing landfill at Ramnagar Mazra, Moradabad

The land use of the site is given in Table & Figure below:

LAND USE DETAIL		
Particulars	Details (in sqm)	% of plot area
Plant Area	3000	24.69
Road Area/ Parking Area	2400	19.75
Utilities/ Office	500	4.12
Green Area	3645	30.00
Free land	2605	21.44
Total plot area	12150	100

Table: Land use of the project Site

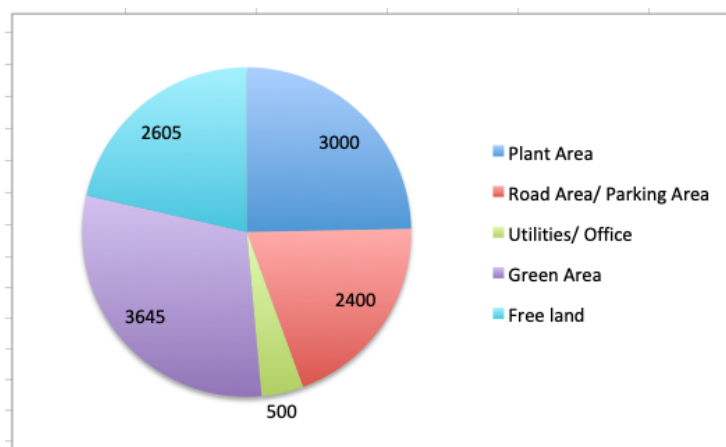
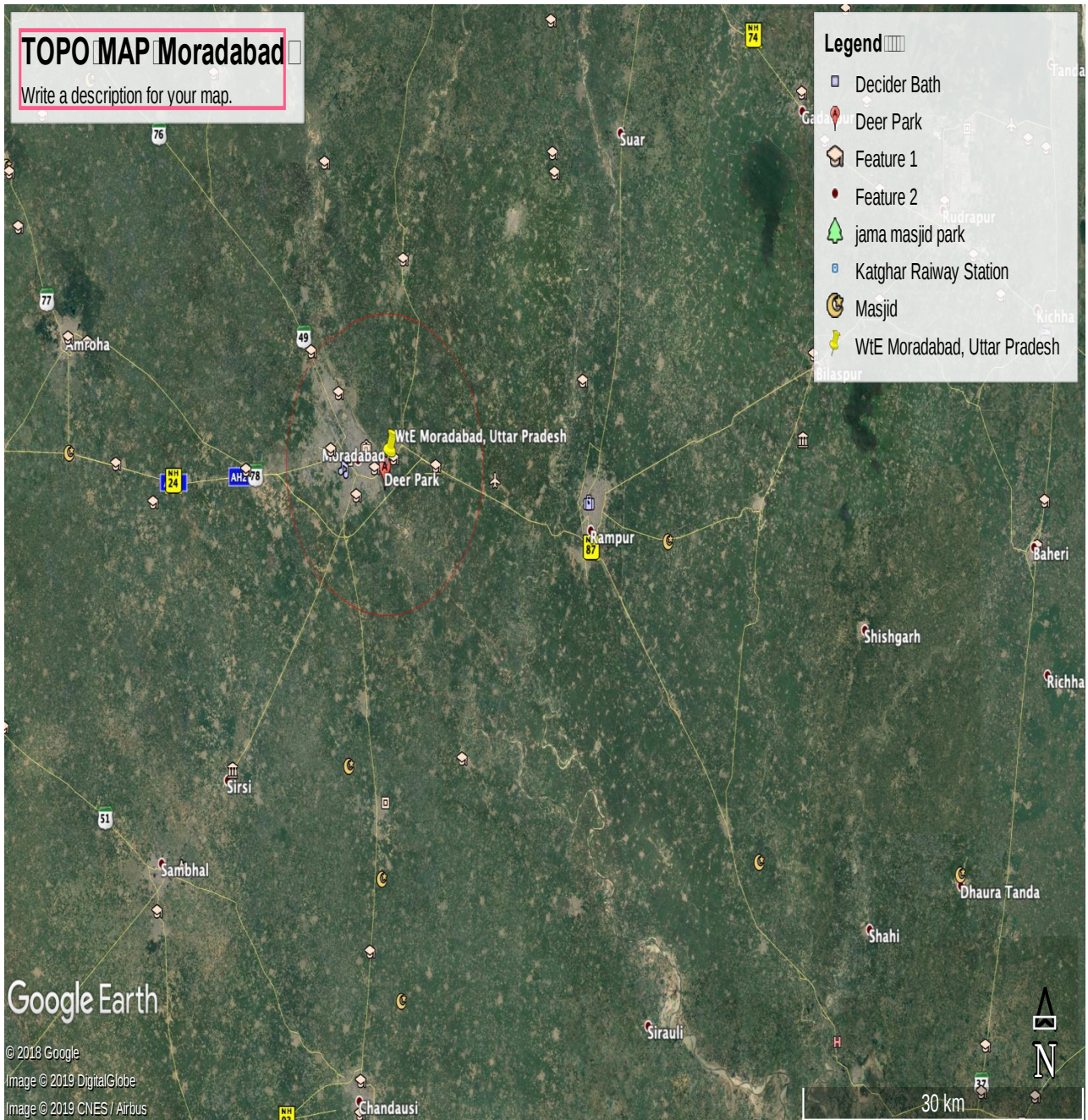


Figure: Land use of the project Site

Topography

Topography of the site is highly uneven and undulating due to barren rocky outcrops. The Topographical map of the 10 km radius study area is shown in below fig:



Existing land use pattern (Shortest distance from the periphery of the forests, national parks, wild life sanctuary, ecosensitive areas, waterbodies)

Areas	Name/ Identity	Aerial distance (within 15 km.) from Proposed project location boundary
Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Brij Ghat to Narora barrage Stretch of Ganga river : Ramsar Site Ramganga river Ganga river Dhela River	80 km, S/SW 1.5 km in West 20 km, West 38.0 km , NE
Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering, migration		No protected or sensitive area is located within 10 km radius of the proposed project. There is an Eco Park for Deer within 3 km radius.

Existing infrastructure

The site is at present is a landfill which is vacant. The location is well connected to roads, railways stations, hospitals, post office, schools etc.

Soil classification:

Soils of the City exhibit a wide variation in composition, texture and appearance. The area occupied by younger alluvium can be delineated along Ramganga and Dhela rivers draining the district. The younger alluvium is confined dominantly within the flood plain of these rivers.

Older alluvium occupies the entire upland or interfluvial area between the major drainage Ramganga and Kosi and Sot & Ramganga. The soils are silty, clayey and sandy in varying proportions.

Climate data from secondary sources:

Rainfall:

The average annual rain fall is 967.3 mm. The climate is sub- humid and it is characterized by hot , summer, abtracting cold season and general dryness except the South- West monsoon season. About 86 % of rainfall takes place from June to September. During monsoon, surplus water is available for deeper collaction to ground water.

Drainage and Physiography:

The District of Moradabad lies within the great Gangetic plain and is demarcated into three Sub- Divisions by the rivers Ramganga and Sot. The eastern tract consists of a submontane country, with an elevation slightly greater than the plain below, and is traversed by numerous streams descending from the Himalayas. The central portion consists of a level ventral plain descending at each end into the valleys of the Ramganga and Sot. The western section has a gentle slope towards the Ganges, with a rapid dip into the lowlands a few miles from the bank of the great river. Ramganga, Sot is a tributary of River Ganges. Meandering streams with a few oxbow lakes have been noticed in the area.

The highest flood level (HFL) recorded at Ramganga River gauging site Near Gurukul School, Katghara Railway Bridge is 190.5 m above MSL and for Gagan River at Gagan Bridge gauging site Moradabad is 192.7m above MSL.

Climate and Meteorology:

Climate and meteorology of a place can play an important role in the implementation of any developmental project. Meteorology is also the key to understand local air quality, as there is an essential relationship between meteorology and atmospheric dispersion involving wind in the broadest sense of the term.

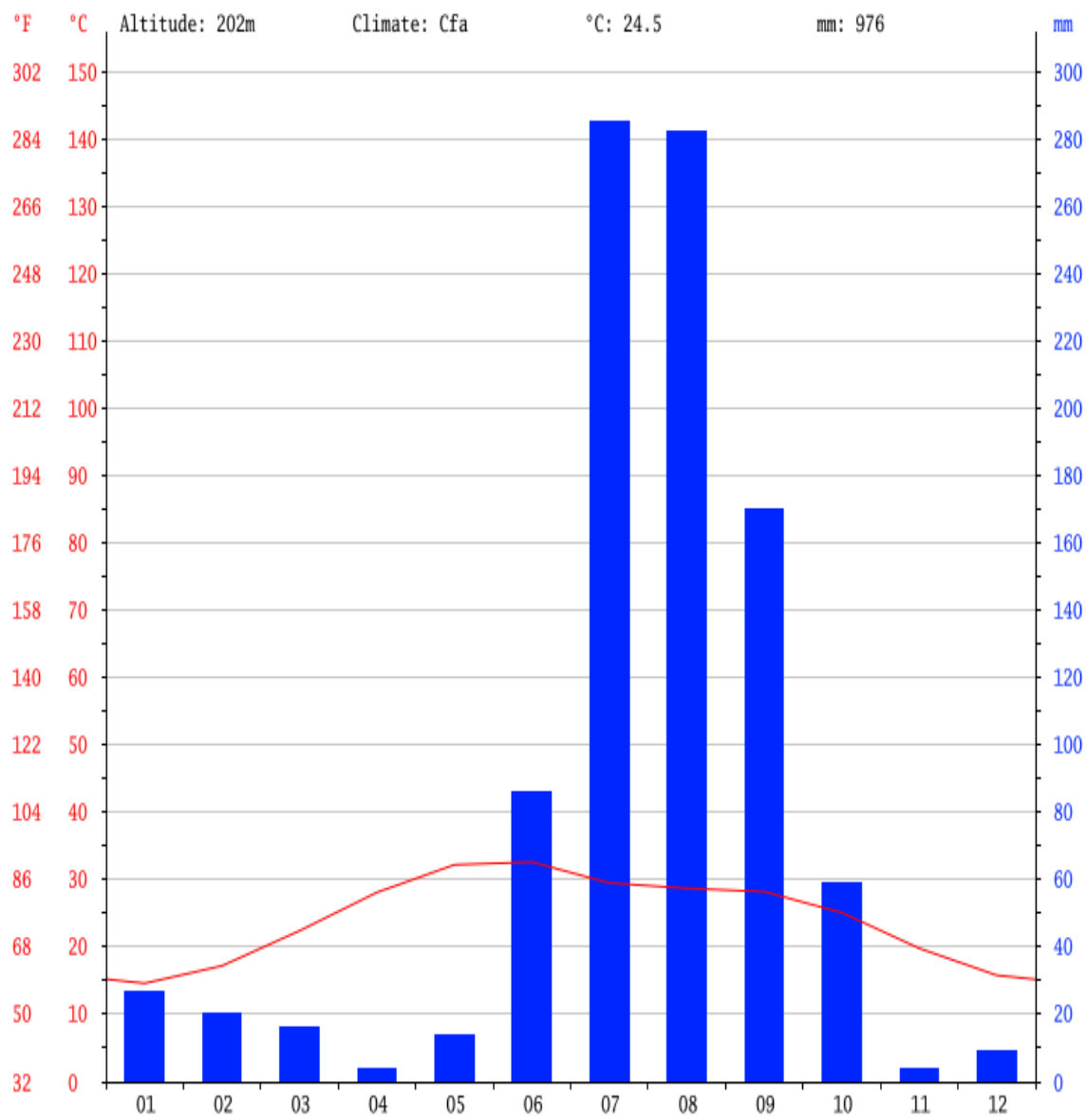
Relative Humidity:

The air is very humid during south-west monsoon season and the rest of the period the humidity is comparatively less. The mean monthly relative humidity is 69% and mean monthly evening relative humidity is 51%.

Temperature:

May and early part of June form the hottest part of the year. In May, the mean daily maximum temperature is about 40°C and mean daily minimum temperature about 25°C and maximum temperature rises up to over 45°C. With the advancement of the monsoon in June there is an appreciable drop in day temperature. January is generally the coldest month with mean daily maximum temperature at about 21°C and the mean daily minimum is about 8°C. The mean monthly maximum temperature is 29.4°C and mean monthly minimum temperature is 12°C.

CLIMATE GRAPH // WEATHER BY MONTH MORADABAD



Source: [My weather 2.com/city-Town/ India/ Moradabad/ Climate- profile- aspx](http://Myweather2.com/city-Town/India/Moradabad/Climate-profile.aspx)

MORADABAD WEATHER BY MONTH // WEATHER AVERAGES

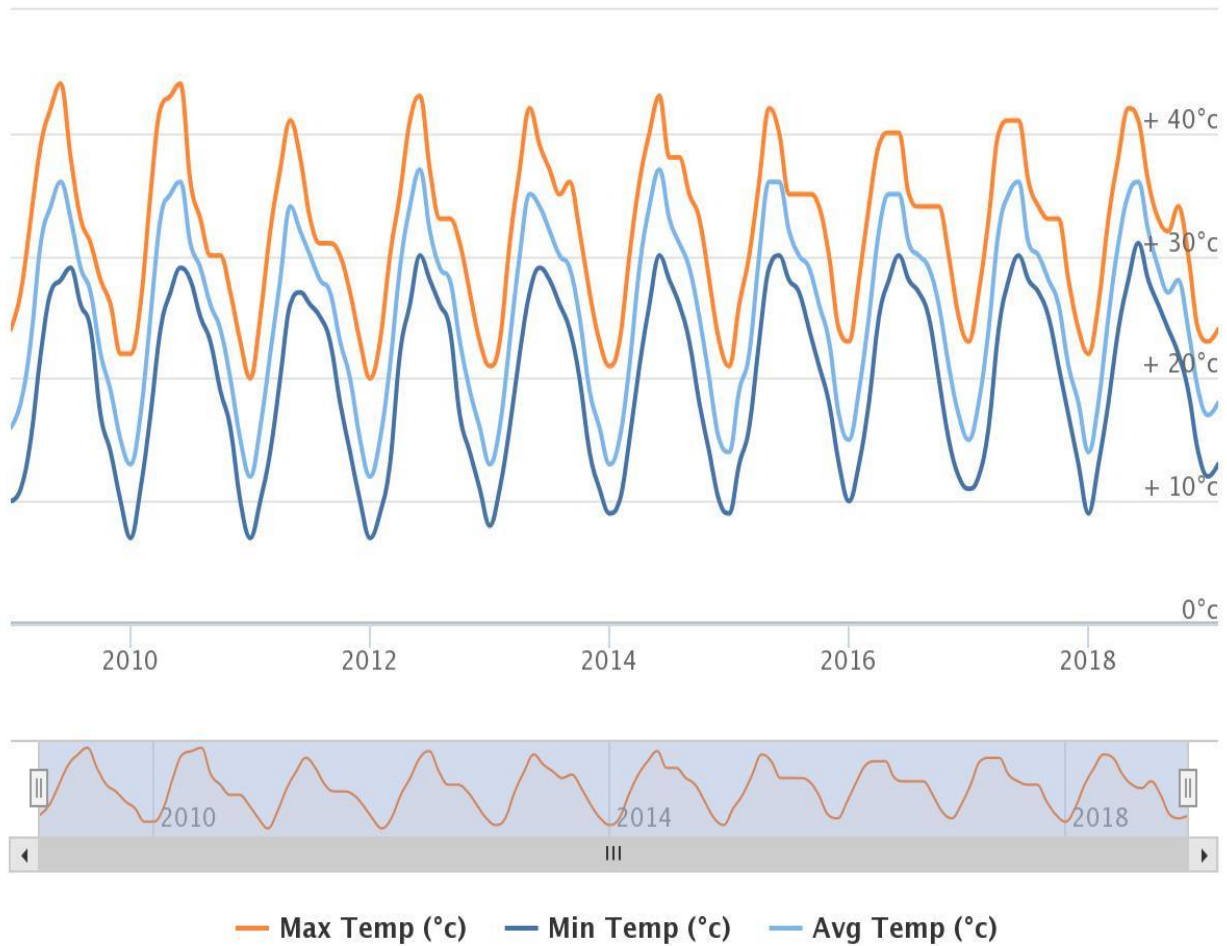
	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	14.6	17.2	22.4	28.1	32.2	32.6	29.5	28.7	28.2	25.1	19.8	15.8
Min. Temperature (°C)	8.1	10.1	14.8	20	24.7	26.7	25.7	25.2	24	18.7	12	8.6
Max. Temperature (°C)	21.1	24.3	30	36.2	39.7	38.5	33.4	32.2	32.5	31.6	27.6	23
Avg. Temperature (°F)	58.3	63.0	72.3	82.6	90.0	90.7	85.1	83.7	82.8	77.2	67.6	60.4
Min. Temperature (°F)	46.6	50.2	58.6	68.0	76.5	80.1	78.3	77.4	75.2	65.7	53.6	47.5
Max. Temperature (°F)	70.0	75.7	86.0	97.2	103.5	101.3	92.1	90.0	90.5	88.9	81.7	73.4
Precipitation / Rainfall (mm)	27	20	16	4	14	86	285	282	170	59	4	9

Source: [My weather 2.com/city-Town/ India/ Moradabad/ Climate- profile- aspx](https://myweather2.com/city-Town/India/Moradabad/Climate-profile.aspx)

Moradabad

Max, Min and Average Temperature (°C)

Zoom 1m 3m 6m YTD 1y **All**



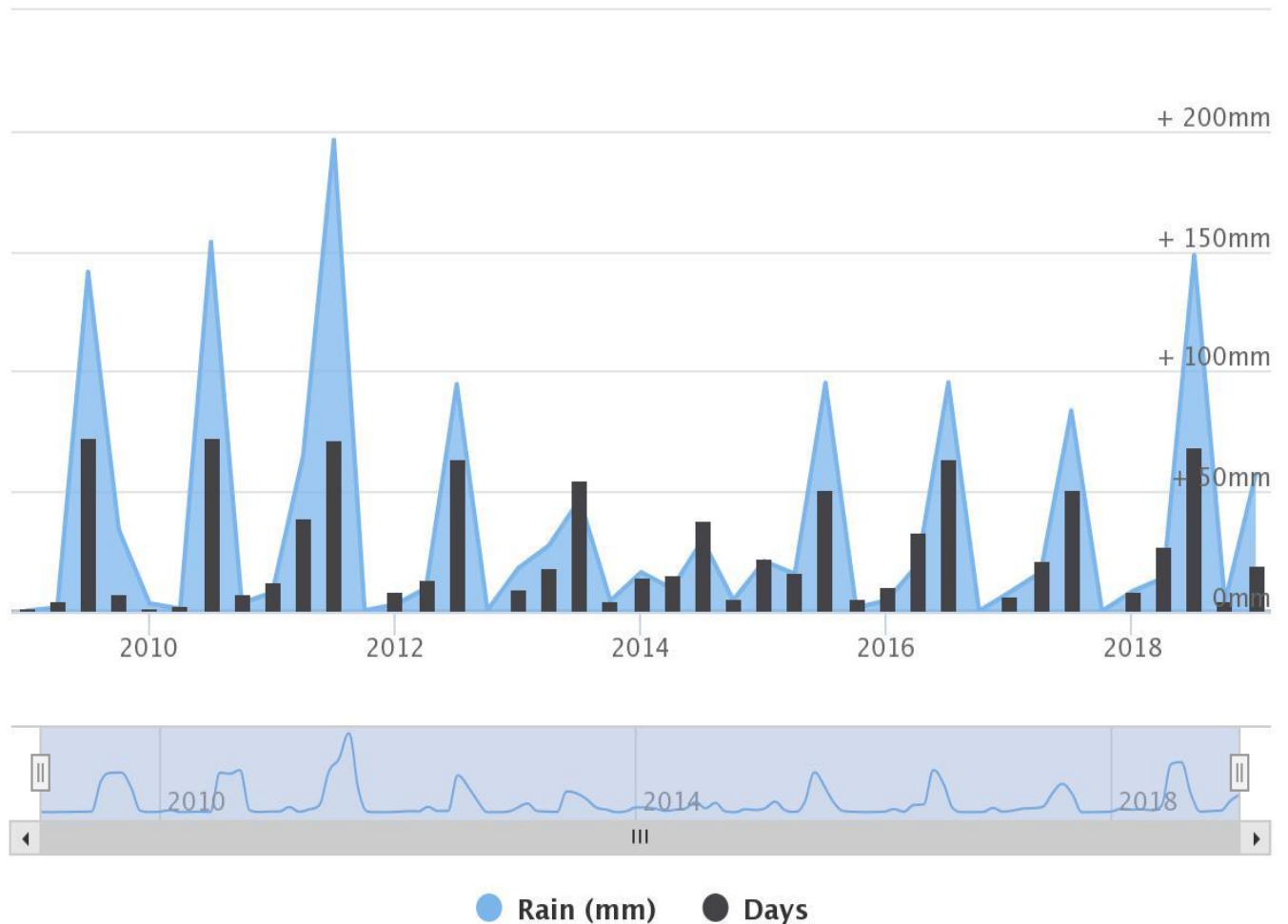
WorldWeatherOnline.com

Source: www.world-weather-online.com/long/on-in/moradabad-weather-history/uttarpradesh

Moradabad

Average Rainfall Amount (mm) and Rainy Days

Zoom 1m 3m 6m YTD 1y **All**



WorldWeatherOnline.com

Source: [www.world weather online.com/ long/on-in/moradabad-weather history/ utterpradesh](http://www.worldweatheronline.com/long/on-in/moradabad-weather-history/uttarpradesh)

Moradabad

Average and Max Wind Speed and Gust (kmph)

Zoom

1m

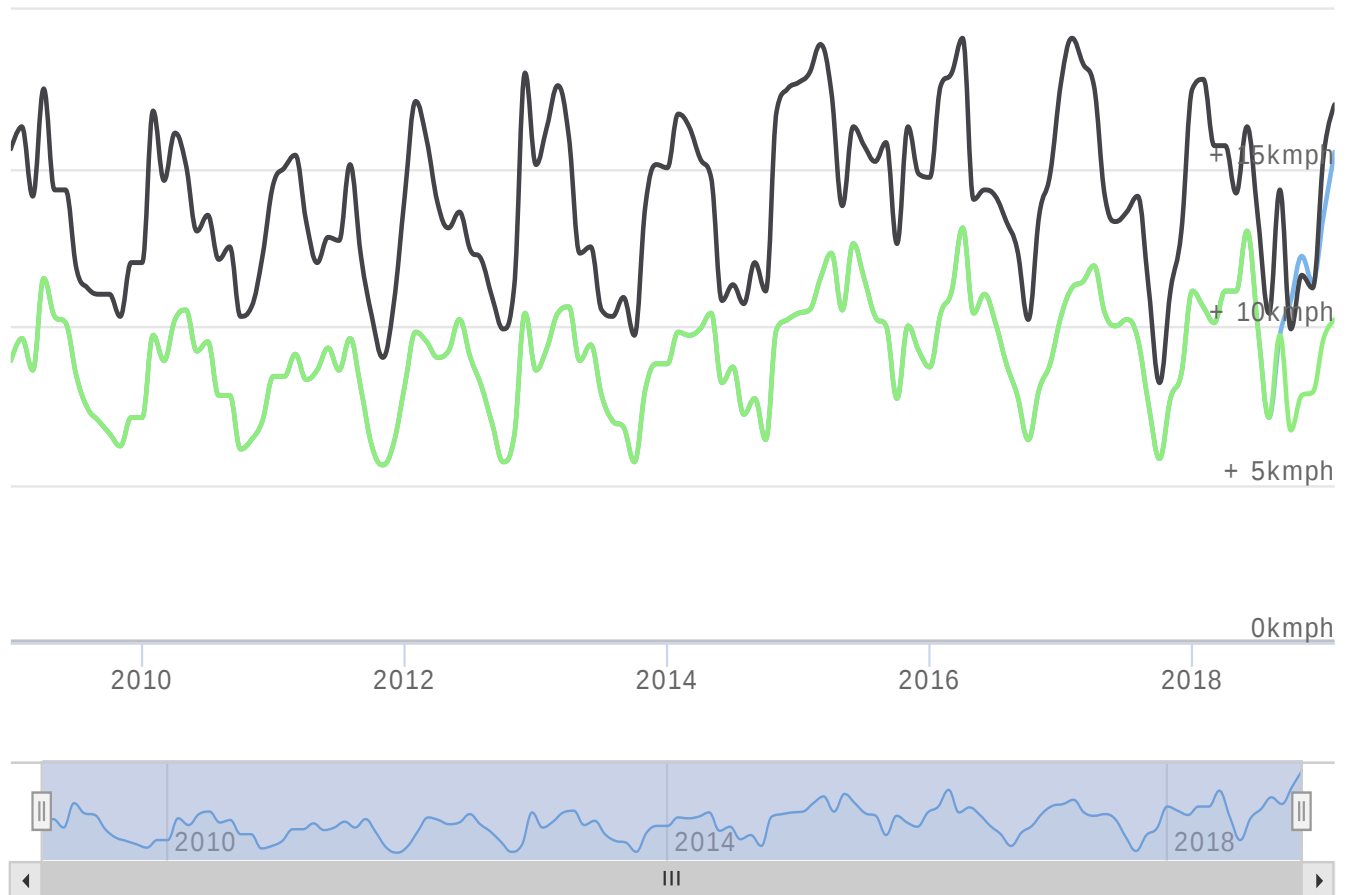
3m

6m

YTD

1y

All



— Max Wind (kmph) — Avg Gust (kmph) — Avg Wind (kmph)

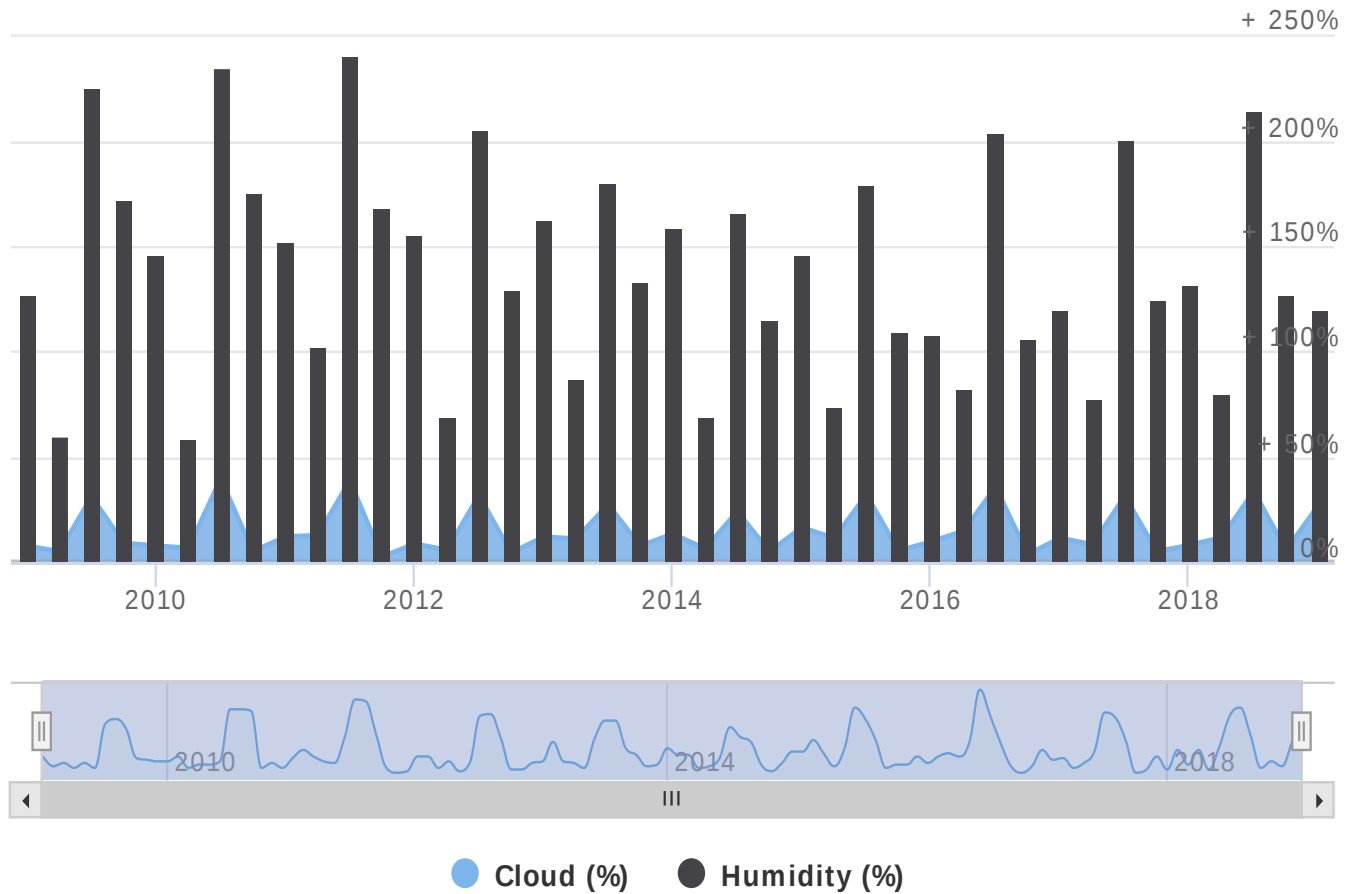
WorldWeatherOnline.com

Source: [www.world weather online.com/ long/on-in/moradabad-weather history/ uttarpradesh](http://www.worldweatheronline.com/long/on-in/moradabad-weather-history/uttarpradesh)

Moradabad

Average Cloud and Humidity (%)

Zoom 1m 3m 6m YTD 1y **All**



WorldWeatherOnline.com

Source: [www.world weather online.com/ long/on-in/moradabad-weather history/ uttarpradesh](http://www.worldweatheronline.com/long/on-in/moradabad-weather-history/uttarpradesh)

Social infrastructure available

Social infrastructure facilities like Hospital, School, College, Temple, etc., are available within the

nearby project.

	Many hospitals, schools, place of workshops & community facilities are available.
	School
Kendriya Vidyalaya, Railway Harthala colony	10.5 km, NE
Vivekanand Inter Collage, Rampur Road	27.5 km, NE
KCM School, Opposite meston park	9.5 km, NE
Gandhi Nagar Public School, DPS, 6 Mile Stone, Moradabad	25.7 km, West
Maharaja Agrasen Inter Collage	10.5 km, NE
Arya Kanya Inter Collage, Moradabad	8.9 km, NE
	Hospitals
Mr. Lohia Hospital Lagpat Nagar	5.8 km, West
City Hospital Adarsh Nagar	7.2 km, West
Photon Hospital	5.0 km, NW
District Hospital, Civil lines, Moradabad	9.8 km, NE
	Place of Worship
Full Gospal Church	28.4 km, NW
Jama Masjid	6.6 km, NW
Hathi Wala Mandir	7.1 km, NW
Mano Kamna mandir	8.8 km, NW

Planning Brief

Planning concept

The proposed based on MSW will be developed in within the existing landfill facility. The project area falls within the MMC limits having all required infrastructure (power, roads, water lines, etc.).

Population projection

There will be an influx of 150 labours during construction and 37 staffs and workers to the area due to the proposed project at the time of operation. No demographic change is expected in Moradabad due to this project. Since a majority

of manpower will be hired locally

Land use planning:

The total area allotted for MSW based waste to energy power plant is 10.540 sq.m. The detailed land breakup of total area is given in Table: Land Use

LAND USE DETAIL		
Particulars	Details (in sqm)	% of plot area
Plant Area	3000	24.69
Road Area/ Parking Area	2400	19.75
Utilities/ Office	500	4.12
Green Area	3645	30
Free land	2605	21.4
Total plot area	12150	100

Assessment of Infrastructure demand (physical & social)

There will be a minimum influx of people to the area due to the proposed project, as the major manpower will be employed from the nearby locality. Hence the infrastructure available is sufficient to accommodate the demand.

Amenities/Facilities

All the amenities / facilities like security room, administrative building, toilet block, etc., will be constructed within the facility.

Proposed Infrastructure

Industrial area (processing area)

The site is at present vacant piece of land at landfill which will be developed into Solid Waste to Energy Facility

Residential area (non-processing area)

No residential area is proposed within the project site or outside.

Greenbelt

A thick green belt will be developed all around the facility and the total area allocated for green belt development will be 3645 sqm.

Social infrastructure

No Social infrastructure is proposed within the project site.

Connectivity (traffic and transportation Road/Rail/Metro/Waterways etc.)

The site is well connected with all the transportation facilities from the nearby places. No further road or metro network is proposed.

Drinking water management (Source & Supply of water)

The drinking water required for the proposed project will be taken from MMC i.e., 10 KLD

Sewerage system

The domestic waste water and floor washing generated from the proposed project will be fed in the process. There will be no other waste water generated from the facility.

Industrial Waste Management

500-2000 kg/day from 500 TPD of waste will be generated in the form of plasma rock from the plant which will be disposed off within the plant or used as building material.

Solid waste management

Domestic solid waste of 6- 10 kg/day generated from the staff which will be treated within the facility.

Hazardous Waste Management:

No hazardous waste from the Cold Plasma Gasification technology will be generated.

Power requirement & supply/source.

No external power is required. Out of In-house generated power of 50MWH,100KWh will be used for air conditioning, lighting, etc.

Rehabilitation and Resettlement(R&R) Plan

Policy to be adopted (Central/State) in respect of the project affected persons including home out sees and landless laborers (a brief outline to be given).

The proposed project will be developed within the existing landfill and hence there is no rehabilitation and resettlement are envisaged.

Project Schedule & Cost Estimates

Likely date of start of construction and likely date of completion (Time schedule for the project should be given).

The project will be started after getting all the necessary approvals from the regulatory authorities viz., MoEF&CC, UPPCB, etc. say by June 2019.

Estimated project cost along with analysis in terms of economic viability of the project

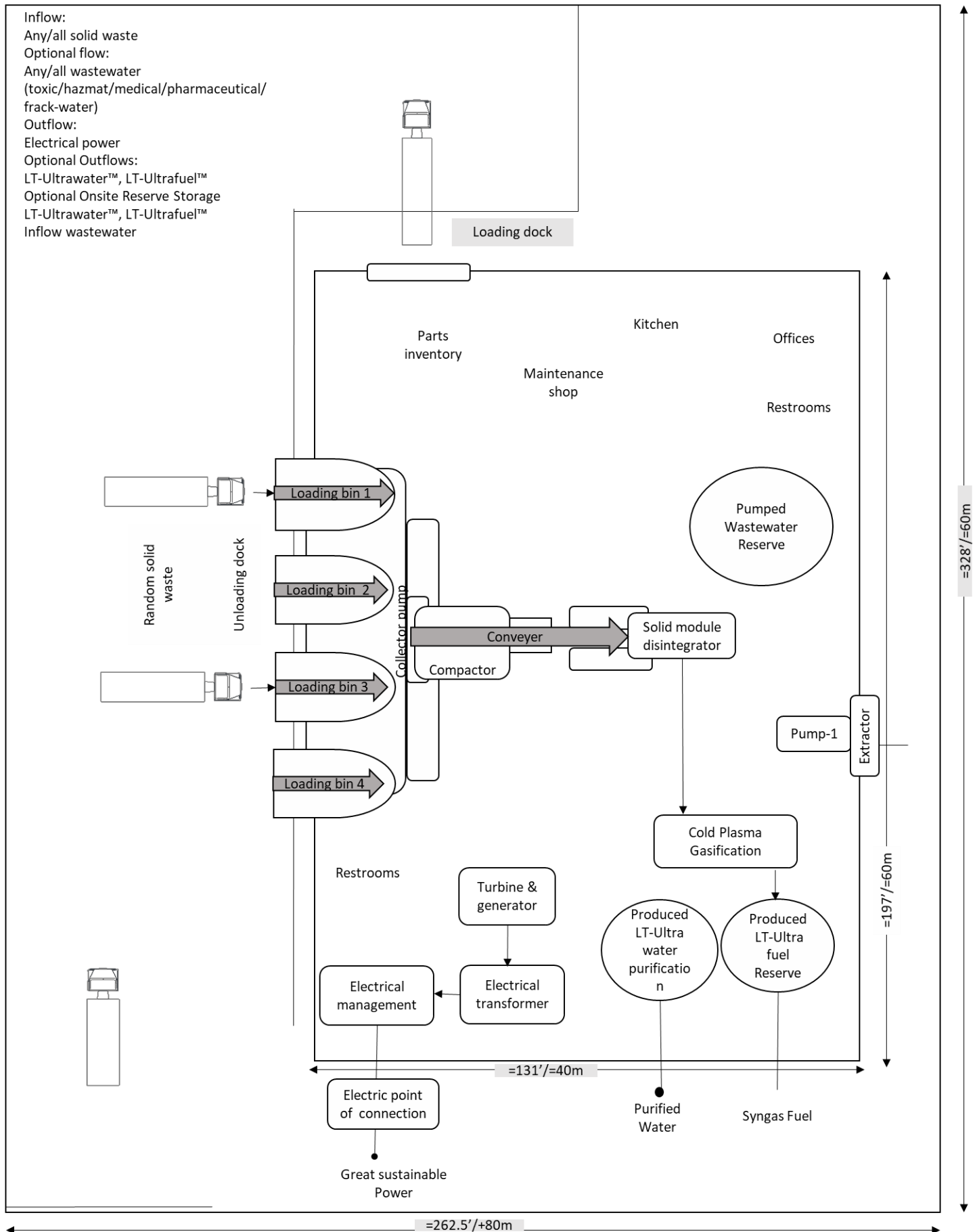
The estimated cost of the project is Rs. 2125 crores. The proposed project will be developed within the existing landfill plant and hence there is no rehabilitation and resettlement are envisaged.

Analysis of Proposal

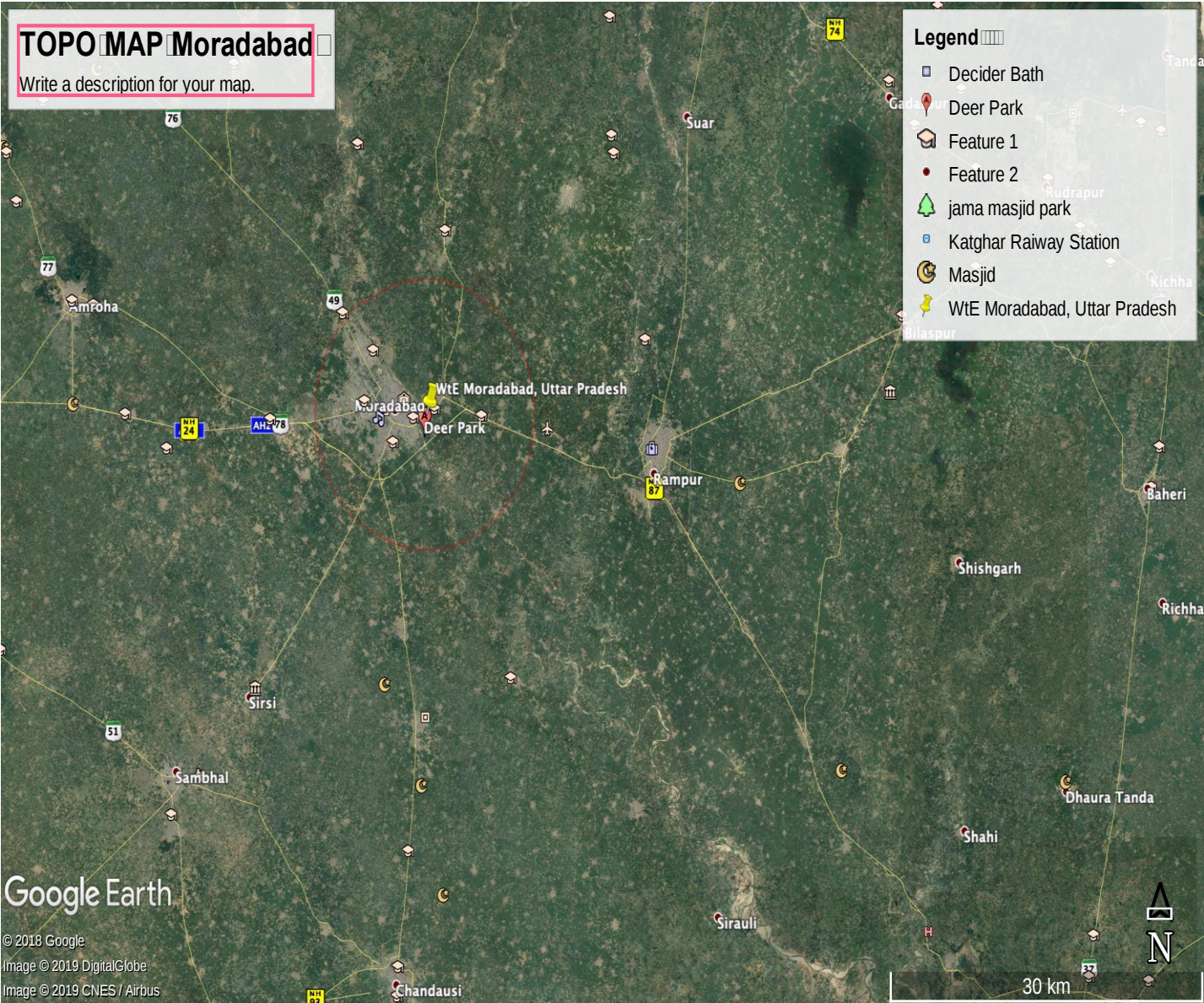
Financial and social benefits with special emphasis on the benefit to the local people including tribal population if any, in the area. Overall the proposed project will have a positive impact on the people and surroundings. The technology will allow huge savings at the landfill as the volume of MSW will be reduced and will be converted into green power, green fuel and drinking water.

Enclosure 2. LAND PAPERS

Enclosure 3. LAYOUT PLAN



Enclosure 4. TOPOGRAPHICAL MAP



STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR
PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

Enclosure 5. PROPOSED TOR

1(d): STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR THERMAL POWER PLANTS PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

1) The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

for its better identification and reference.

- 2) Vision document specifying prospective long-term plan of the project shall be formulated and submitted.
 - 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.
 - 4) 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.
 - 5) 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.
 - 6) Harnessing solar power within the premises of the plant particularly at available roof top and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted.
 - 7) 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.
 - 8) Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.
 - 9) 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.
 - 10) 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
 - 11) 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.
-
- 12) 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.
 - 13) The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report.
 - 14) 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.
 - 15) 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.
 - 16) 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.
 - 17) 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.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

- 18) 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.
- 19) 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.
- 20) 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.
- 21) Waterbody/ 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.
- 22) It shall also be ensured that a minimum of 500m distance of plant boundary is kept from the HFL of river system/ streams etc. and the boundary of site should also be located 500m away from railway track and National Highways.
- 23) 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.

- 24) 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.
- 25) 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.
- 26) Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished.
- 27) Feasibility of near zero discharge concept shall be critically examined and its details submitted.
- 28) Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.
- 29) Plan for recirculation of ash pond water and its implementation shall be submitted.
- 30) 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/groundwater) 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.
- 31) 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.
- 32) 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.
- 33) If the area has tribal population it shall be ensured that the rights of tribal are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

- 34) A detailed CSR plan along with activities wise breakup of financial commitment shall be prepared. CSR 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. Separate budget for community development activities and income generating programmes shall be specified.
- 35) While formulating CSR 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). CSR details done in the past should be clearly spelt out in case of expansion projects.
- 36) 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.
- 37) 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.
- 38) 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.
- 39) One complete season site specific meteorological and AAQ data (except monsoon season) as per latest MoEF&CC Notification shall be collected and the dates of monitoring shall be recorded. The parameters to be covered for AAQ shall include PM10, PM2.5, SO₂, NO_x, 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.
- 40) 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 24hrs).
- 41) A list of industries existing and proposed in the study area shall be furnished.
- 42) 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 wind rose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socio-economics.
- 43) Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.
- 44) Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.
- 45) 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

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

- 46) 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 along 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.
- 47) 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.
- 48) 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.
- 49) 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.
- 50) A Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be carried out. It should take into account the maximum inventory
- 51) 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. Mock drills shall be suitably carried out from time to time to check the efficiency of the plans drawn.
- 52) 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.
- 53) 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 with tree density of 2000 to 2500 trees per ha with a good survival rate of around 80% 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 CO₂ and other gaseous pollutants and hence a stratified green belt should be developed.
- 54) 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.
- 55) Corporate Environment Policy
- a. 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.
 - b. 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.
 - c. 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.
 - d. 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.

All the above details should be adequately brought out in the EIA report and in the presentation to the Committee.

- 56) Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

Additional TOR for Coastal Based Thermal Power Plants Projects (TPPs):

Over and above the TOR mentioned in Thermal Power Plants Projects, the following shall be strictly followed (as applicable):

- a) Low lying areas fulfilling the definition wetland as per Ramsar Convention shall be identified and clearly demarcated w.r.t the proposed site.
 - b) If the site includes or is located close to marshy areas and backwaters, the sea areas must be excluded from the site and the project boundary should be away from the CRZ line. Authenticated CRZ map from any of the authorized agencies shall be submitted.
 - c) The soil levelling should be minimum with nor minimal disturbance to the natural drainage of the area. If the minor canals (if any) have to be diverted, the design for diversion should be such that the diverted canals not only drains the plant area but also collect the volume of flood water from the surrounding areas and discharge into marshy areas/major canals that enter into creek. Major canals should not be altered but their embankments should be strengthened and desilted.
 - d) Additional soil required for levelling of the sites should as far as possible be generated within the site itself in such a manner that the natural drainage system of the area is protected and improved.
 - e) Marshy areas which hold large quantities of flood water to be identified and shall not be disturbed.
 - f) No waste should be discharged into Creek, Canal systems, Backwaters, Marshy areas and seas without appropriate treatment. Wherever feasible, the outfall should be first treated in a Guard Pond and then only discharged into deep sea (10 to 15 m depth). Similarly, the Intake should be from deep sea to avoid aggregation of fish and in no case shall be from the estuarine zone. The brine that comes out from Desalinization Plants (if any) should not be discharged into sea without adequate dilution.
 - g) Mangrove conservation and regeneration plan shall be formulated and Action Plan with details of time bound implementation shall be specified, if mangroves are present in Study Area.
-
- h) A common Green Endowment Fund should be created by the project proponents out of EMP budgets. The interest earned out of it should be used for the development and management of green cover of the area.
 - i) Impact on fisheries at various socio-economic level shall be assessed.
 - j) An endowment Fishermen Welfare Fund should be created out of CSR grants not only to enhance their quality of life by creation of facilities for Fish Landing Platforms / Fishing Harbour / cold storage, but also to provide relief in case of emergency situations such as missing of fishermen on duty due to rough seas, tropical cyclones and storms etc.
 - k) Tsunami Emergency Management Plan shall be prepared wherever applicable and Plan submitted prior to the commencement of construction work.
 - l) There should not be any contamination of soil, ground and surface waters (canals & village pond) with sea water in and around the project sites. In other words necessary preventive measures for spillage from pipelines, such as lining of Guard Pond used for the treatment of outfall before discharging into the sea and surface RCC channels along the pipelines of outfall and intake should be adopted. This is just because the areas around the projects boundaries could be fertile agricultural land used for paddy cultivation.
