

A. INTRODUCTION

a. BRIEF DESCRIPTION OF PROJECT

M/s IndianOil Corporation Ltd has set up a LPG Bulk Storage & Bottling Facility (**Indane Bottling Plant**) at S.F nos. B37/pt to B43/pt, B50/pt, B51/pt, C30 to 41 etc. at SIPCOT Industrial Growth Centre, Gangaikondan village, Tirunelveli Taluk & District, Tamil Nadu.

LPG from M/s Indian Oil Petronas Pvt Ltd (Athipattu, Chennai) will be received through bullet trucks & stored in mounded bullets of capacity 3 x 600MT (total 1800MT). LPG will be pumped from storage bullets to filling shed where cylinders will be filled prior to dispatch through road.

The current proposal has been submitted to Ministry of Environment, Forests & Climate Change for issuance of Environmental Clearance for the existing bulk LPG storage (1800MT) and the LPG throughput of 1,20,000MTPA through 2 LPG Filling Stations / Carousels.

b. NATURE OF PROJECT

Indane Bottling Plant operates strictly as a storage & packing facility for LPG into 14.2kg, 19kg, 47.5kg & 5kg cylinders. No by-products / additional products are generated / manufactured during the operations. **Hence, the present proposal is classified under Schedule 6(b) & Category 'B' according to EIA Notification 2006 & subsequent amendments.**

c. PROFILE OF PROJECT PROPONENT

Indian Oil Corporation Limited is an Indian state-owned oil and gas corporation with its headquarters in New Delhi, India. It is the world's 88th largest corporation, according to the Fortune Global 500 list, and the largest public corporation in India when ranked by revenue. IndianOil is the highest ranked Indian company in the latest Fortune 'Global 500' listings, ranked at the 96th position.

The company is mainly controlled by Government of India which owns approximately 79% shares in the company. It is one of the seven Maharatna status companies of India, apart from Coal India Limited, NTPC Limited, Oil and Natural Gas Corporation, Steel Authority of India Limited, Bharat Heavy Electricals Limited and Gas Authority of India Limited.

IndianOil and its subsidiaries account for a 49% share in the petroleum products market, 31% share in refining capacity and 67% downstream sector pipelines capacity in India. The

IndianOil Group of companies owns and operates 10 of India's 22 refineries with a combined refining capacity of 65.7 million metric tonnes per year. In FY 2012 IOCL sold 75.66 million tonnes of petroleum products and reported a PBT of Rs.37.54 billion, and the Government of India earned an excise duty of Rs.232.53 billion and tax of INR10.68 billion.

d. NEED FOR THE PROJECT & ITS IMPORTANCE

The present demand for packed LPG in Tamil Nadu is 780TMT as against the rated bottling capacity of 682TMT/PA as on 1st April 2011. MOP&NG has mandated coverage of 75% population with LPG connection by the year 2014-15 including LPG connection in rural markets under RGGLV Scheme. The packed LPG demand projections in the State of Tamil Nadu are estimated to be 1051 TMT by the year 2014-15. Even after exhausting the available possibilities of additional capacity generation of 300 TPTMA in the existing LPG Bottling Plants in Tamil Nadu, the available LPG capacity would not be sufficient to meet the increased demand of 1051 TMT during the year 2014-15. Therefore there is a requirement of setting up a new LPG Bottling Plant in the state of Tamil Nadu.

Presently, there are no IOCL bottling plants in down south of Madurai, i.e. in the districts of Tirunelveli, Tuticorin, Kanyakumari and Nagercoil. There is a backlog at times during monsoon season and festival seasons. In order to overcome this problem, a bottling plant is very much necessary to be established in Tirunelveli to cater to the customers in the above districts so that there would not be a shortfall in supplies and customers will not be affected on any account.

e. DESCRIPTION OF CURRENT PROPOSAL

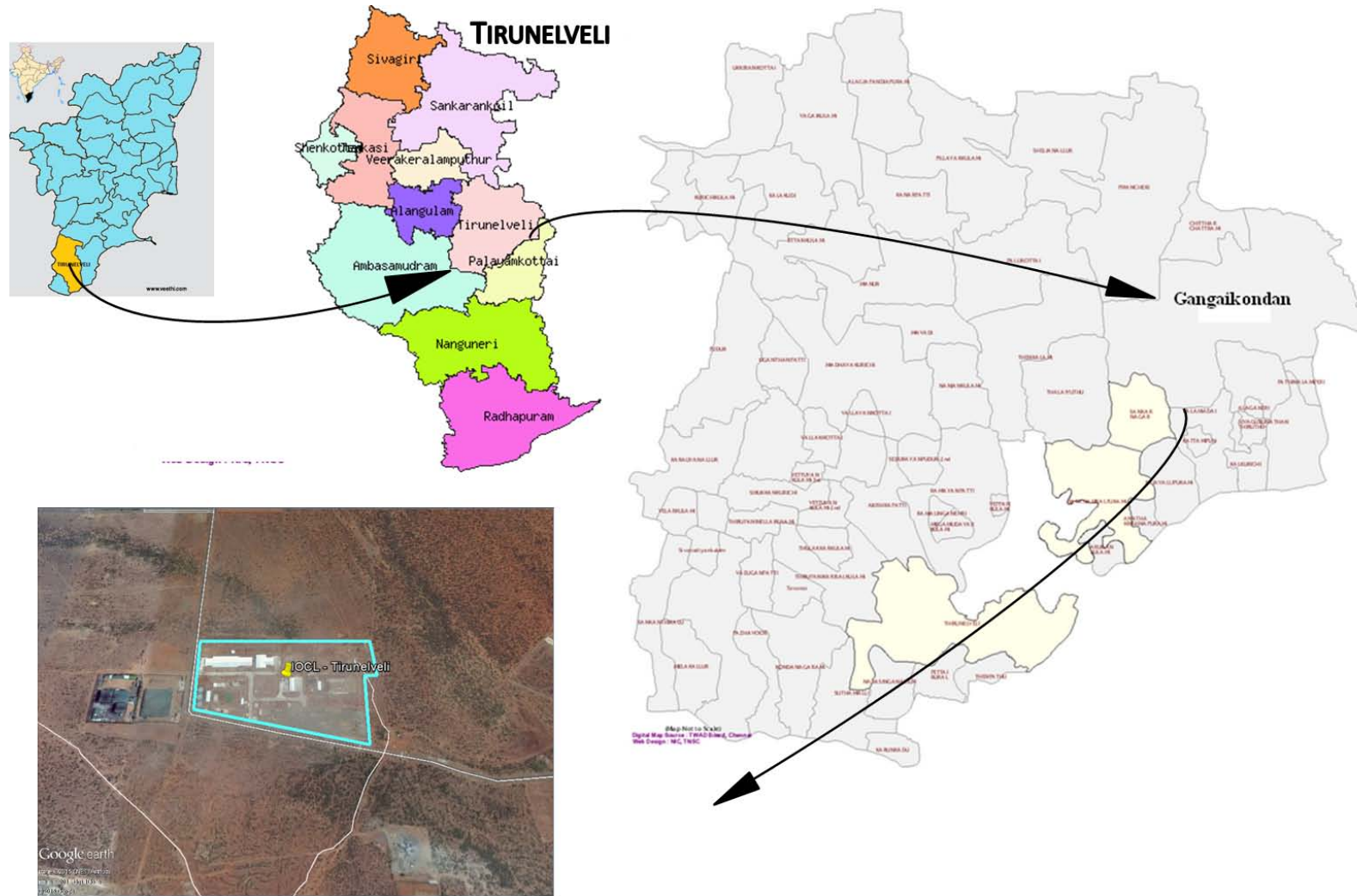
The present proposal has been submitted to MoEF-CC for obtaining EC for the existing bulk LPG storage capacity of 1800MT to achieve the consented LPG bottling throughput of 1,20,000MTPA. The throughput will be achieved by installing two LPG cylinder Filling Carousels each having 24 Filling Machines within the existing plant.

B. SITE ANALYSIS

M/s. Indian Oil Corporation Ltd has set up the Indane Bottling Plant located at S.F nos. B37/pt to B43/pt, B50/pt, B51/pt, C30 to 41 etc. at SIPCOT Industrial Growth Centre, Gangaikondan village, Tirunelveli Taluk & District. The Google map showing the project site is given in **Figure 2.1**. The general location of the project area is shown in **Figure 2.2**.



FIGURE 2.1 GOOGLE IMAGE OF PROJECT SITE



INDANE BOTTLING PLANT, SIPCOT

FIGURE 2.2 LOCATION MAP OF PROJECT SITE

a. CONNECTIVITY

The project site is well connected by road and rail network. The project site is located adjacent to NH 7 which connects Varanasi & Kanyakumari. Gangaikondan Railway Station is located at the distance of 4km (E). Tuticorin Airport is located at the distance of 33.55km (SW). Map showing the road network around the site is given in **Figure 2.3**.

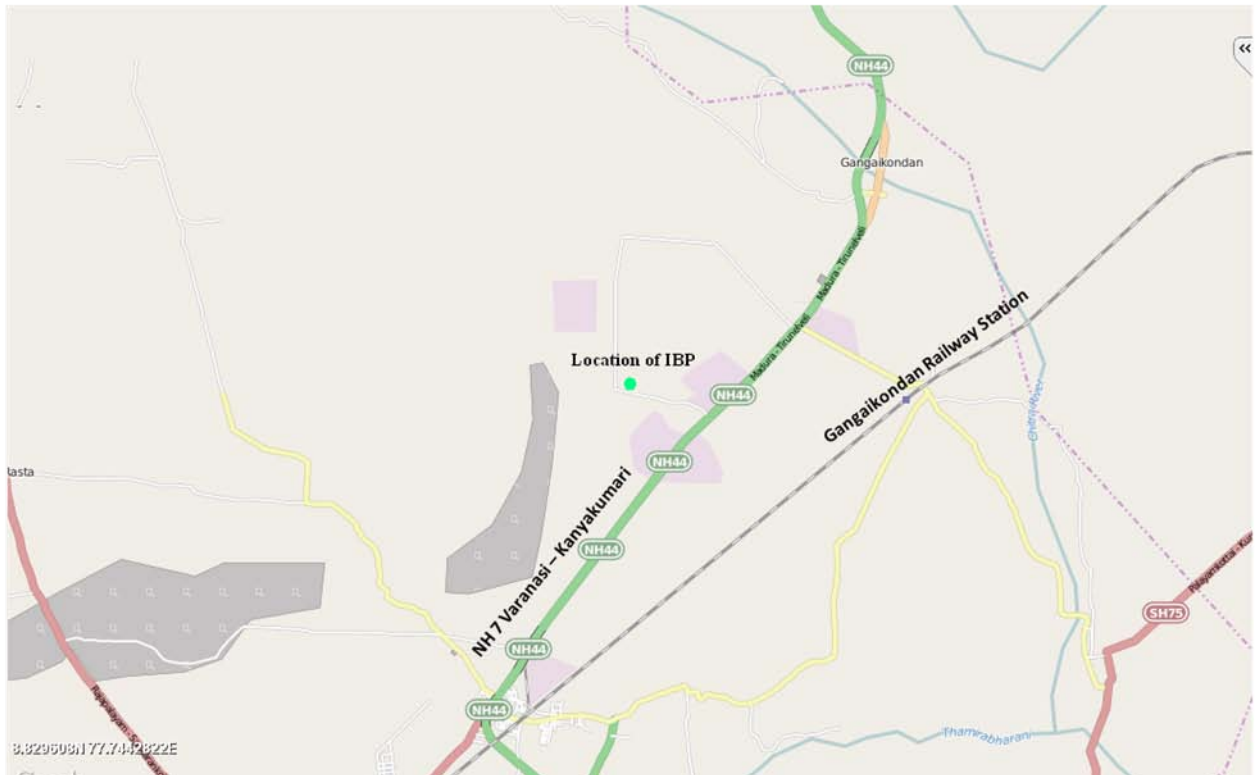


FIGURE 2.3 CONNECTIVITY MAP

b. SITE CHARACTERISTICS

Table 2.1 Environmental Settings of the Project Site

S. No.	Particulars	Details
1	Latitude	8°49'50.10"N
2	Longitude	77°44'41.27"E
3	Site Elevation above MSL	0 m
4	Topography	Plain
5	Present land use at the site	Industrial
6	Nearest highway	National Highway 7 – 850m (SE)
7	Nearest railway station	Gangaikondan Railway Station – 4km (E)
8	Nearest airport	Tuticorin Airport – 33.55 km (SW)

S. No.	Particulars	Details
9	Nearest town / city	Tirunelveli city – 13km (S)
10	Water body	Tamirabarani river – 5.9km (SSE) Gangaikondan kulam – 3.8km (ENE) Indira kulam – 7km (NE) Mannur pond – 11.3km (W) Nainarkulam lake – 11.2km (SSW)
11	Nearest Port	Tuticorin Port – 46km (ESE)
12	Hills / valleys	Nil in 15km radius
13	Archaeologically important places	Nil in 15km radius
14	National parks / Wildlife Sanctuaries/ Eco sensitive zones as per Wild Life Protection Act, 1972	Nil in 15 Km radius
15	Reserved / Protected Forests	Nil in 15km radius
16	Seismicity	Zone III according to the Indian Standard Seismic Zoning Map
17	Defense Installations	Nil in 15km radius

c. CLIMATE

The district enjoys a tropical climate. The period from April to June is generally hot and dry. The weather is pleasant during the period from November to January.

d. TEMPERATURE

The district enjoys a Sub tropical climate. The period from May to June is generally hot and dry. The weather is pleasant during the period from December to January. The mean minimum temperature is 22.9°C and mean maximum daily temperature is 33.5°C respectively.

e. RAINFALL

The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district. Rainfall data from IMD stations over the period 1901-2000 were utilized and a perusal of the data shows that the normal annual rainfall over the district is 879 mm. It is the maximum around Senkottai, Sankarankoil and all along the coast and it decreases towards inland. The areas around Ambasamudram, Tirunelveli and Kadayanallur receive minimum rainfall.

f. RELATIVE HUMIDITY

The relative humidity is on an average between 79 and 84%.

g. GEOMORPHOLOGY

Tirunelveli district is bordered by Western Ghats (Ridge and valley complex) in the West. A major part of the district constitutes a plain terrain with a gentle slope toward East and Southeast, except for the hilly terrain in the west. The general elevation of the area varies from less than 10 to 1408 m amsl (Tulukkapparai hill range). The prominent geomorphic units identified in the district through interpretation of Satellite imagery are Structural Hill, Bazada Zone, Valley Fill, Flood Plain, Pediment, Shallow buried pediment, Deep buried pediment and Coastal Plain.

h. SOIL

Soils in the area have been classified into i) Deep Red soil ii). Red Sandy Soil. iii) Block Cotton Soil. iv) Saline Coastal Alluvium, and v) River Alluvium. Major parts of the area are covered by Deep Red soil and are found in Sivakasi, Tenkasi, Senkottai and Sankarankoil blocks and it is suitable for cultivating coconut and palmyrah trees. Red sandy soil also in reddish yellow in colour and are found in Nanguneri, Ambasamudram, and Radhapuram blocks and it is suitable for cultivating groundnut, millets and pulses etc., The Block Cotton Soil is found in Tirunelveli, Palayankottai and Sankarankoil blocks, and it is suitable for cultivating Paddy, Ragi, and Cholan etc., The Saline Coastal Alluvium are dark grey to deep brown in colour and spread over the Nanguneri and Radhapuram blocks. The River alluvial soils occur along the river courses of Tamrabarani and Chittar river covering in the blocks Tirunelveli and Palayankottai and it is suitable for cultivating Groundnut, Chillies and Cumbu.

i. INFRASTRUCTURE

i. INDUSTRIES

1. SIPCOT INDUSTRIAL GROWTH CENTRE

Industrial Growth Centre, Gangaikondan - SIPCOT.(www.sipcot.com) is located at about 17 KMs from Tirunelveli in a village called Gangaikondan at an area of 2073.86 acres. As on January 2013 there are 13 units functioning at an area of 174.87 acres and 8 units are under construction at about 594.38 acres in Gangaikondan growth Centre.

2. SIDCO INDUSTRIAL ESTATES

To cater to the needs of the entrepreneurs SIDCO has developed three Industrial Estates at Pettai (Tirunelveli), Kesavaneri (Vallioor), Mangalapuram, (Kadayanallur).

3. SPECIAL ECONOMIC ZONE

Sipcot has promoted a multiproduct SEZ at Nangunari called AMRL High Tech City Ltd.

Some industries located in the vicinity of IOCL are shown in the following table,

Table 2.3 List of industries in vicinity of IOCL

- | |
|---|
| <ol style="list-style-type: none">1. Elcot IT Park2. Alliance Tire Group3. M/s.BOSCH Limited.4. M/s.Ramco Industries Ltd.5. M/s.South India Bottling Company Pvt Ltd. |
|---|



C. PROJECT DESCRIPTION

M/s IndianOil Corporation Ltd has set up a LPG cylinder bottling plant i.e. **Indane Bottling Plant (IBP)** at SIPCOT, Gangaikondan village.

Prior to commencing construction activities M/s IOCL have obtained Consent to Establish from Tamil Nadu Pollution Control Board (TNPCB) vide Consent Order No. 5985 dtd. 18.09.2012 (enclosed as **Annexure 2**). Subsequently they have obtained Consent to Operate from TNPCB vide Consent Order No. 23108 dtd. 07.04.2015 (enclosed as **Annexure 3**).

The current proposal has been submitted to MoEF-CC for issuance of Environmental Clearance for the existing bulk LPG storage (1800MT) and the LPG throughput of 1,20,000MTPA through 2 LPG Filling Stations / Carousels.

a. LAYOUT OF PROJECT SITE

The total area occupied by Indane Bottling Plant is approximately 42 acres & has been leased to M/s Indian Oil Corporation Ltd. Land vide documents enclosed as **Annexure 4**. The layout of the plant is shown in **Figure 3.1**.

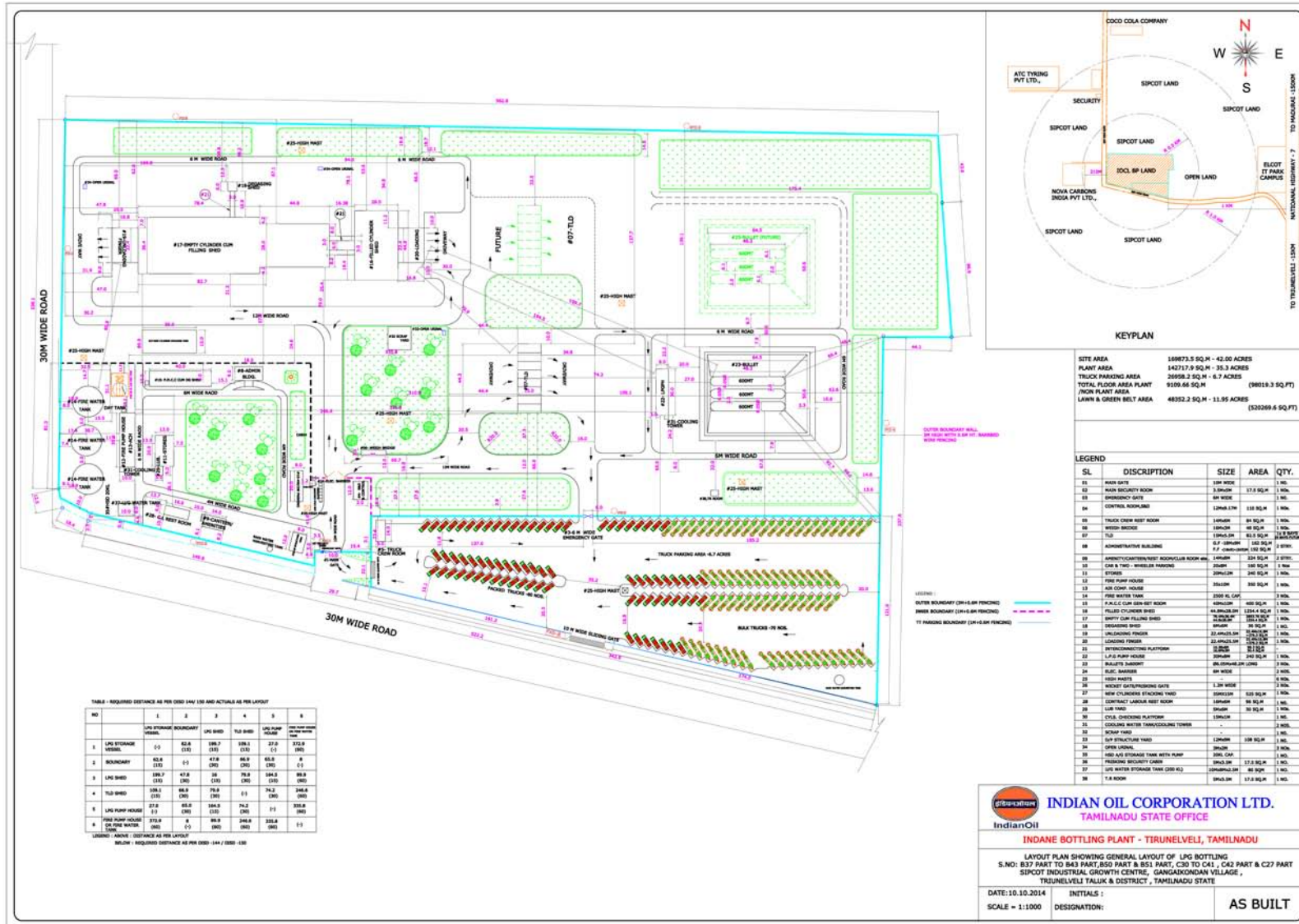


FIGURE 3.1 SITE LAYOUT

b. DETAILS OF ALTERNATE SITES CONSIDERED

The reasons favorable to setting up the Indane Bottling Plant at SIPCOT, Gangaikondan village are,

1. The Plant is located in the SIPCOT Industrial Growth Centre hence basic infrastructure of roads, power, water etc. is readily available.
2. There is an estimated saving of Rs. 14.48 Crores/annum towards logistic cost.
3. The site is located near high demand area.
4. There is no likelihood of any residential development in the vicinity of the Plant.
5. Possible mutual aid in emergency will be available in the Industrial Area.
6. There is potential for future growth in demand.
7. Adequate availability of land within the existing Bottling Plant for future expansion.

c. SIZE & MAGNITUDE OF OPERATION

The **Indane Bottling Plant** has a consented LPG bottling throughput of 1,20,000MTPA and bulk storage capacity is 1800MT (3 mounded bullets x 600MT capacity).

Table 3.1 Details on current proposal

Bulk LPG storage facility (Existing)	LPG bottling throughput (Existing)
3 x 600MT (mounded bullets)	1,20,000MTPA

M/s IOCL have obtained Petroleum & Explosives Safety Organization (PESO) License for the mentioned quantity of LPG storage (enclosed as **Annexure 5**) and NOC from Tamil Nadu Fire & Rescue Services, Tirunelveli Circle (enclosed as **Annexure 6**).

d. PROCESS DESCRIPTION

Indane Bottling Plant at SIPCOT Gangaikondan village will be operated by M/s Indian Oil Corporation Ltd. The plant will function primarily as LPG receipt, storage & bottling unit for filling into cylinders. The plant operations are categorized as,

1. Receipt of product

- a. Transfer of LPG from M/s IndianOil Petronas Pvt Ltd (M/s IPPL) through bullet trucks
- b. Truck unloading
- c. LPG transfer to storage bullets
- d. Storage of LPG in bullets

2. Receipt of empty LPG cylinders & segregation

3. a. Bottling

- e. Pumping of LPG to filling shed
- f. Bottling of LPG cylinders
- g. Quality check on filled cylinders

b. Loading into Trucks

4. Dispatch

- h. Loading of packed cylinders in trucks
- i. Supply & distribution to markets (through Authorized Vendors)

i. RECEIPT OF PRODUCT

LPG dosed with mercaptan will be received from M/s IPPL through bullet trucks. There are 8 nos of Tank Lorry Decantation Bays for the purpose of unloading bullet trucks and the product will be stored in mounded vessels (3 x 600MT storage capacity).

ii. RECEIPT OF EMPTY LPG CYLINDERS & SEGREGATION

Empty LPG cylinders are received from vendor trucks & faulty cylinders are segregated at the point of receipt and diverted towards valve refitting section.

iii. A. BOTTLING

LPG from storage bullets will be pumped to LPG Filling Shed (2 carousels having 24 filling machines each). Cylinder bottling will be the primary process carried out. After filling, each cylinder is subjected to quality check i.e. to check for leaks.

iv. DISPATCH

Filled cylinders are loaded into respective Authorized Vendor trucks and dispatched. Cylinders that are damaged are stored separately and subsequently sold as scrap metal to Authorized Dealers.

e. PROCESS DESCRIPTION

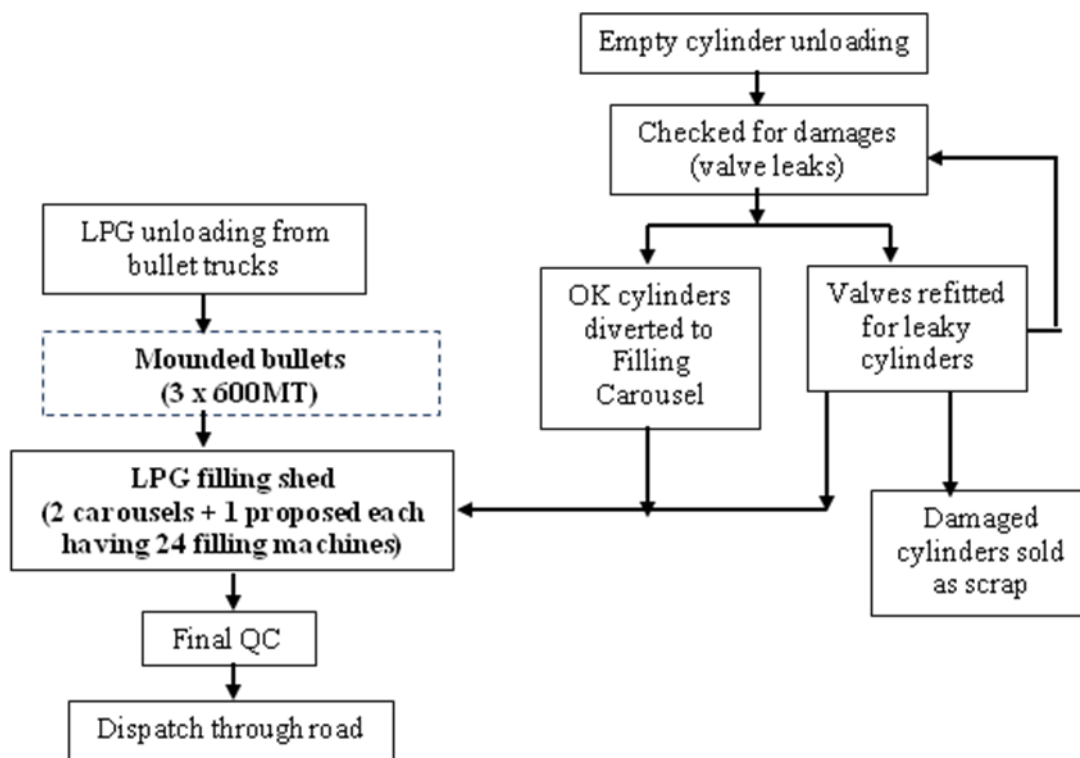


Figure 3.2 Process flow chart

f. RAW MATERIAL REQUIREMENT & MATERIAL BALANCE

LPG is the only input & output for the entire bottling process. LPG is received from M/s IPPL through bullet trucks. The mass balance for the existing bottling capacity has been detailed below,

Table 3.1 Mass balance for LPG bottling throughput (existing & proposed)

Flowrate (cum/hr)	Hours of operation (day ⁻¹)	LPG bottling (Tons /day)	Number of days working (month ⁻¹)	Total throughput (MTPA)
85	8	374	26	1,16,688

g. POWER REQUIREMENT & SOURCE

Power required for the existing operations is 450kVA sourced from Tamil Nadu Electricity Board. D.G sets are used & their specifications are detailed below,

Table 3.2 Details on D.G sets

S. No.	Capacity	Number	Fuel used	Stack height (m)	Stack diameter (in)
1	750	1	HSD BS III	13.5	12
2	250	1	HSD BS III		6

h. MANPOWER REQUIREMENT

The total manpower requirement will be 75 persons which includes,

S. No.	Grade	Number
1.	Officers	6
2.	Workmen (Blue collar)	9
3.	Contract labourers	40
4.	Security	15
5.	Electrical personnel	5

i. WATER REQUIREMENT, SOURCE & WASTEWATER GENERATION

Total water requirement for the plant is 4KLD which is sourced through SIPCOT Industrial Growth Centre, Gangaikondan village. Permission letter is enclosed as **Annexure 4**. Water balance table & diagram are given below

Table 3.3 Water balance table

S. No.	Domestic water requirement (KLD)	Industrial water requirement (KLD)	Domestic sewage generation (KLD)	Wastewater from process / cylinder washing (KLD)*
		Cylinder washing		
1	3	1	2.4	0.8
Total	4		3.2	

** Note – Wastewater generated from cylinder washing will be primarily dirty water with suspended solids. After sedimentation, this water will be reused for cylinder washing. There will be no process / trade effluent generated during operations.*

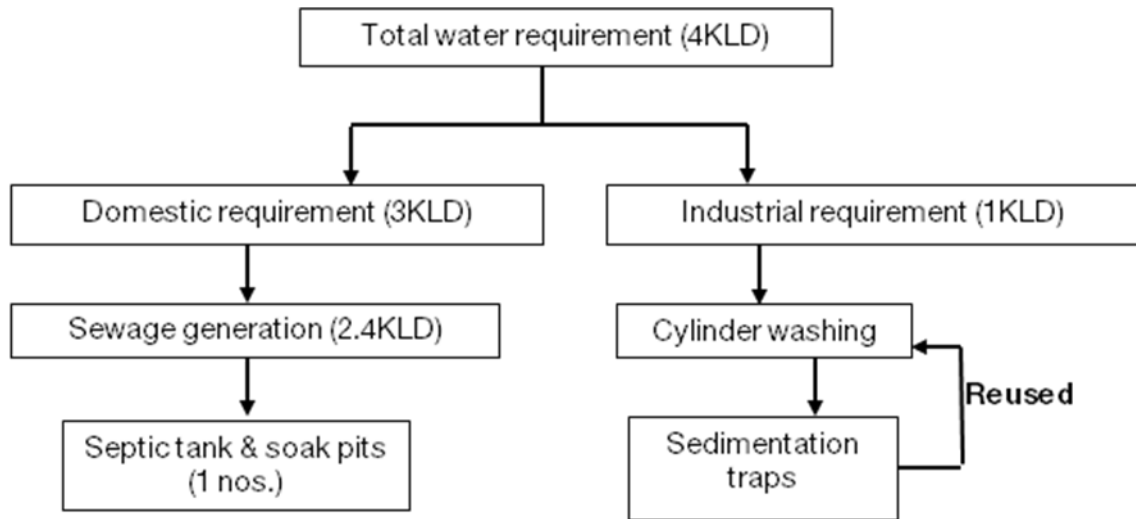


Figure 3.3 Water balance chart

j. INDUSTRIAL WASTE GENERATION & DISPOSAL METHODS

No industrial solid waste will be generated during the bottling process. Damaged cylinders will be segregated & stored on site prior to disposal as scrap metal. Hazardous waste generated from D.G set operation will be disposed to TNPCB Authorized Recyclers.

D. INFRASTRUCTURE REQUIREMENTS

The list of equipments present at the Indane Bottling Plant is

Table 4.1 List of equipments / facilities & number

Sl no	EQUIPMENT	TOTAL NUMBER	CAPACITY
1	LPG PUMPS	2	85 CUM/HR
2	LPG COMPRESSORS	2	3.85CUM/MIN
3	SCREW AIR COMPRESSORS	2	500 CUM/HR
4	MOUNDED BULLET	3x600 MT	1800MT
5	DG SET-1	1	750KVA
6	DG SET-2	1	250KVA
7	AUTOMATIC FILLING TYPE CARAOSAL	2	24 POINT—1600-1800 CYL/HR
8	FIRE ENGINES	3	615CUM/HR
9	JOCKEY PUMPS	2	10CUM/HR
10	LOADING ARMS	8	-
11	AIR DRYER	1	540NM3/HR
12	EVACUATION COMPRESSOR	1	165NM3/HR
13	EVACUATION VESSEL	2	1CUM
14	VALVE CHANGING WITHOUT EVACUATION	2	-
15	AIR RECEIVER-1	1	1.5CUM
16	AIR RECEIVER-2	1	0.5CUM
17	SECURITY AIR COMPRESSOR	2	-

The existing land-use breakup of the project site is,

Table 4.2 Land-use breakup

S. No.	Land use parameter	Area
1.	Process building area	7000 sqm
2.	Non-process building area	2.26 acres
3.	Storage area	3250 sqm
4.	Parking Area	6.7 acres
5.	Driveway & pathway area	6000 sqm
6.	Future expansion area	8 acres
7.	Green belt development area	11.95 acres
8.	Open area	16 acres
9.	Total Area	42 acres

a. AIR POLLUTION CONTROL MEASURES

No emissions are generated during the operations as the entire bottling process is carried out through pipelines from Storage Area to Filling Shed. The only point sources of emissions are D.G sets & Fire Engines. They have been fitted with stacks of adequate height to disperse the pollutants.

Table 4.3 Details on existing APCs

S. No.	Source of emission	Control measure	Material of construction	Top diameter (m)	Height above GL (m)
1	750kVA D.G set & 250kVA D.G set	Stack	MS Pipe	12” & 6”	13.5
2	Fire engines (3 nos.)	Stack	MS Pipe	6”	11

b. WASTEWATER TREATMENT METHOD

Sewage is disposed through septic tanks & soak pits (1 nos.) of dimensions 2m x 1.5m x 1.5m. Washing water generated from cylinder washing will be diverted to sedimentation traps fitted with oil separator & clarified water will be reused for cylinder washing. The dimension of the sump is 2m x 1.5m x 1.5m.

c. FIRE FIGHTING & DISASTER MANAGEMENT MEASURES

M/s IOCL is classified as “Major Accident Hazard (MAH)” Installation under Manufacture, Storage & Import of Hazardous Chemicals (MSIHC) Rules 1989, 2000. Accordingly they have formulated & implemented On-site & Off-site Emergency Plans.

The safety aspects taken into account during pipeline design are,

- Pipelines have been designed in accordance with the requirements of ASME B3.14 and OISD 141.
- Cathodic protection is provided for the pipelines to prevent external corrosion.
- Thickness of the pipeline as provided presently (6.4mm) is more than the calculated thickness (as per design). The calculated thickness is 2.17mm (inclusive of corrosion allowance) for the LPG pipelines.
- The pipelines are being provided with enhanced external corrosion 3LPE coating compared to the standard requirements of DIN 30670, which would significantly improve the in-filed performance of the coating.

M/s IOCL have also conducted a Risk Assessment study. Findings & recommendations of the RA study have been summarized as follows,

- In mounded bullets, catastrophic failure will not take place. They are non-credible scenarios with a very low frequency of occurrence i.e. $1/10^6$ years.
- Hazard distance due to road tanker catastrophic failure and unloading arm failure will not go beyond the plant boundary.
- The individual risk level of 1×10^{-6} /yr is limited to a distance of about 200m on either side of the pipeline corridor.
- Small holes when undetected may lead to large holes in the pipeline system. Large holes are associated with a very low frequency of occurrence and can be considered as rare. The results of such a failure are to be used for developing a meaningful emergency plan. The large hole scenario case (wherein the hazard distances are larger when compared to small holes) can be averted if the leak is determined in the initial stage itself when the leak size is small and the pipeline is isolated immediately on detection of the leak.
- It is advised to have a leak detection system to detect leaks in the pipeline due to small holes. Operator on detection of leak could then isolate this line by closing the valves remotely.



PREFEASIBILITY REPORT

- Majority of pipeline incidents are caused by external interference. This external interference could be due to excavation, drilling etc. Frequent patrolling / full walking surveys of pipeline along the pipeline route will enable to detect, as early as possible, such activities near the pipeline.
- Emergency Response Plan / Disaster Management Plan which would be prepared for the system shall address the action plans to be taken in event of releases from LPG pipelines.

The Hydrant Layout showing location of Fire Hydrants & Water Lines is shown in the following figure.

PREFEASIBILITY REPORT

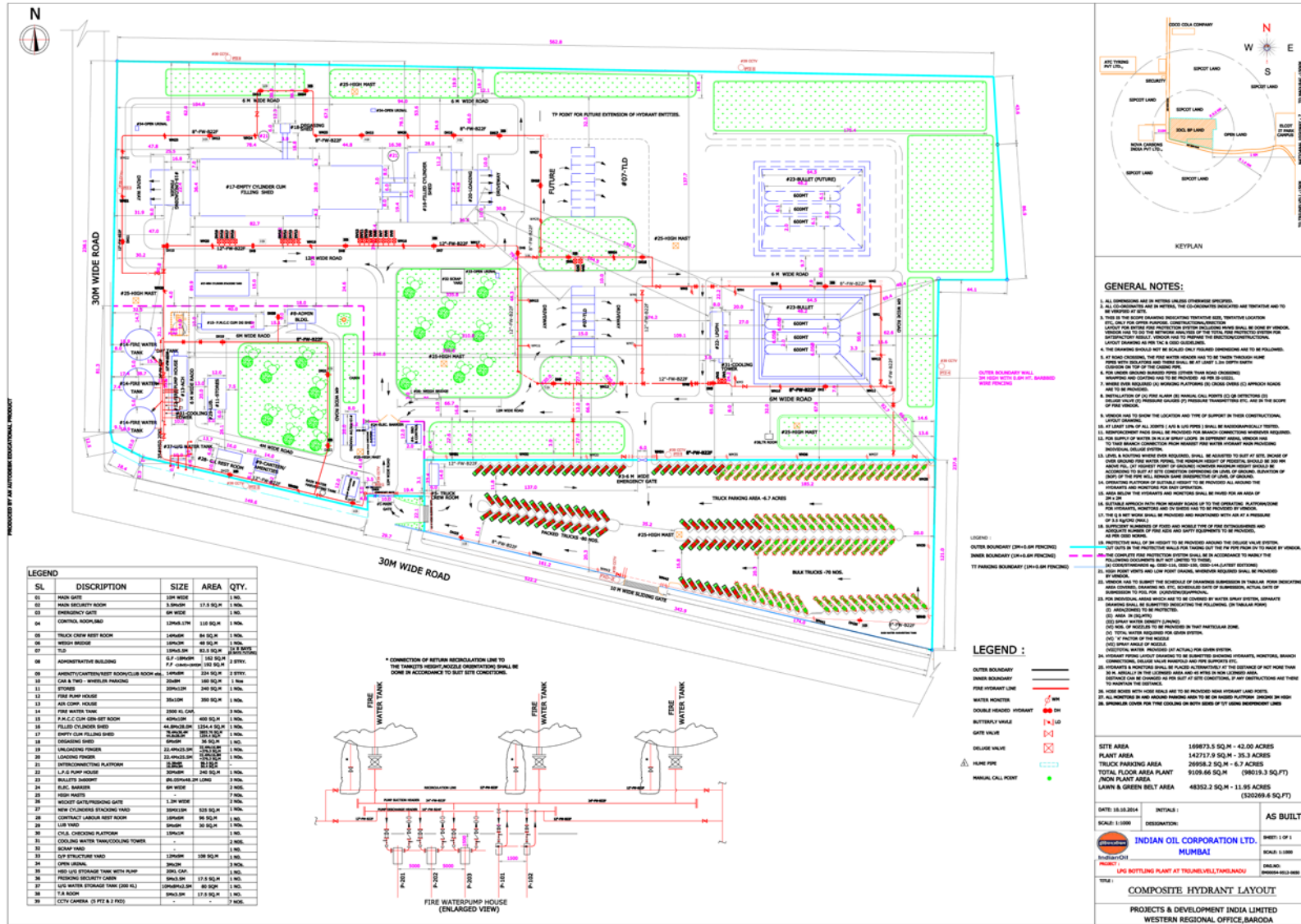


Figure 4.1 Fire Hydrant Layout

d. DESCRIPTION OF MOUNDED BULLETS

The mounded storage of LPG has proved to be safer compared to above ground storage vessels since it provides intrinsically passive and safe environment and eliminates the possibility of Boiling Liquid Expanding Vapour Explosion (BLEVE). The cover of the mound protects the vessel from fire engulfment, radiation from a fire in close proximity and acts of sabotage or vandalism. The area of land required to locate a mounded system is minimal compared to conventional storage. Excavation up to a depth of 0.75 M was done for construction of mounded bullet foundation (Below FGL). Cathodic protection through sacrificial anode method has been provided for all the three bullets for their protection.

i. SAFETY ASPECTS FOR SETTING UP MOUNDED BULLETS

- Mounded tanks are semi-conventional pressure vessels, covered by a layer of soil or sand. By mounding LPG tanks with an adequate layer of sand and earth, the possibility of fire engulfment and a BLEVE is removed.
- Mounded vessel(s) placed on a firm foundation will not suffer from flotation. Thus mounded tanks have the advantage over underground LPG tanks, which require protection against possible floatation.
- Mounding allows safety distances around the facility to be considerably reduced, compared to an equivalent unprotected design.
- The extra cost associated with a mounded system is offset by the lower cost of the land required, and the virtual exclusion of fire fighting systems.
- Mounded systems have also been installed where the available space, or environmental pressure, precluded traditional storage methods.

ii. ENVIRONMENTAL ASPECTS

- Large volume of water required for the fire systems of conventional storage are eliminated thus reducing the demand on valuable water sources, and problems associated with the drainage and disposal of the water.
- Mounded LPG gas tanks can be landscaped to blend with the environment.

e. RAINWATER HARVESTING MEASURES

Storm water drains have been developed to collect run-off water from paved areas. Three recharge pits (2 on-site & 1 truck parking area) have been set up at the site to harvest run-off water. The storm water layout is shown in the following figure.

E. CORPORATE SOCIAL RESPONSIBILITY

M/s IOCL will construct sanitary facilities in nearby Girls Government School as per directive from Ministry. Estimated cost will be Rs 15 lakhs.

F. ENVIRONMENTAL MANAGEMENT PLAN

Sl no	Environmental management plan	Capital costs in Rs	Recurring costs in Rs (Annual)
1	Gardening / Horticulture	5 Lac	2 Lac
2	Rain water Harvesting	3 Lac	0.2 Lac
3	Septic tank / soak pits	3.4 Lac	0.3 Lac
4	Gas monitoring system	46 Lac	1.0 Lac
5	Vapour extraction unit	11.5 Lac	0.3 Lac
6	Monitoring of air and noise pollution	-	0.5 Lac
7	Water water management – cylinder washing unit and In line bath	1.5 Lac	0.2 Lac
Total		70.4 Lac	4.5 Lac

G. PROJECT COST & IMPLEMENTATION SCHEDULE

Cost for setting up the Indane Bottling Plant at SIPCOT, Gangaikondan village is estimated at 78.58 crores. Upon obtaining Environmental Clearance, M/s IOCL will commence LPG bottling at the Indane Bottling Plant.