Shop No. 19, Bhoomi Oscar
Plot No. 16/17, Sector 9,
Ghansoli, Navi Mumbai - 400701.
Email : neelkanthico@gmail.com

NEELKANTH
INFRATECH CO.

13.04.2017

To,
The Director,
IA-III Division,
Ministry of Environment Forests and Climate Change, (IA-III Division)
Indira Paryavaran Bhawan,
Jor Bagh Road,
New Delhi - 110 003

Subject : Submission of point wise reply raised by Hon'ble EAC during 13th meeting of Expert Appraisal Committee (Infra-2) for Projects related to All ship breaking yard including ship breaking unit, Airport, Common Hazardous Waste Treatment, Storage and Disposal Facilities, Ports and Harbours, Aerial Ropeways, CETPs, Common Municipal Solid Waste Management Facility, Building/Construction Project, Townships and Area Development projects held on 23rd - 25th January, 2017 for the Proposed Residential and commercial development of Sunberry at Plot No. -26, Sector- 8, Ghansoli, Navi Mumbai, District, Thane, Maharashtra by M/s. Neelkanth Infratech Co. –Environmental Clearance - [F.No.21-95/2016-IA-III][IA/MH/MIS/60828/2016] listed as item number- 13.3.19

Dear Sir,

With reference to the above subject of 13thMoM of EAC, M/s Neelkanth Infratech Co. Project Sunberry is located at Plot No. 26, Sector-8, Ghansoli, Navi Mumbai and We hereby submitting point wise reply:

i.	Land use of the propose project site. **Compliance:**As per the Sanctioned Demarcation Plan, present land use of the proposed project site for residential Purpose. Please refer the Enclosure No. 1.
ii.	Copy of approved Sanction plan. Approval of the project from High Rise Building Committee of Maharashtra. **Compliance:** Please refer Enclosure No. 2 for proposed building sanction plan and application copy to Navi Mumbai Municipal Corporation for High Rise Committee approval dated 1stmarch 2017. Since, High rise committee approval is still in process due to delay at the committee level, hereby we request you to consider our project and recommend for environment clearance on subject to receipt of High Rise Committee approval and on receive we will submit the receipt.

For NEELKANTH INFRATECH CO.

PARTNER

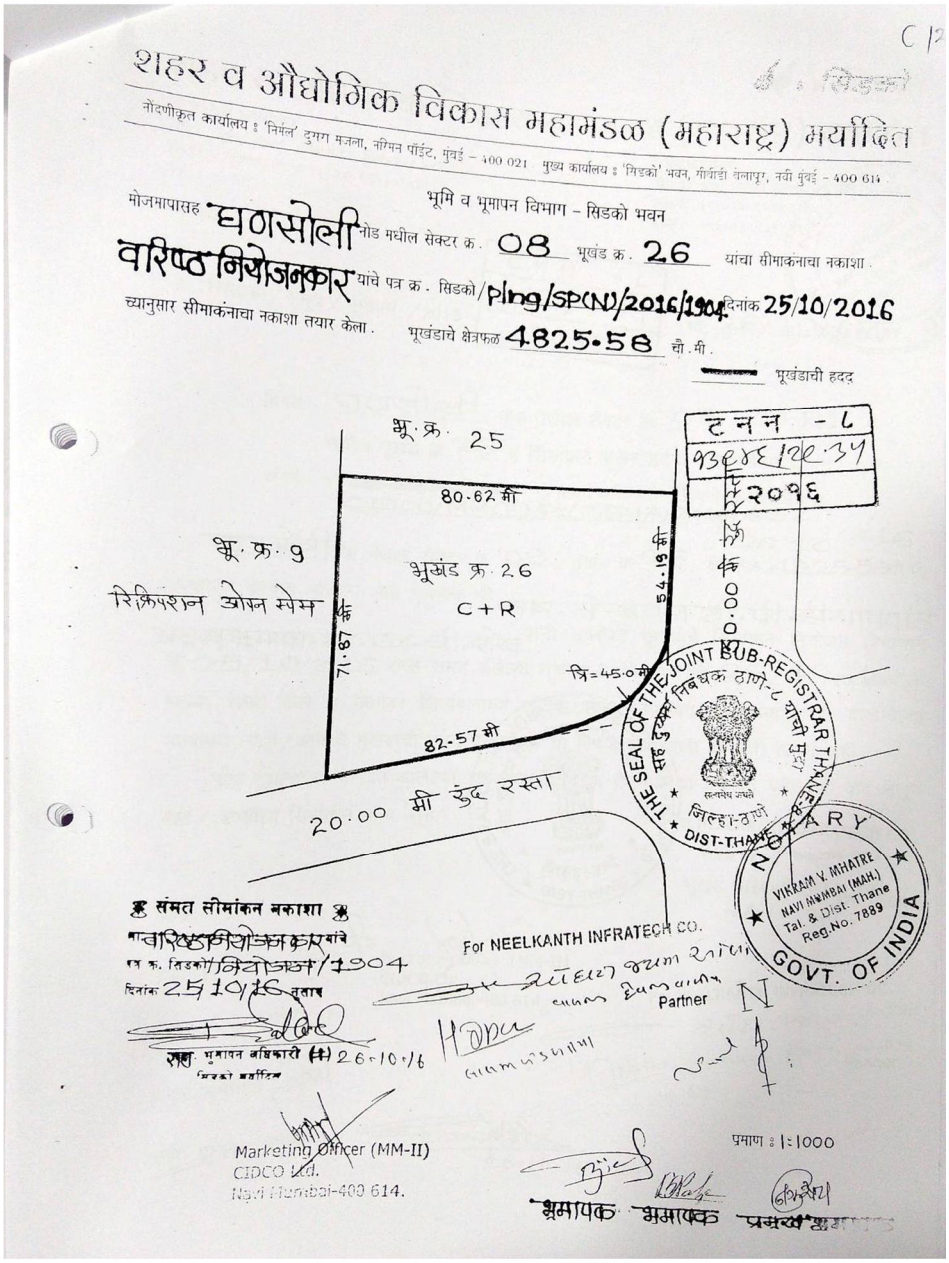
iii.	Give a conformity status to conditions stipulated in Annexure XIV of the amended EIA notification of 09-12-2016. **Compliance:** We complied the conditions stipulated in Annexure XIV of the amended EIA notification of 09-12-2016 in our project. Please refer the Enclosure No. 3.
iv.	Status project proposal in the SEIAA, Maharashtra. **Compliance:** We have withdrawn our proposal No. SIA/MH/MIS/59971/2016 of Neelkanth Infratech Co., Project Sunberry from MoEF website and also submitted the withdrawn letter to Member Secretary, State Environment Impact Assessment Authority, Mantralaya, Mumbai dated December 8, 2016. Please refer the Enclosure No. 4.
v.	Layout plan indicating road, greenbelt, drainage, sewer line, STP, solid waste handling area, rain water harvesting structure, etc. in different colour to be Furnished. **Compliance:** Please Refer Enclosure No. 5 as Ground Floor- Utilities Plan along with indicating road and greenbelt area.
vi.	Layout of parking plan indicating entry and exit points of vehicular movement as Well as traffic management plan. Highlight the fire tender pathway. **Compliance:** kindly refer Enclosure No. 6 for Parking Plan and Traffic movement on Ground, first, second and third floor and enclosure No. 7 for fire tender movement plan.
vii.	Prediction of ground level concentration of emissions from stack due to DG sets. **Compliance:** Please refer Enclosure No. 8 for prediction of ground level concentration of emission from stack due to DG sets.
viii.	Efforts shall be made to reduce the capacity of DG sets. **Compliance:** We proposed 1 DG set of 320 KVA with adequate acoustic enclosure for emergency power back up. External landscape lights and two light + one fan in each apartment are considered on solar power. Please refer attached calculations in Enclosure No. 9 for DG set details and energy conservation via solar energy.
ix.	At least 2 solar powered lights and one fan shall be provided in each flat. Solar Generation shall be connected to the grid. **Compliance:** We already complied with the same. Kindly refer Enclosure No. 9 for energy conservation via solar energy. Kindly refer Enclosure No. 10 for solar panel layout.
x.	Increase the area earmarked for solid waste management facilities.

	Compliance: The area requirement for OWC has been revised. • Space required for waste storing and segregation will be 5.00 m. X 5.00 m. i.e. 25.00 sq.m • Area required: Cabin Space for Kesari Fully Automatic OWC = 4m x 5 m + extra clearance space around machine: 30.00 sq.m • Total Area Required for Waste Management Processing of the Project = 45. 00 sq.m • Total Area Requirement = 100.00 sq.m Kindly refer Enclosure No. 4 for location of OWC.
xi.	Details energy conservation measures to be taken. taken (all points mentioned in the proposal such as orientation to support reduced heat gain, use of ASHRAE 90.1, use of ECBC compliant envelope measures to be supported through drawings and details in the proposal. **Compliance:** We already complied with the same. Kindly refer Enclosure No. 11.
xii.	Increase the area for greenbelt. Layout plan indicating Greenbelt along with area Earmarked to be provided. **Compliance:** We have assessed the possible green area on ground floor and provided as possible on ground- 483.567 Sq. Mt. and on podium floor- 500.584 Sq. Mt. Kindly refer Landscape layout plan on ground and podium as Enclosure No. 12.

For NEELKANTH INFRATECH CO.

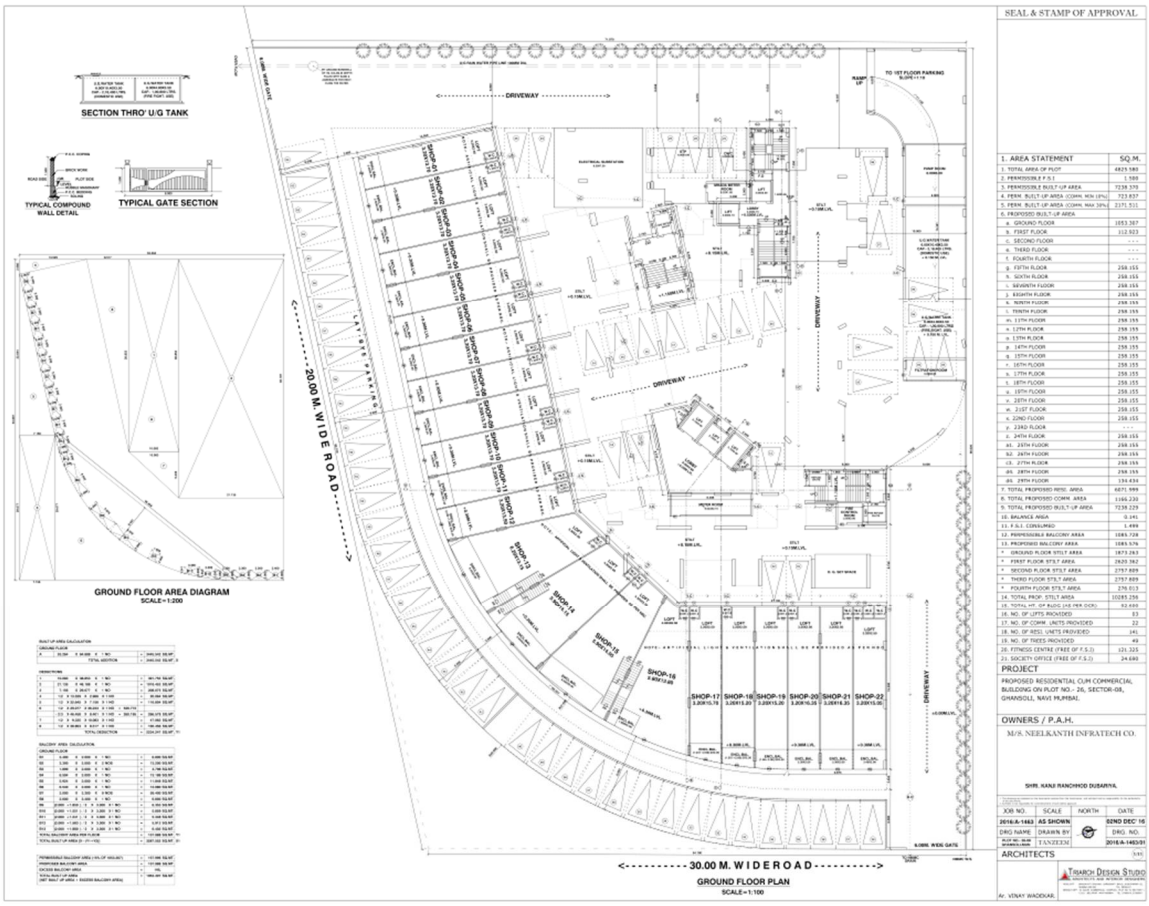
PARTNER

Enclosure 1: Demarcation Plan



Enclosure 2: Approved Sanction Plan and Acknowledgment copy High Rise Committee, Navi Mumbai, Application.

Proposed Sanction Plan



Acknowledgement copy of HRC Application

TRIARCH DESIGN STUDIO

ARCHITECTS AND INTERIOR DESIGNERS

Date : 01st Mar' 2017.

To,
The A.D.T.P.,
Navi Mumbai Municipal Corporation,
Sector 15-A, C.B.D., Belapur, Navi Mumbai.

Sub: Proposed High Rise Building on Plot No. 26, Sector 08, Ghansoli, Navi Mumbai.

Sir,
With reference to the above mentioned subject we are submitting herewith the following documents:

1. Appendix A showing Project Personnel on Records (8 sets - Hard + soft CD copies).
2. Architectural Drawings and Report (8 sets - Hard + soft CD copies).
3. Appendix B showing Plot & Geotechnical information (8 sets - Hard + soft CD copies).
4. NMMC/HRC/DBR/V1 showing design basis report (8 sets - Hard + soft CD copies).
5. NMMC/HRC/CHK-LST-STR-ENG/V1 and Appendix C (I & II) from Structural Engineer (8 sets- Hard + soft CD copies).
6. ECG V1 and EPPP-V1 from Environmental Consultant (8 sets - Hard + soft CD copies).

You are requested to scrutinize the proposal & give High Rise clearance at your earliest.

For **TRIARCH DESIGN STUDIO,**

Ar. Vinay Wadekar.

3/3/17
लेखनिक
नगररचना विभाग
नवी मुंबई महानगरपालिका

Regd. Office : Bhagvati Bhuvan, Saraswati Baug, Jogeshwari (E), Mumbai - 400 060. Tel.: 28354441, 28365599
Branch Office : 18, Gauri Commercial Complex, Plot No. 19, Sector - 11, C.B.D., Navi Mumbai - 400 614. Tel.: 022 49245567 / 27580810

Enclosure 3: Annexure XIV

Medium	**S.N**	**Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters**	**Compliance**
Topography and Natural Drainage	1	The natural drain system should be maintained for ensuring unrestricted flow of water.	Building has been designed following natural topography & slopes. Project layout superimposed on Google image is attached. Kindly refer Enclosure No. 13.
		No construction shall be allowed to obstruct the natural drainage through the site.	Proposed project not affecting the natural drainage system.
		No construction is allowed on wetland and water bodies.	It is a residential development and the project does not fall under any wetland as per National Wetland Atlas of Maharashtra, Kindly refer the wetland map of Thane district as Enclosure No 14.
		Buildings shall be designed to follow the natural topography as much as possible.	Building has been designed following natural topography & slopes. Project layout superimposed on Google image is attached. Kindly refer Enclosure No. 13.
		Minimum cutting and filling should be done.	Approximately 7238.37 cum of soil generated due to excavation. Excavated soil already been used for land levelling & excess handed over to Authorized Vendor for disposal.
		Check dams, bios wales, landscape, and other sustainable urban drainage systems (SUDS) are allowed for maintaining the drainage pattern and to harvest rain water.	Rain water harvesting system is proposed in the project. Please refer Enclosure 15.
Water Conservation, Rain Water	2	A complete plan for rain water harvesting, water efficiency and conservation should be prepared.	Roof top Rain Water available during monsoon period to harvested in RWH tank having minimum storage capacity of 17.73 Cum. for minimum two

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
Harvesting, and Ground Water Recharge			days of total fresh water requirement. Detail RWH calculation is provided in Enclosure No. 15. Harvested rain water will be treated in water treatment plant & to be reused in Domestic Purpose to carter Municipal Demand during monsoon period. Layout showing RWH tank location along with WTP in Enclosure No.5.
		Use of water efficient appliances should be promoted with low flow fixtures or sensors.	Water efficient appliances with low flow fixtures or sensors will be used in the project.
		The local bye-law provisions on rain water harvesting should be followed. If local bye-law provision is not available, adequate provision for storage and recharge should be followed as per the Ministry of Urban Development Model Building Byelaws,2016. A rain water harvesting plan needs to be designed where the recharge bores of minimum one recharge bore per 5,000 square meters of built up area and storage capacity of minimum one day of total fresh water requirement shall be provided. In areas where ground water recharge is not feasible, the rain water should be harvested and stored for reuse. All recharge should be limited to shallow aquifer.	Roof top Rain Water available during monsoon period to harvested in RWH tank having minimum storage capacity of 17.73 Cum. for minimum two days of total fresh water requirement. Detail RWH calculation is provided in Enclosure No. 15.
		The ground water shall not be withdrawn without approval from the Competent Authority.	We are not withdrawing ground water for this project.

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
	2(a)	At least 20% of the open spaces as required by the local building bye-laws shall be pervious.	Detail calculation showing 22% of the open spaces as required by the local building bye-laws is provided. Kindly refer Enclosure No. 16.
		Use of Grass pavers, paver blocks with at least 50% opening, landscape etc. would be considered as pervious surface.	
Waste Management	3	Solid waste: Separate wet and dry bins must be provided in each unit and at the ground level for facilitating segregation of waste.	For collection of MSW separate colour coded bins will be provided to each flat (Green- For Biodegradable Waste & Blue – For Non-biodegradable waste) & at ground level storage space for facilitating segregation of waste. Kindly refer Enclosure No. 17 for solid waste calculation and management. Kindly refer Enclosure No. 5 for OWC Location.
		Sewage: Onsite sewage treatment of capacity of treating 100% waste water to be installed.	Onsite STP is provided with Microfiltration technology based on KSQ Flat sheet Membrane; Kindly refer Enclosure No. 18 for brief description of technology. Treated waste water shall be reused on site for landscape, flushing, and other end-uses. Excess treated water shall be discharged as per CPCB norms. Layout showing location of STP is provided in Enclosure No. 5
		Sludge from the onsite sewage treatment, including	Sludge generated from STP will be used as manure &

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
		septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.	excess will be handed over to Authorized Recyclers for disposal. Copy of undertaking to supply the non-biodegradable waste is attached as Enclosure No. 19.
		The provisions of the Solid Waste (Management) Rules 2016 and the e-waste (Management) Rules 2016, and the Plastics Waste (Management) Rules 2016 shall be followed.	Being a residential project it is assumed major e-waste will not be generated.
	3(a)	All non-biodegradable waste shall be handed over to authorized recyclers for which a written tie up must be done with the authorized recyclers.	Non-biodegradable waste generated from project site will be handed over to authorized recyclers. Copy of undertaking is attached as Enclosure No. 19
	3(b)	Organic waste composter/ Vermiculture pit with a minimum capacity of 0.3 kg /person/day must be installed.	Detail calculation of solid waste generated from site considering 0.45 kg /person/day is shown in the Enclosure No. 17 Area requirement for Organic waste composter/ Vermiculture pits is provided.
Energy	4	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States which have notified their own ECBC, shall comply with the State ECBC. Concept of passive solar design that minimize energy consumption in buildings by using design elements, such as building orientation, landscaping, efficient building envelope, appropriate fenestration, increased day lighting design and thermal mass etc. shall be incorporated in the building design.	Building complied ECBC norms. Detail energy modelling report is enclosed as Enclosure No. 11.

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
		Wall, window, and roof u-values shall be as per ECBC specifications.	
		Outdoor and common area lighting shall be LED.	Lighting scheme is provided for considering energy saving measures. Kindly refer Attachment No. 9 for Energy saving measures.
	4(a)	Solar, wind or other Renewable Energy shall be installed to meet electricity generation equivalent to 1% of the demand load or as per the state level/ local building bye-laws requirement, whichever is higher.	Detail energy saving calculation is provided showing electricity generation equivalent to 1% of the demand load or as per the state level/ local building bye-laws requirement, whichever is higher by using Solar, wind or other Renewable Energy. Please refer Attachment No. 9.
	4(b)	Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirement of the local building bye-laws, whichever is higher.	Rooftop layout showing solar PV is provided. Kindly refer Attachment No. 10 for solar PV Location.
		Residential buildings are also recommended to meet its hot water demand from solar water heaters, as far as possible.	Rooftop layout showing solar PV is provided. Kindly refer Attachment No. 10.
	4(c)	Use of environment friendly materials in bricks, blocks and other construction materials, shall be required for at least 20% of the construction material quantity. These include fly ash bricks, hollow bricks, AACs, Fly Ash Lime Gypsum blocks, Compressed earth blocks, and other environment friendly materials. Fly ash should be used as building material in the construction as per the provisions of the Fly Ash Notification of September, 1999 as amended from time to time.	We will comply with the same.

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
Air Quality and Noise	5	Dust, smoke & other air pollution prevention measures shall be provided for the building as well as the site. These measures shall include screens for the building under construction, continuous dust/ wind breaking walls all around the site (at least 3 meter height). Plastic/tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, murram and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. Wheel washing for the vehicles used be done. Sand, murram, loose soil, cement, stored on site shall be covered adequately so as to prevent dust pollution. Wet jet shall be provided for grinding and stone cutting. Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust. All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed. All demolition and construction waste shall be managed as per the provisions of the Construction and Demolition Waste Rules 2016. All workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or working in any area	Ambient Air Quality Mitigation measure during Construction Phase- Per day 2 tanker will be used for water sprinkling for dust suppression DG sets will be provided with adequate acoustic enclosure for emergency power back up Raw material carrying vehicles with valid PUC will be allowed at site per day. Wheels wash to be done for vehicles plying in and out of the construction site. Periodic Maintenance of construction equipment to be done 3 meter height sheets to be provided for barricading the periphery of the site Plastic/tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, murram and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. All construction and demolition debris shall be stored at the site before they are properly disposed. Sensor based Air Monitoring to be done. Sand, murram, loose soil, cement, stored on site shall be covered adequately so as to prevent dust pollution Dust mask will be provided to workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or working in any area with dust pollution

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
		with dust pollution shall be provided with dust mask.	
		For indoor air quality the ventilation provisions as per National Building Code of India.	Detail of indoor air quality the ventilation provisions will be provided as per National Building Code of India.
	5(a)	The location of the DG set and exhaust pipe height shall be as per the provisions of the CPCB norms.	DG stack height will be calculated as per CPCB norms.
Green Cover	6	A minimum of 1 tree for every 80 sq.mt. of land should be planted and maintained. The existing trees will be counted for this purpose. Preference should be given to planting native species.	Landscape plan is provided showing details of tree plantation along with tree list. Kindly refer Enclosure No. 12.
	6(a)	Where the trees need to be cut, compensatory plantation in the ratio of 1:3 (i.e. planting of 3 trees for every 1 tree that is cut) shall be done and maintained.	Not Applicable
Top Soil preservation and reuse	7	Topsoil should be stripped to a depth of 20 cm from the areas proposed for buildings, roads, paved areas, and external services. It should be stockpiled appropriately in designated areas and reapplied during plantation of the proposed vegetation on site.	Excavation quantity, topsoil preservation is calculated & excavation management plan provided. Kindly refer Enclosure No. 20.
Transport		A comprehensive mobility plan, as per MoUD best practices guidelines (URDPFI), shall be prepared to include motorized, non-motorized, public, and private networks. Road should be designed with due consideration for environment, and safety of users. The road system can be designed with these basic criteria. 1. Hierarchy of roads with proper segregation of vehicular and pedestrian traffic.	Detail Traffic Study is done & Management Plan is provided. Kindly refer Enclosure No. 21.

Medium	S.N	Environmental Condition for Building Category '2': 20,000 to less than 50,000 Square meters	Compliance
		2. Traffic calming measures. 3. Proper design of entry and exit points. 4. Parking norms as per local regulation.	

Enclosure 4: Withdrawn Letter

Shop No. 19, Bhoomi Oscar
Plot No. 16/17, Sector 9,
Ghansoli, Navi Mumbai - 400701.
Email : neelkanthico@gmail.com

NEELKANTH
INFRATECH CO.

Date: 05.12.2016

To,
The Member Secretary,
State Level Expert Appraisal Committee,
Environment Department,
Government of Maharashtra,
New Administration Building,
15th Floor, Mantralaya,
Mumbai- 400032

8.12.16
अवर सचिव
पर्यावरण विभाग
मंत्रालय, मुंबई-३२.

Sub: Request regarding withdrawal of project Sunberry at Plot No. 26, Sector-8, Ghansoli, Navi Mumbai.
Reference No.: SIA/MH/MIS/59971/2016

Respected Sir,

With reference to the above subject, we hereby request you to transfer the above case to Expert Appraisal Committee (Infra-2), Ministry of Environment, Forest and Climate change, Indira Paryavaran Bhawan, Jor Bhag road, New Delhi, as the constituted State Level Expert Appraisal Committee-2, Mumbai, Maharashtra is currently not in force.

Request you to kindly withdrawal our proposal and forward to Expert Appraisal Committee (Infra-2), Delhi.

Thanking you.

Yours faithfully,

For,
Neelkanth Infratech Co.

Authorized Signatory

Acceptance Letter for withdrawal of EC application

---------- Forwarded message ----------
From: <monitoring-ec@nic.in>
Date: Mon, Jan 9, 2017 at 2:35 PM
Subject: Withdraw of EC
To: neelkanthinfratechco@gmail.com
Cc: monitoring-ec@nic.in

Acceptance Letter for withdrawal of EC application

State Environment Impact Assessment Authority

Maharashtra

Member Address

Dated: 09 Jan 2017

To,

NEELKANTH INFRATECH CO

, Thane

Maharashtra , 400705

Subject : Withdraw of EC

Sir,

This has reference to your proposal No. SIA/MH/MIS/59971/2016 dated 26 Oct 2016 regarding withdrawal of Environmental/CRZ Clearance for the above mentioned proposal.

2.0 This is to inform that your request for withdrawal of EC has been accepted in the SEIAA an hence forth, your apllication will be treated as withdrawn.

Yours Sincerely

SEIAA, Maharashtra

Gmail

Srinivasan Kothandaraman <neelkanthinfratechco@gmail.com>

Withdraw of EC

1 message

monitoring-ec@nic.in <monitoring-ec@nic.in> Thu, Dec 8, 2016 at 10:25 AM
To: neelkanthinfratechco@gmail.com
Cc: monitoring-ec@nic.in

Acknowledgement Slip for request of withdrawal of EC application

This is to acknowledge that your request for withdrawal of the EC application(with the following details) has been uploaded on the portal.
Now this request is under consideration of SEIAA portal.

Following should be mentioned in further correspondence

1. Proposal No.	:	SIA/MH/MIS/59971/2016
2. Category of the Proposal	:	Infrastructure and Miscellaneous Projects + CRZ
3. Date of submission for Withdrawal	:	08 Dec 2016

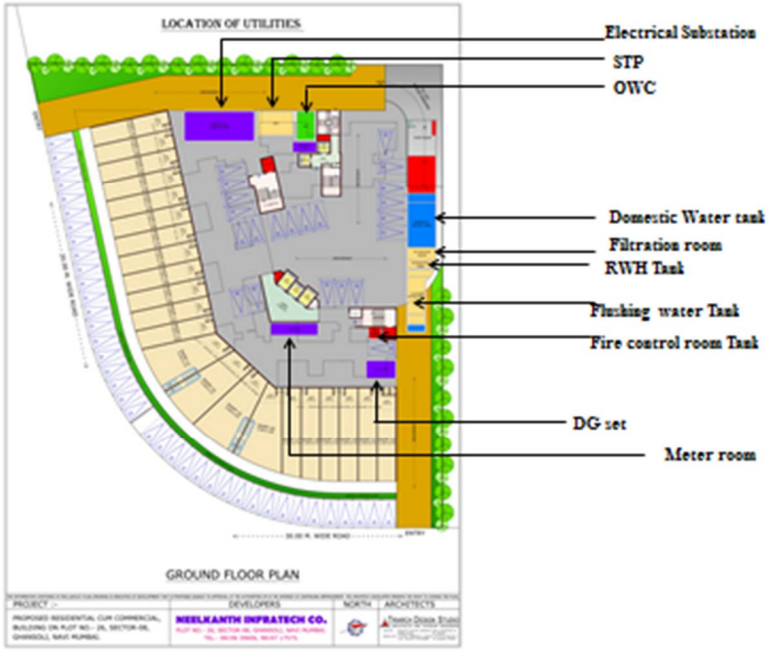
4. Name of the Project proponent along with contact details

a) Name of the proponent	: NEELKANTH INFRATECH CO
b) State	: Maharashtra
c) District	: Thane
d) Pincode	: 400705

After getting approval of competent authority, the acceptance of same will be uploded on SEIAA protal.

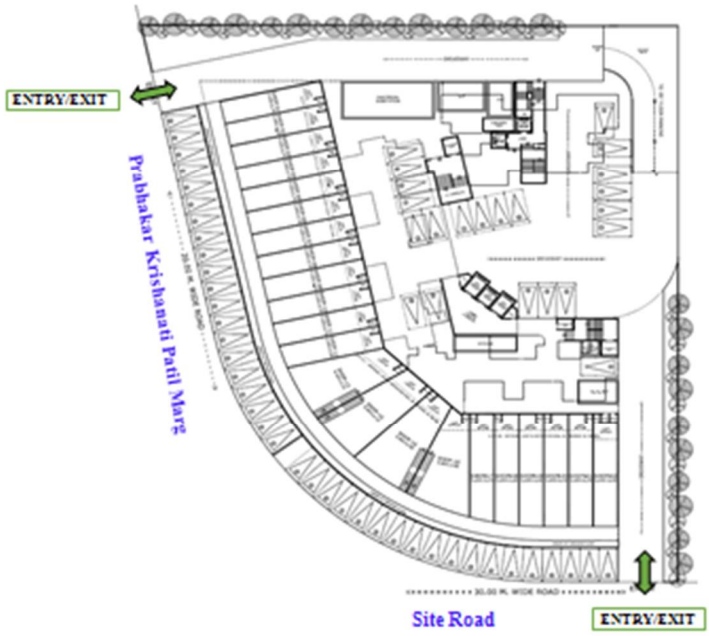
Enclosure 5: Ground Floor Utilities Drawing

LOCATION OF UTILITIES- GROUND FLOOR

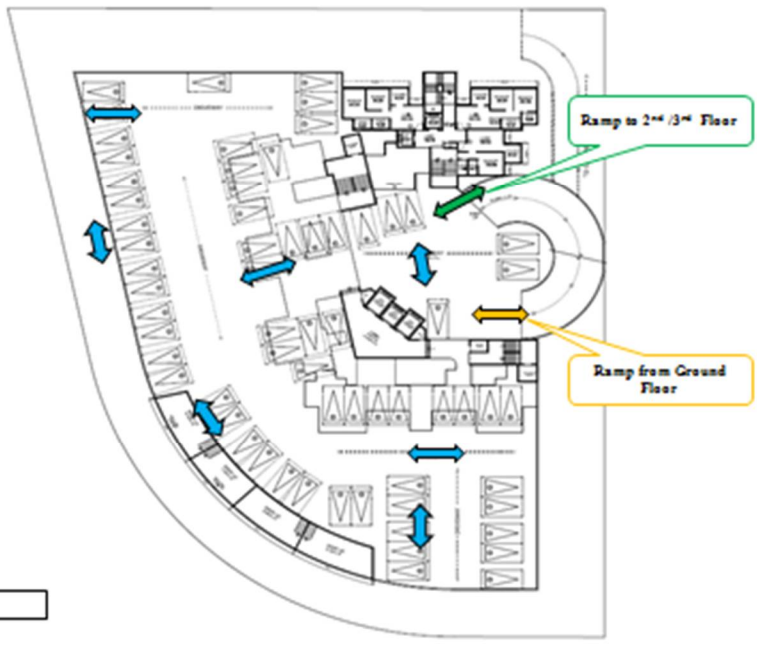


Enclosure 6: Parking Plan and Traffic Movement

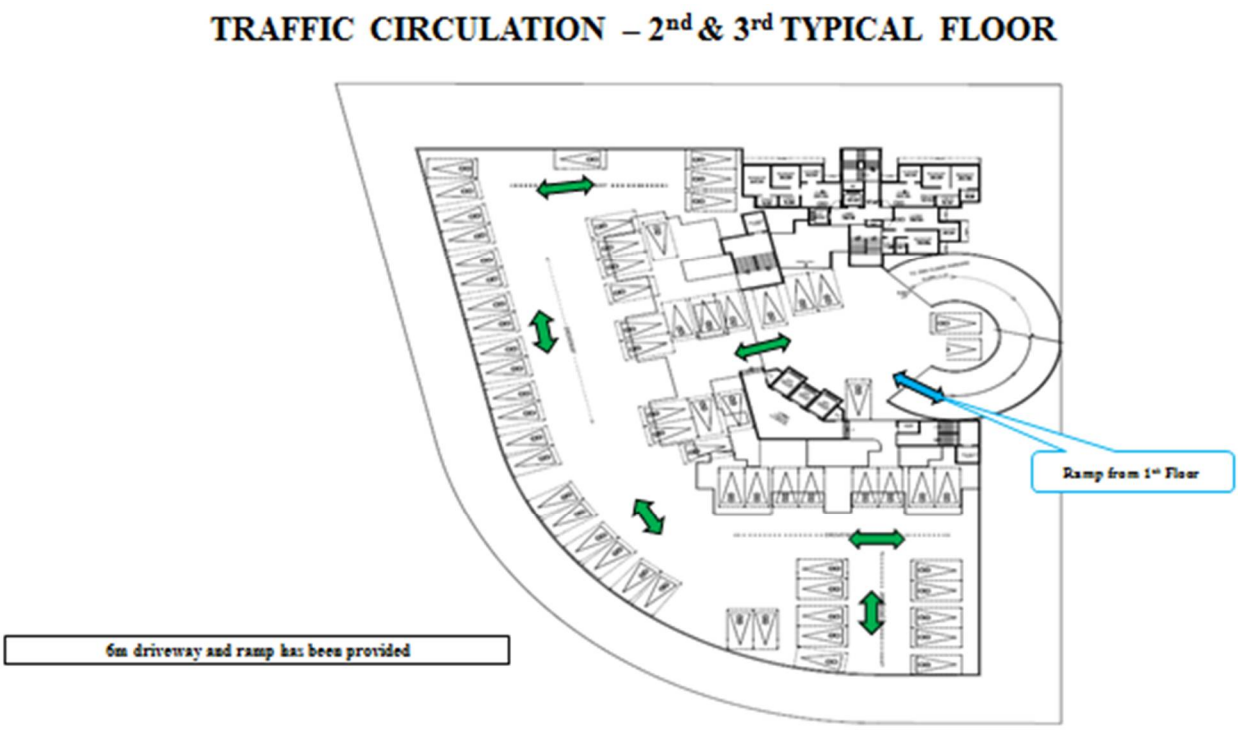
PROJECT ACCESS



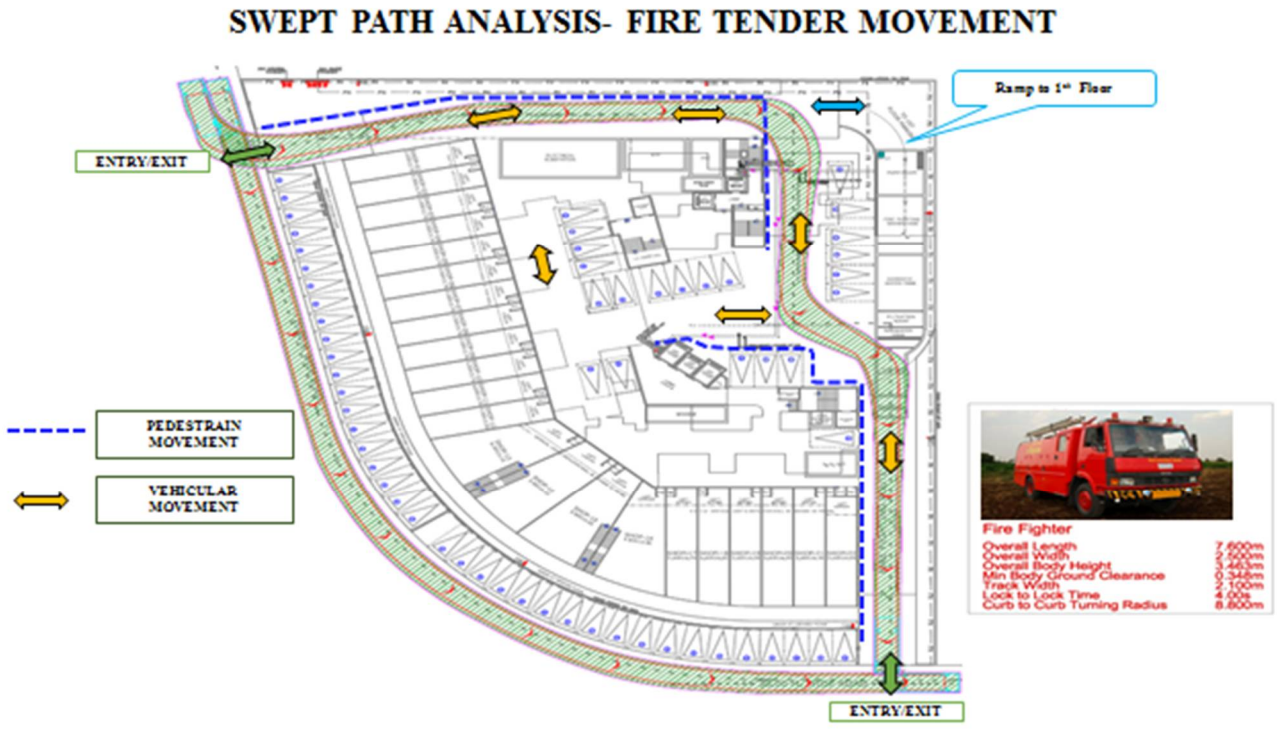
TRAFFIC CIRCULATION – FIRST FLOOR



6m driveway and ramp has been provided



Enclosure 7: Fire Tender Movement Plan



Enclosure 8: Cumulative Assessment of Ground Level Concentration of DG Set's & Road Traffic

Baseline Data For Refereed To Understand the Current Scenario

For Assessment of Ground level Concentration we have taken the Baseline Values of Airoli Meteorological station installed by CPCB.

DG set, Project Traffic & Traffic of adjacent roads are considered as source of pollutants.

CENTRAL POLLUTION CONTROL BOARD

CONTINUOUS AMBIENT AIR QUALITY

Date : Monday, January 23, 2017
Time :1:08:39 PM

State: Maharashtra
City: Mumbai
Station: NMMC Airoli
Parameter: NOx,CO,PM10
AvgPeriod: Annual Average
DateFrom: 2016
DateTo: 2016

Maharashtra, Mumbai, NMMC Airoli (Industrial Residential Rural and Other Area)

Parameter	Date	Concentration	Unit	Prescribed Standard	Exceeding Standard? (Yes/No)	Remarks
Oxides of Nitrogen(NOx)	2016	51.00	ppb	NA	NA	

The Avearge value of Oxides of Nitrogen(NOx) is 51.00 ppb
There is **No** instance when data has exceeded Prescribed Standard of **Oxides of Nitrogen(NOx)**.

Maharashtra, Mumbai, NMMC Airoli (Industrial Residential Rural and Other Area)

Parameter	Date	Concentration	Unit	Prescribed Standard	Exceeding Standard? (Yes/No)	Remarks
Carbon Monoxide(CO)	2016	2.09	mg/mÂ³	4.00 mg/mÂ³	No	

The Avearge value of Carbon Monoxide(CO) is 2.09 mg/mÂ³
There is **No** instance when data has exceeded Prescribed Standard of **Carbon Monoxide(CO)**.

Maharashtra, Mumbai, NMMC Airoli (Industrial Residential Rural and Other Area)

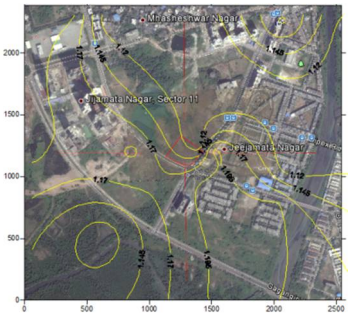
Parameter	Date	Concentration	Unit	Prescribed Standard	Exceeding Standard? (Yes/No)	Remarks
PM_{10}(PM_{10})	2016	66.82	Âµg/m3	100.00 Âµg/m3	No	

The Avearge value of PM10(PM10) is 66.82 Âµg/m3
There is **No** instance when data has exceeded Prescribed Standard of **PM10(PM10)**.

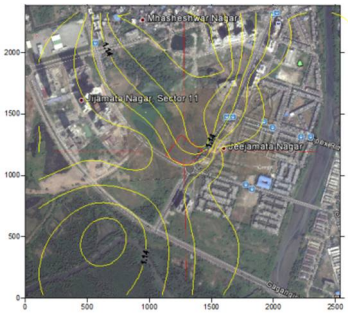
Cumulative Assessment of Ground Level Concentration of DG Set's & Road Traffic

Sr. No.	Coordinates of Receptors		Concentration (ppm)		
	X	Y	2016	2020	2030
1	146	902	1.1	1.2	1.2
2	253	891	1.1	1.1	1.1
3	537	860	1.2	1.1	1.1
4	763	883	1.1	1.2	1.2
5	959	852	1.2	1.1	1.2
6	580	728	1.1	1.1	1.1
7	666	696	1.1	1.1	1.2
8	28	486	1.1	1.2	1.2
9	326	499	1.1	1.2	1.2
10	519	516	1.1	1.1	1.1
11	783	453	1.1	1.1	1.2
12	528	391	1.2	1.2	1.2
13	747	339	1.1	1.2	1.2
14	233	246	1.1	1.1	1.1
15	573	61	1.1	1.2	1.2
16	560	502	1.2	1.2	1.2

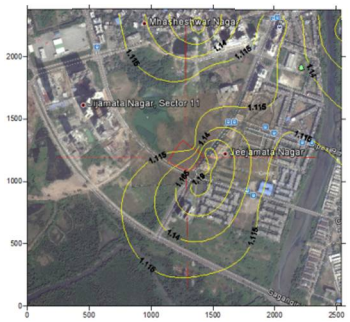
The baseline average concentration of CO is found to be 1285 whereas that FY 2020 & 2030 are predicted as 1320 µg/m^3 & 1372 µg/m^3 respectively. The annual average CO concentrations are within the safe limit of 2000µg/m^3



Concentration contour for CO (ppm) FY 2016 Scenario



Concentration contour for CO (ppm) FY 2020 Scenario

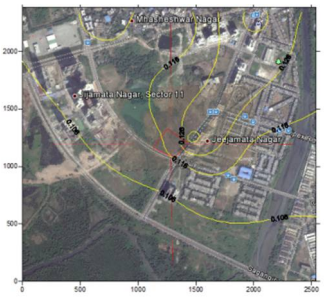


Concentration contour for CO (ppm) FY 2030 Scenario

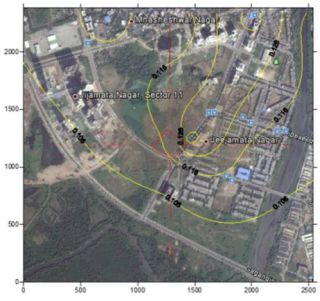
Cumulative Assessment of Ground Level Concentration of DG Set's & Road Traffic

Sr. No.	Coordinates of Receptors		Concentration (ppm)		
	X	Y	2016	2020	2030
1	146	902	0.11	0.11	0.11
2	253	891	0.12	0.12	0.12
3	537	860	0.11	0.11	0.11
4	763	883	0.14	0.14	0.14
5	959	852	0.11	0.11	0.12
6	580	728	0.12	0.12	0.12
7	666	696	0.13	0.13	0.13
8	28	486	0.1	0.1	0.1
9	326	499	0.11	0.11	0.11
10	519	516	0.12	0.12	0.12
11	783	453	0.11	0.11	0.11
12	528	391	0.11	0.11	0.11
13	747	339	0.11	0.11	0.11
14	233	246	0.1	0.1	0.1
15	573	61	0.1	0.1	0.1
16	5560	502	0.1	0.14	0.14

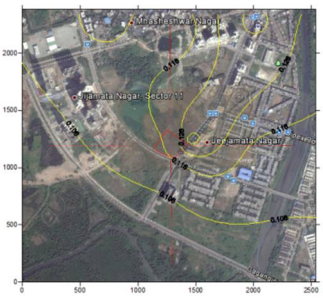
The baseline average concentration of NOx is found to be 0.1125 ppm for each year. The annual average concentration of the project exceeds the NAAQS standards which is 0.02 ppm. However it should be noted that contribution of the project to the total traffic of the area is 10.7% during the current year and 6.1% for FY2030 which is lesser as the project traffic remains the same. As a part of the mitigation landscape trees with high API may be planted on the site. Also it should be noted that the baseline data for Airoli weather station shows annual avg. of 0.05ppm which shows the NOx levels of the area are already exceeding the benchmarks.



Concentration contour for NO (ppm) FY 2016 Scenario



Concentration contour for NO (ppm) FY 2020 Scenario

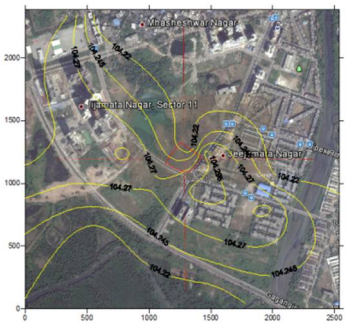


Concentration contour for NO (ppm) FY 2030 Scenario

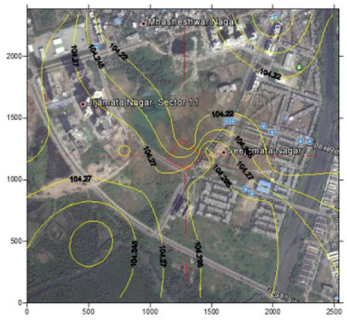
Cumulative Assessment of Ground Level Concentration of DG Set's & Road Traffic

Sr. No.	Coordinates of Receptors		Concentration (µg/m3)		
	X	Y	2016	2020	2030
1	146	902	104.3	104.3	104.3
2	253	891	104.2	104.2	104.2
3	537	860	104.2	104.2	104.2
4	763	883	104.2	104.3	104.3
5	959	852	104.2	104.2	104.3
6	580	728	104.2	104.2	104.2
7	666	696	104.2	104.2	104.3
8	28	486	104.3	104.3	104.3
9	326	499	104.3	104.3	104.3
10	519	516	104.2	104.2	104.3
11	783	453	104.2	104.2	104.3
12	528	391	104.3	104.3	104.3
13	747	339	104.3	104.3	104.3
14	233	246	104.2	104.2	104.3
15	573	61	104.2	104.3	104.3
16	560	502	104.3	104.3	104.3

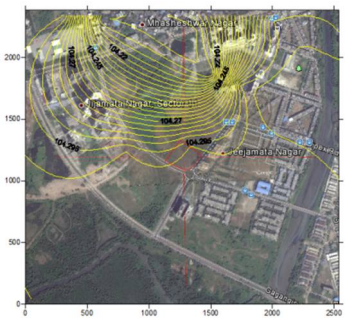
The baseline average concentration of PM_{10} is found to be 104.23µg/m3 for FY2030. the PM10 levels are exceeded from the benchmark levels of 60µg/m3. It should be taken into account that the baseline concentration of the Airoli meteorological station is 66.80µg/m3 which more than the NAAQS standards.



Concentration contour for PM_{10} (ppm) FY 2016 Scenario



Concentration contour for PM_{10} (ppm) FY 2020 Scenario



Concentration contour for PM_{10} (ppm) FY 2030 Scenario

Enclosure 9: Electrical load sheet and Power saving statement summary

Sl. No.	Description	Qty	Unit	Load in KW	Connected Load in KW
1	**Ground Level (Parking)**	1	Set	6	6.00
2	**First Level (Podium)**	1	Set	6	6.00
3	**Second Level (Parking)**	1	Set	6	6.00
4	**Third Level (Parking)**	1	Set	6	6.00
5	Flats/ Homes (1 BHK)	32	Nos.	8.89	284.48
6	Flats/ Homes (2 BHK)	113	Nos.	12.92	1459.96
7	Flats/ Homes (3 BHK)	23	Nos.	15.51	356.68
8	TOTAL SHOPS (22 NOS.)	22	Nos.	200.00	200.00
9	TOTAL OFFICE (13 NOS.)		Nos.	185.00	185.00
10	Pent House/ Duplex	0	Nos.		
11	Common Area (Internal Passage/Others)	1	Set	20.00	20.00
12	External Lighting (Compound)	1	Set	20.00	20.00
13	Passenger Lifts	5	Nos.	13.5	67.50
14	Service Lift		No.	15.5	0.00
15	Water Pump & Allied Load	1	No.	40	40.00
16	Fire Hydrant / Sprinkler System	1	No.	150	150.00
17	STP	1	Set	50	50.00
18	Club House Others	1	Set	5	5.00
19	Swimming Pool & Allied Load	1	Set	15	15.00
	TOTAL				**2878**

SELECTION OF TRANSFORMER:

Connected Load	**2878**	KW
Maximum Demand With 50% DF	1438.81	KW
Maximum Demand With 85% PF	1692.72	KVA

Hence Choosing 2 x 1000 KVA Transformer with 80% Loading Factor

SELECTION OF DG SET (COMM. LOAD+Fire Fighting+Lifts)

Connected Load	376.50	KW
Maximum Demand With 80% DF	188.25	KW
Maximum Demand With 80% PF	235.31	KVA

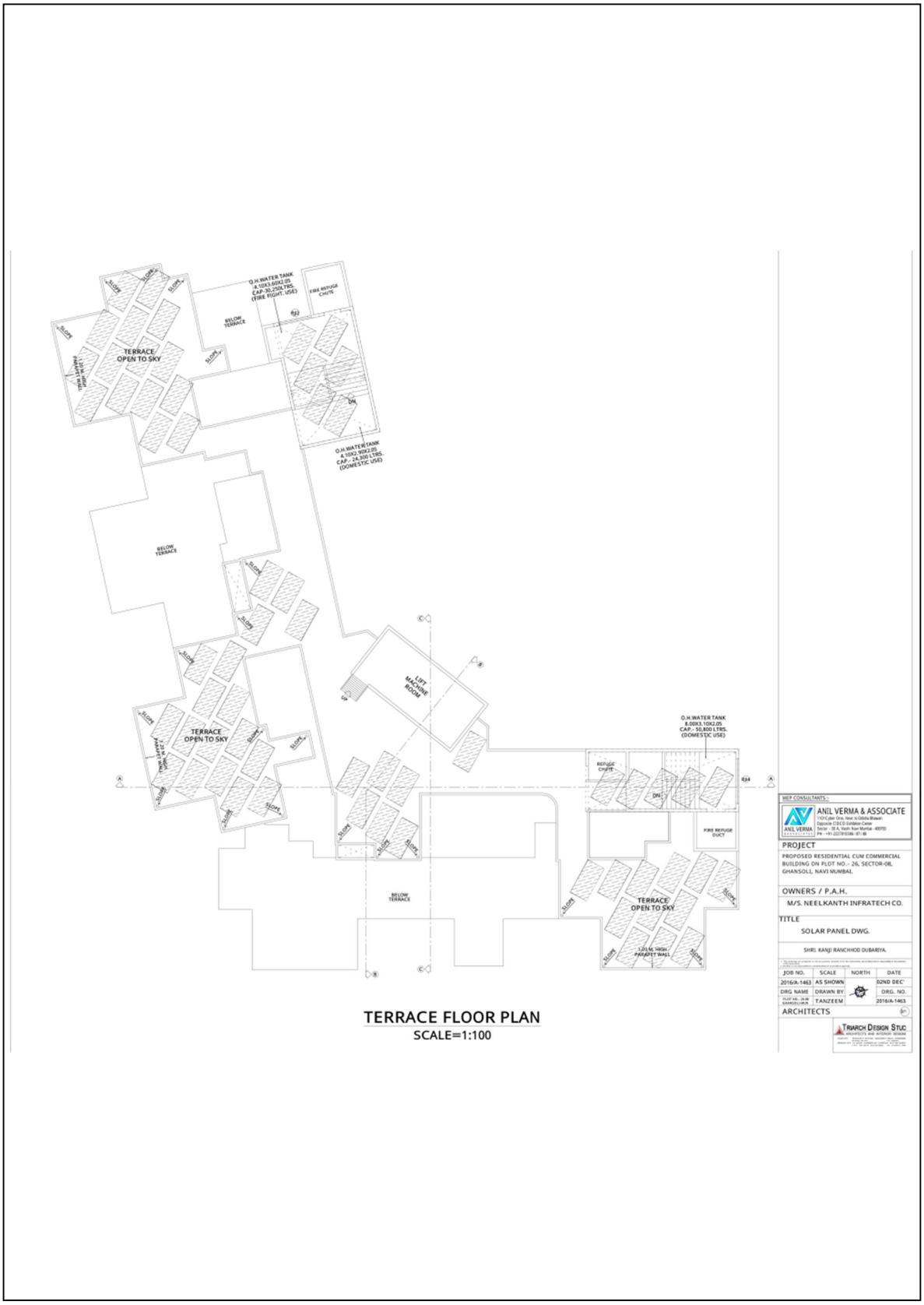
Hence Choosing 1x320 KVA DG Set with 80% Loading Factor

Power Savings Statement - Summary

PLOT NO 26 SECTOR 8 GHANSOLI PROJECT					
SR. NO.	**LOAD DESCRIPTION**	**AVG. KW**	**QTY.**	**AVG. HRS./DAY**	**AVG. KWH/DAY**
1.0	**SALES BLOCK:**				
	4-BHK Flats			8.00	-
a	3-BHK Flats	5.50	23.00	6.00	759.00
b	2-BHK Flats	4.27	113.00	6.00	2,895.06
c	1-BHK Flats	3.60	23.00	6.00	496.80
d	1-RK Flats			8.00	-
1.1a	Passenger Lifts	13.50	5.00	6.00	405.00
1.1b	Service lifts	15.50		3.00	-
1.1c	18.5 KW lifts			3.00	-
1.2a	Staircase Lighting	5.00	2.00	8.00	80.00
1.2b	Common Areas Lighting & Small Power - full load for 8 hours	5.00	2.00	8.00	80.00
1.2c	Common Areas Lighting & Small Power - 50% load for - 4hours	2.50	2.00	4.00	20.00
1.2d	Common Areas Lighting & Small Power - 25% load for 4 hours	1.25	2.00	4.00	10.00
1.3	Club house	5.00	1.00	5.00	25.00
1.4	Fountains / water bodies	15.00		3.00	-
1.5a	Compound/Street Lighting - full load for 4 hours	20.00	2.00	4.00	160.00
1.5b	Compound/Street Lighting - 50 % load for 4 hours	10.00	2.00	4.00	80.00
1.5c	Compound/Street Lighting - 25% load for 4 hours	5.00	2.00	4.00	40.00
1.6	Plumbing load	40.00	1.00	3.00	120.00
1.7	STP ventilation	5.00	1.00	10.00	50.00
1.8	STP	50.00	1.00	18.00	900.00
	Therefore Average KWH/Day:				6,120.86
	Therefore Average KWH/Annum:				22,34,113.90
	Therefore Average KWH/Sq.M./Annum considering B.U.A. of (in Sq.M):		2,91,000.00		**7.68**

D	**Savings within apartment with use of Star rated geysers and AC**				
1.0	Motor load for 5 lifts + all pumps plumbing and -1475KW	at 0.8 P.F. - load is 1843.7 KVA, where as at 0.98 p.f. load is 1505.10KVA - where by saving in consmption shall be 15%		Total units consumed by this equipments item no 1.1a / b + 1.6+1.7+1.8 above per day = 1475 units	221.25
1.1	Star Rated Acs in 1,2 & 3 BHK Flats	Total AC load is 180 x 8 hrs KW= 1440- where by saving in consmption shall be 15%			216.00
E	**Saving due to Solar Lights**				
4.0	**Apartment internal ligting & Fan load** - app 0.1 KW for 1,2 & 3BHK apartment @6hours per day	item no 1a, b & c 159 units @ 6 hrs/day.		Total units consumed by Solar panel x 6 Hrs.per day = 95.4 units	95.40
	Apartment internal ligting & Fan load - app 0.1 KW for 1 & 2 BHK apartment @1 hours per day 15.9 kw				
	Therefore Average KWH/Day Saving:				1,382.58
	Therefore Average KWH/Annum Saving:				5,04,641.70
	Therefore Average KWH/Sq.M./Annum Saving considering B.U.A. of (in Sq.M):		2,90,000.00		1.74
	THEREFORE AVERAGE ANNUAL ENERGY SAVINGS IN %:				**22.67%**
	AVAILABLE TERRACE 600 SQ.MTR	REQ. PANELS	REQ. AREA		
TOTAL REQUIRED PV PANELS FOR 1 BLDG		80 NOS	200.00		
	One PV Panel Required Area Approx. 2.5 Sqmtr.				
	Total 15.9Kw Solar Panel Capital Cost	Rs. 23,85,000			
	Mainatenance Cost / Year	Rs3,50,000			

Enclosure 10: Solar Panel Layout



Enclosure 11: Energy Modelling

The energy modelling of the project building shows that the savings of the design case over base case are 10.12%. The improvements incorporated to achieve so are as below:

- More than 25% of the site area shall be covered with soft paving or vegetation or materials with low SRI
- BEE star rated energy equipment like fans, AC'S, Geysers shall be installed.
- 100% of outdoor lighting lamps should meet the luminous efficacy requirements of GRIHA

Table 6.1 Minimum allowable values of luminous efficacy of outdoor lighting system	
Light source	Minimum allowable luminous efficacy (lm/W)
CFL (compact fluorescent lamp)	50
FL (fluorescent lamps)	75
MH (metal halide)	75
HPSV (high pressure sodium vapour lamp)	90
LEDs (light emitting diodes)	50

- Vertical fenestration U value & SHGC shall be as per ECBC Standards – For warm & humid climate, Maximum U factor – 3.30 W/sqm.k, If WWR ≤ 40% maximum SHGC to be 0.25 and if 40% ≤WWR≤ 60% maximum SHGC to be 0.20.

- Defaults for Unrated vertical fenestration (Overall Assembly including Sash and Frame)

Frame Type	Glazing Type	Clear Glass			Tinted Glass		
		U-factor ($W/m^2 \cdot K$)	SHGC	VLT	U-Factor ($W/m^2 \cdot K$)	SHGC	VLT
All frame types	Single Glazing	7.1	0.82	0.76	7.1	0.70	0.58
Wood, vinyl, or fiberglass frame	Double Glazing	3.3	0.59	0.64	3.4	0.42	0.39
Metal and other frame type	Double Glazing	5.1	0.68	0.66	5.1	0.50	0.40

Window Wall Ratio	Minimum VLT
0 - 0.3	0.27
0.31-0.4	0.20
0.41-0.5	0.16
0.51-0.6	0.13

- Fenestration shall meet SHGC requirement of ECBC 2007 standards, shading devices as per SP41, run sun path analysis to ensure that all windows are shaded between 10:00 am on 1st April to 15:00 on 30th September
- U values of wall & roof assembly shall be as per ECBC standards
- Roof Construction U value for warm & humid climate: - U value will be 0.261 W/m^2K, R value will be 3.5 W/m^2K with china mosaic tiles/high reflective material to be used. Also buffer zones to be provided on eastern and western façade.
- Wall Construction U value for warm & humid climate : - U value will be 0.440 W/m^2K, R value will be 2.10 W/m^2K

- Artificial lighting design shall fall within limits (lower and higher range limits) as recommended for space/task specific lighting levels as per NBC and to meet a minimum uniformity ratio of 0.4.
- Minimum 15% or 25% replacement of OPC with fly ash or any BIS recommended waste by weight of cement used in structural concrete
- Minimum 40% of materials (by volume) in building blocks/bricks should be fly ash or any BIS recommended waste, for 100% load bearing and non-load bearing walls
- Minimum 15% or 25% replacement of OPC with fly ash or any BIS recommended waste in plaster/masonry mortar
- Steel with recycled content, cement with fly ash content, AAC blocks/fly ash bricks shall be used.
- Renewable energy system shall be installed to cater minimum 2.5% of the annual energy consumption of internal artificial lighting and HVAC systems
- Low energy material having a minimum 5% recycled content shall be used in the interiors for flooring, door window frames, false ceiling etc. Low energy materials include ceramic flooring, vitrified flooring with recycled content, flush doors, gypsum board false ceiling etc.
- All interior paints shall be low-VOC and lead-free

Table 3 VOC limits for paints		
Paint applications	VOC limits (grams of VOC per litre)	
Interior coatings	Flat	< 50
	Non Flat	< 150
Exterior coatings	Falt	< 200
	Non Flat	< 100
Anti corrosive	Gloss, semi gloss, flat	< 250

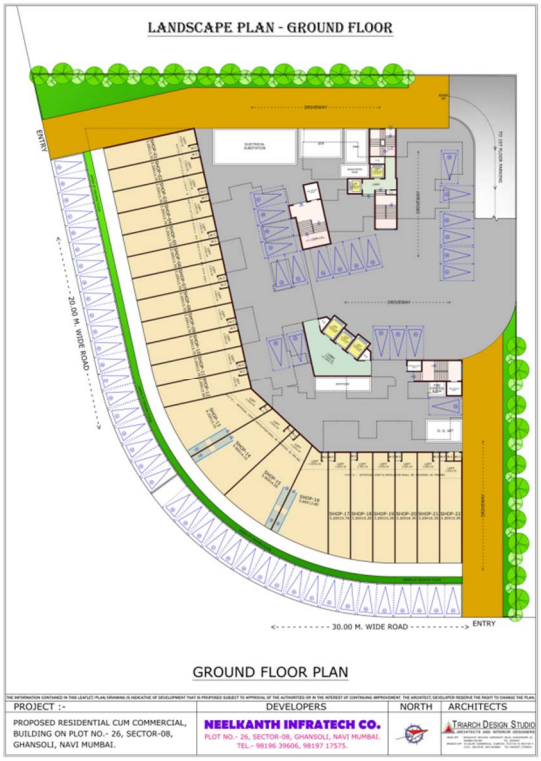
- All adhesives and sealants used shall be low-VOC & that interior composite wood-products do not use urea-formaldehyde as a bonding resin

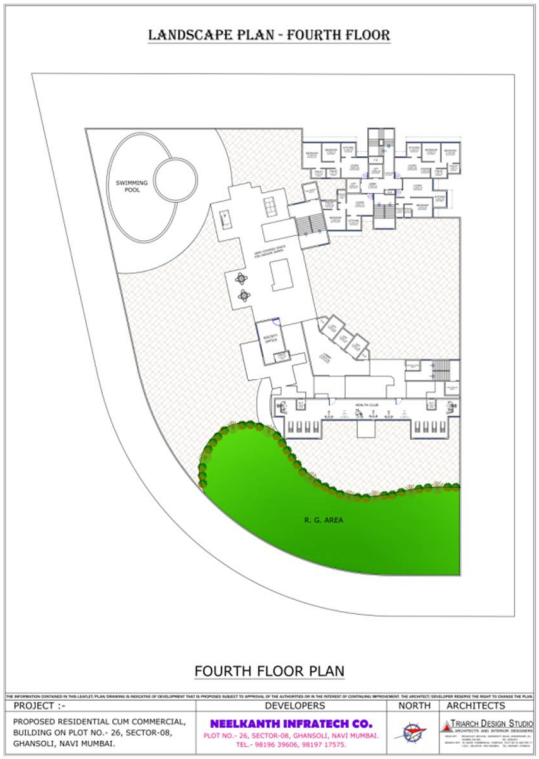
Table 1 VOC content limit for adhesives	
Architectural adhesive application	VOC content limit (g of VOC limit)
Wood flooring	100
Industrial /rubber flooring	60
Ceramic tile	65
Structural glazing	100
Multi purpose construction	70
Sub-floor	50
Wall boards/panel	50
PVC welding	285
Adhesive primer for plaster	250
Structural wood member	140
Sub specific use metal to metal	30
Wood	30
Fibre glass	80
Plastic foams/porous materials (except wood)	50

- Teakwood door/frames etc. shall comply with the standards of forest steward council.

Table 2 VOC content limit for sealants	
Sealant application	VOC content limit (grams of VOC per litre)
Architectural/roadways	250
Single-ply roof material installation/repair	450
Others	420
Sealant primer applications architectural non porous	250
Sealant primer applications architectural porous	775
Other sealant primer applications architectural	750

Enclosure 12: Landscape plan on Ground and fourth floor podium

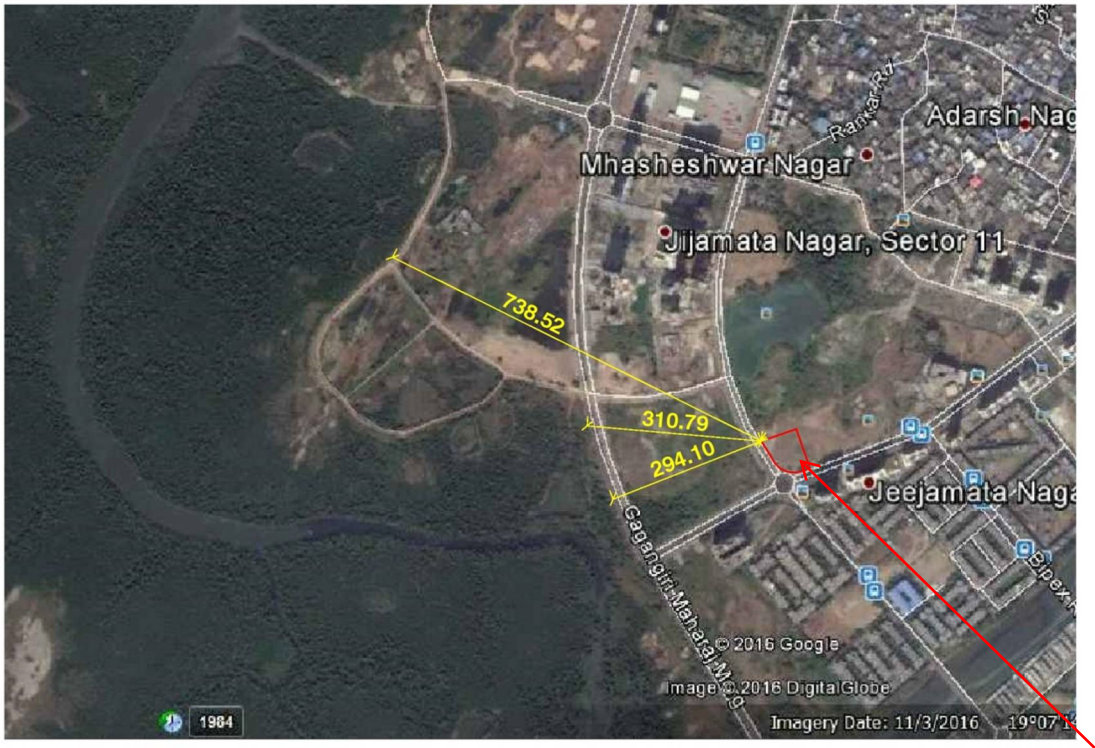




Components	**Proposed**
Total green area on Ground	483.567 Sq. M.
Total green area on Podium	500.584 Sq. M.
Existing tree cover if any	Nill
No. of trees cut	Nill
No. of trees to be retained	Nill
Trees to be planted on Ground (1 trees/80 sq.mt of plot area)	60
Total new trees to be planted	60

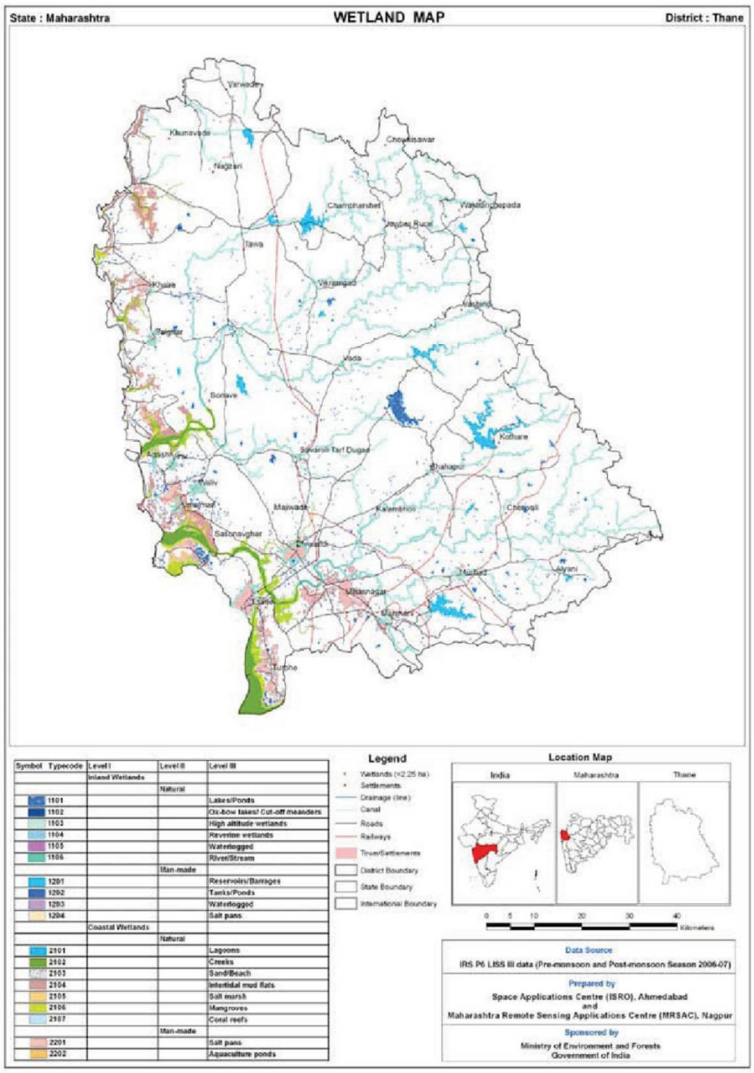
Sr. No.	**Botanical Name**	**Common Name**	**Qty.**	**Characteristics & Ecological Importance**
1.	False Ashoka	*Polyalthia longifolia*	20	Tree having high Air Pollution Index Tolerance (APIT)
2.	Parijatak	*Nyctanthes arbor-tristis*	12	Small deciduous fast growing tree, beautiful flowers
3.	Bahava	*Cassia fistula*	10	Medium sized deciduous tree Beautiful yellow flowers, Butterfly host plant
4.	Apta	*Bauhinia racemosa*	10	Small tree with small white flowers, Butterfly host plant
5.	Lemon	*Citrus sp*	8	Butterfly host plant having high Air Pollution Index Tolerance (APIT)
	Total		**60**	

Enclosure 13– Google image location



Plot No. 26, Sector – 8, Ghansoli, Navi Mumbai

Enclosure 14- wetland map of Thane district



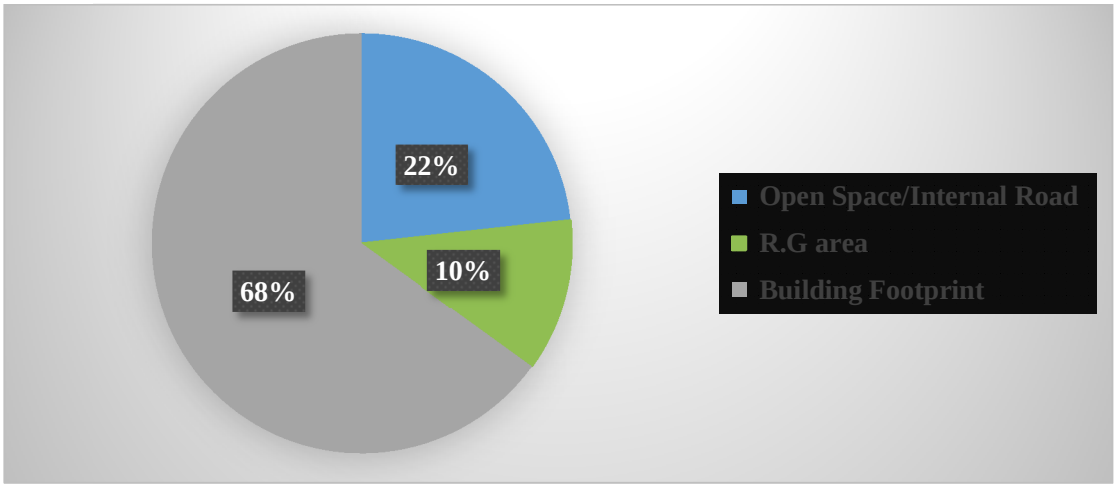
Enclosure 15- Detail of RWH

Rainwater harvesting tank is proposed for capacity 17.73 cum storage. (2 days storage is provided). Recharge pits are not provided as ground water table is high. Harvested Rain water will be treated with multigrade sand filter & carbon filter to remove suspended impurities and odour.

CALCULATION OF RAIN WATER HARVESTING TANK	
Average Annual Intensity Of Rainfall:	0.05 Mtrs
Area Name	Terrace area
Area Of Roof	197.00 Sq. m.
Run-off Coefficients :	0.90
Discharge (Q) Roof	8.90
Assuming Retention Time	2 Days
Rain Water Harvesting Tank Capacity	**17.73 Cum**

Enclosure 16: Open space calculation

Particulars	**Proposed (Area in sq.m)**	**In %**
Net Plot Area	4825.580	
Open Space/Internal Road	1054.259	21.85
R.G area	483.567	10.02
Building Footprint	3287.754	68.13
Total		**100**


22%
10%
68%
Open Space/Internal Road
R.G area
Building Footprint

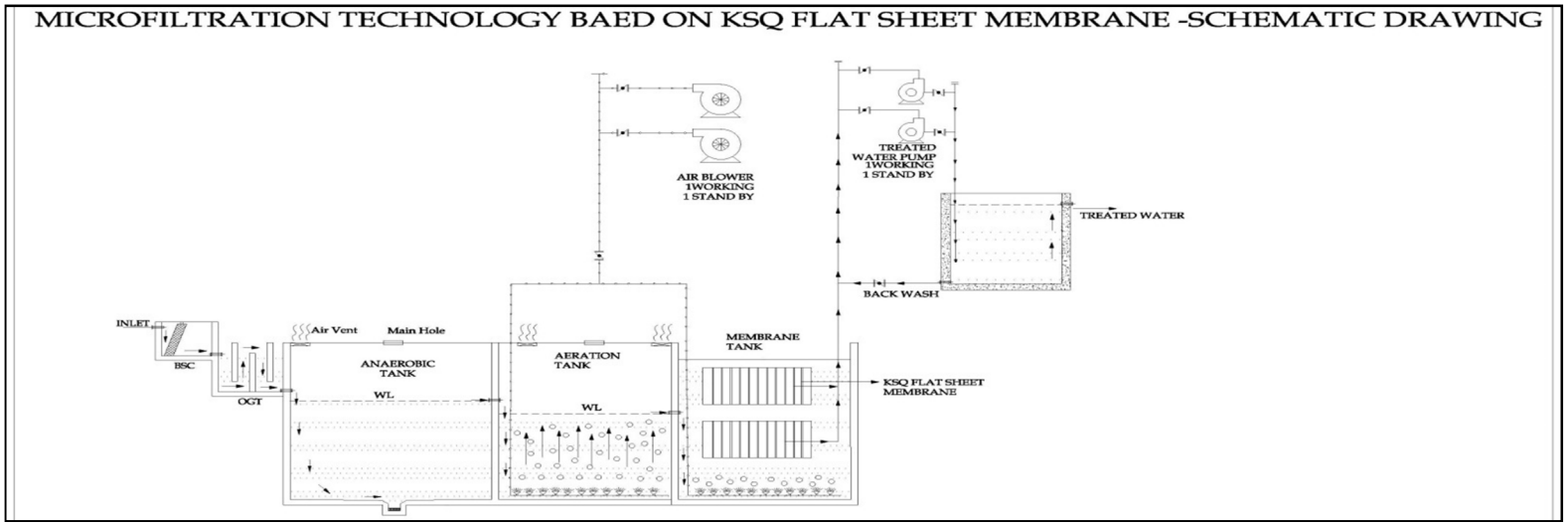
Enclosure -17 solid waste calculation and management

Facilities Provided	Waste Generation Norms		Basis of Assumption	Unit		Total Waste Generated (KG per day)
Residential	0.45	kg/Capita/day	Source: Manual for municipal solid waste management	870	Persons	391.50
Commercial	0.25	kg/Capita/day	Guidelines for preparation for environmental impacts, CIWMB	66	Persons	16.50
Garden space	0.003	kg/sq.m./day	Discussion with Horticulturists	984.151	sq. m.	2.95
STP Sludge	250	kg per MLD of wastewater treated	Manual for Sewerage and Sewage treatment by CPHEEO		Million Liters per Day	3.50
Total Bio Degradable						**290.11**
Total Non-Bio Degradable						**124.34**
Total Waste Generated (Kg/day)						**414.45**
Space provided for waste storage and segregation will be 100 Sq.mt						

Generation, Segregation, Collection, Storage, Treatment and Disposal

Moisture Content	**21.03 % by weight**	**CPHEEO Manual, 2000**
C / N Ratio	22.45	
Total Biodegradable waste Generated per day 290.11 Kg/day		
Area required for segregation, collection, storage, treatment and disposal	• Space required for waste storing and segregation will be 5.00 m. X 5.00 m. i.e. 25.00 sq.m • Area required: Cabin Space for Kesari Fully Automatic OWC = 4m x 5 m + extra clearance space around machine: 30.00 sq.m • Total Area Required for Waste Management Processing of the Project = 45. 00 sq.m • Total Area Requirement = 100.00 sq.m	
Segregation	The waste will be segregated by flat owners. Two different color buckets shall be provided in each flat	
Collection	Waste will be collected from each flat and delivered to Organic Waste Converter in closed containers	
Treatment	Biodegradable waste: through Organic Waste Composting	
Disposal	Biodegradable waste: Used in garden as manure Non-Biodegradable waste: Supplied to authorised vendors	

Enclosure 18: STP Technology



Sr. No	Parameters	Units	Inlet	Outlet
1.	Daily flow	KLD	97.66	87.90
2.	pH	-	6 - 8	6.5 – 8.5
3.	BOD	mg/L	350 mg/l. - 400 mg/l.	Less than 10 mg/l.
4.	COD	mg/L	300 mg/l.	Less than 30 mg/l.
5.	TSS	mg/L	175 mg/l. - 200mg/l.	Traces
6.	Oil & Grease	mg/L	30 mg/l.	Less than 5 mg/l.

STP FLOW CHART

STP based on Micro Filtration - KSQ FLAT SHEET MEMBRANE – 140 KLD (description)

- Sewer Line Invert level is at 1.0 mtrs (assumption) below ground level.

- Sewage water enters through the multiple bar screens of different pore sizes. The bar screens have to be cleaned regularly.

- By way of overflow the sewage water enters the Equalization tank. Toxic gases are vented out through provision of a vent pipe. Depending on the operations of the STP the process of sludge removal should be done periodically for operational efficiency.

- Sewage water moves into the Aeration tank by overflow.

- Air purging is done at this stage with a compressor that caters to the KSQ-membrane tank as well. Also provision of vent pipes to add oxygen is given in this tank.

- Water enters the Membrane Tank by overflow.

- In the membrane tank the filtration will take with the help of compressor and membranes of appropriate capacity.

- Then the treated water will be pumped into the Back Wash tank. Depending on the position of the flush tank the treated water will be pumped or will flow by overflow/gravity into the Flush tank.

Enclosure 19: Undertaking for Non-Biodegradable Waste Supply to Authorized Vendors

Shop No. 19, Bhoomi Oscar
Plot No. 16/17, Sector 9,
Ghansoli, Navi Mumbai - 400701.
Email : neelkanthico@gmail.com

NEELKANTH
INFRATECH CO.

UNDERTAKING

To,
The Director,
IA-III Division,
Ministry of Environment Forests and Climate Change, (IA-III Division)
Indira Paryavaran Bhawan,
Jor Bagh Road,
New Delhi - 110 003

Dear Sir,

I, Kanji Dubariya, Director of Neelkanth Infratech Co., hereby state that we would supply the non-biodegradable waste to authorized vendor for recycling.

For,
Neelkanth Infratech Co.

Director

Place: Navi Mumbai

Enclosure 20: Excavation Management Plan

CONSTRCTION WASTE: TO BE DONE		
Materials	**Quantity (cum)**	**Disposal Method / Handling Procedure**
PCC Waste	17.00	Used for Site filling
Concrete Waste	300.00	Used for Site filling
Reinforcement Steel Scrap	60.00	To be sold to vendors
Brick Debris	114.00	Used for Site filling
RCC	403.00	Will be handed over to recyclers
Tiles Waste	1039.00	To be sold to vendors
Glass Waste	110.00	To be sold to vendors
Paint Cans	86.00	Taken by Contractor
Wood Waste	26.00	
Total	**2155.00**	
Total debris generated : 2155.00 Cum		
30% Waste reused on site i.e. 646.50 Cum		
Remaining Handed over for proper disposal i.e. 1508.50 Cum		

Enclosure 21: Detail Traffic Analysis Report

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1 INTRODUCTION

1.1 Background

Project proponent has proposed to construct residential building on plot No. - 26, Sector 8, Ghansoli, Navi Mumbai, District- Thane, Maharashtra. The project comprises of 174 apartments. On completion, the project will provide 255 car parking spaces within the premises. The project provides easy access to educational, medical and shopping facilities.

GMD Consultants has been commissioned by the project proponent – M/s. Neelkanth Infratech Co. to provide a Traffic Impact Study for this project.

1.2 Scope

The scope of this study is listed below:

- **Traffic Surveys**: To conduct traffic surveys of area project site in order to capture base traffic:
    - Assess current traffic pattern on access road – neighboring road network
    - Capture traffic emanating from new developments and from adjacent properties
- **Traffic Circulation**: To review traffic circulation plan considering various types of vehicles users (cars, 2W, fire tender)
- **Impact Analysis**: Analyze the forecast project traffic in conjunction with base traffic. Conduct an Impact Analysis of project traffic as well as study impacts and suggest mitigation measures.
- **Swept Path Analysis**: Review traffic circulation to ensure proper and efficient traffic movement. Conduct swept path analysis at critical locations of project entry/exit to ensure safe and efficient turning maneuvers.
- **Traffic Control**: Address the provision of road signages, markings and traffic calming measures. Also provide a traffic management plan to address issues of traffic control and safe dispersal.

1.3 Assumptions

GMD Engineering Consultants follows standard procedures and guidelines to determine the impact of added traffic on proposed facilities. In the following sections, the assumptions considered as well as selected design standards and parameters for the analysis have been discussed.

1.3.1 Codes and Manuals

Design standards are generally followed bottom-up or part to whole. Local bylaws are given highest priority to meet the requirements set by local development control agency. Other standards, although explicitly not mentioned by local development control agency, are referred from national

or international design manuals that are accepted and widely referred by other professionals in the industry.

Following Codes and Manuals have been referred in this study:

- Codes by Indian Road Congress
- A Policy on Geometric Design of Highways and Streets' by American Association of State Highway and Transportation Officials (AASHTO)
- Trip Generation and Parking Generation handbooks by Institute of Transportation Engineers (ITE)
- Guidelines for Preparation of Traffic Impact Assessment Reports by LTA, Singapore
- Design recommendations for multi-storey and underground car parks 3rd Edition, IStruct, UK.

1.3.2 Design Parameters

The basic design parameters considered for the study has been illustrated below:

1) The social status as well as economic well-being of the residents plays an important role in determining the parking demand for any residential project.
2) The visitors will expect a safe and efficient circulation with good levels of service, i.e. minimum waiting time at security check, proper traffic control at entry / exits, minimum congestion delays and pleasing aesthetics.
3) A design vehicle is a vehicle whose dimensions and operational characteristics are used to establish layout geometry. Toyota Innova (Big Car) and Maruti Swift (Small Car) and Volvo 400 (Fire Tender) were chosen as the design vehicles.
4) The speed of the vehicle is restricted within the premises as below
    a. On the straight sections - 15 kmph
    b. On turns and bends - 10 kmph
    c. On ramps - 10 kmph
5) The maximum number of traffic a road can carry is referred to as its Capacity or design Service Volume. The service volumes considered for the project is given below.

Table 1-1 Roadway Capacities as per IRC 106: 1990

Type of Roadway	Road Capacity*	Category
6 Lane 2 Way	6143	(Sub Arterial)
4 Lane 2 Way (Undivided)	3429	(Sub Arterial)

*Indian Road Congress 106: 1990 Urban Road Capacity

6) Level of Service (LOS) can be defined as a letter designation that describes a range of operating characteristics on a given facility. Six Levels of Service are defined for capacity analysis. They

are given letter designations from A to F, with LOS 'A' representing best level of operational standards and LOS 'F' the worst.

Table 1-2 Description of LOS based on V/C Ratio

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Level of Comfort	Nature of flow
A	<0.30	Highest	Free Flow
B	0.30 – 0.50		Reasonably free flow
C	0.50 – 0.70		Stable flow
D	**0.70 – 0.90**	**Threshold**	**Approaching unstable flow**
E	1.00		Unstable flow
F	>1.00	Lowest	Forced flow

Maximum waiting time for such high profile users preferred is **60 seconds**.

1.3.3 Entry / Exit Lane Capacities

The following capacities as recommended by UK – Institute of Structural Engineers have been adopted. These have been validated at a few Indian locations.

Entry/Exit Lane Capacities for Car Parks

Sr No	Type of Entry	Capacity (veh/hour/lane)
1	Free-flow access into internal distributor road/ structure (no parking spaces immediately after access, i.e. ramp distributing to several levels of car park)	800
2	Free-flow access	580
3	**Lifting-arm barrier without ticket issue**	**550**
4	**Lifting-arm barrier with automatic ticket issue (push button)**	**360**
5	**Lifting-arm barrier with access card (slot-based)**	**235**
6	Lifting-arm barrier with transponder (no slot – RFID etc.)	380

Sr No	Type of Exit	Capacity (veh/hour/ln)
1	**Ticket on entry and payment at a manned exit**	**240**
2	**Lifting-arm barrier without ticket issue**	**550**
3	Ticket on entry and variable payment to a machine linked to the exit barrier	270
4	Ticket on entry and operation of the exit barrier by a prepaid ticket or token	400
5	Free-flow exit	Analysis based on specific road layout (i.e.yield etc.)

Rates based on: „Design recommendations for multistory and underground car parks, Institute of Structural Engineers, 3rd Edition, June 2002" and „HBS 2001, FGSV Verlag, January 2002"

As per international practices it is preferred to restrict the queue length to around **18m i.e. 3 vehicles**. This is also linked with space availability at site for queuing.

1.4 Traffic Study Methodology

The methodology adopted for traffic analysis for this project is represented in the form of a flowchart as shown in Figure 1-1.

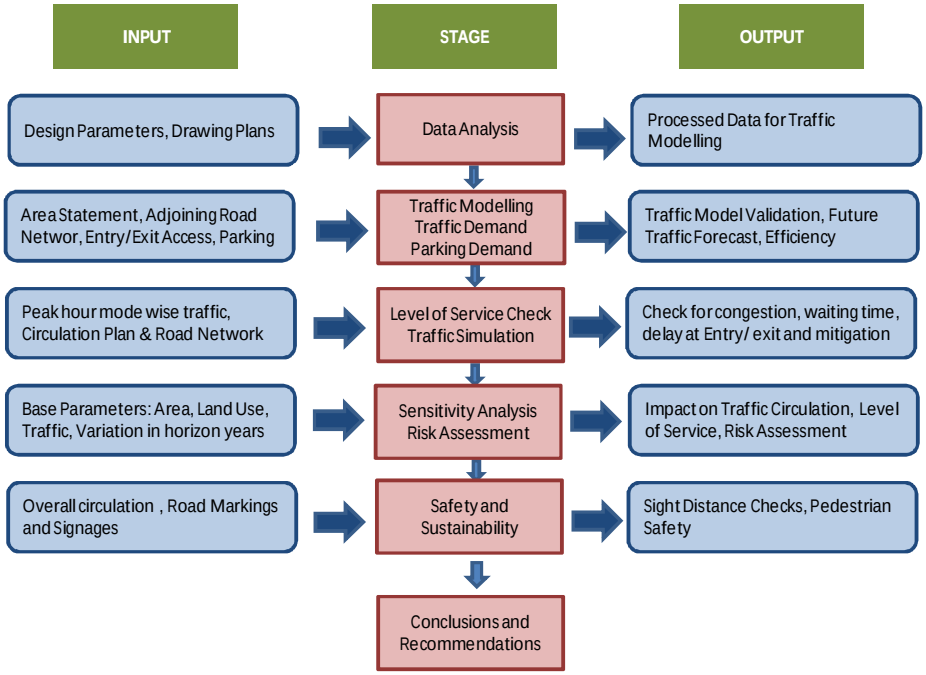

Figure 1-1 Traffic Study Methodology

1.5 Traffic Model

Traffic modeling is the process of analyzing the pattern in which an area's transport network would be used by traffic given the distribution and characteristics of the area's population, employment and other land uses. The output of traffic analysis is forecast of vehicles using each road segment within the study area. Traffic forecast is best achieved by transportation modeling. The conventional transportation modeling is a four stage process. The most widespread form of model utilized is gravity model and the same is utilized for this project. The broad outline of this four stage gravity model is illustrated in Figure 1-2 below.

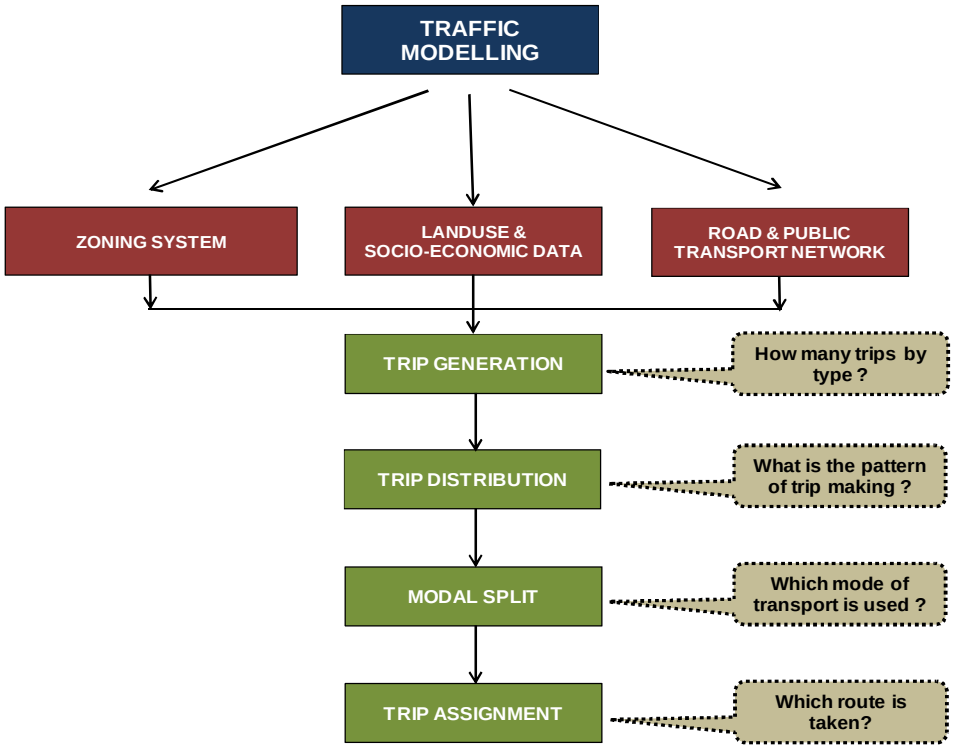

Figure 1-2 Traffic Model

1.6 Outline of the Report

The report has been organized in the following order:

Chapter 1 Introduction, scope, assumptions and methodology

Chapter 2 Illustrates the existing road network and the present traffic scenario at the project site as well as details on external road network considered and neighbouring region profile to give an overview of the baseline (existing) traffic conditions**.**

Chapter 3 Explains the salient features of the proposed development.

Chapter 4 Describes the analysis of traffic survey and road network data for neighbouring roads and gives a better picture of where they stand as far as level of service is concerned. Also, the likely number of trips that would be generated by the project has been forecasted and its likely impact on road traffic was studied.

Chapter 5 Describes the analysis studies conducted to study various other aspects of the project. This includes swept path analysis.

Chapter 6 Describes the Traffic Management Plan including various traffic calming measures for the project to ensure safe and secure circulation of pedestrians and vehicles.

Chapter 7 Summarises the conclusions and recommendations of the study.

****

2 SITE APPRECIATION, EXISTING TRANSPORT NETWORK AND BASE TRAFFIC

The existing transport network surrounding the project has been illustrated in the section below.

2.1 Project Location

The project is located in Ghansoli, Navi Mumbai. Ghansoli railway station is the nearest railway station located at a distance of 1.6 km from site which provides local connectivity. Chhatrapati Shivaji International Airport is the nearest airport from site which is located at distance of 24.6 km from site. The site is well connected to major landmarks in and around Navi Mumbai by road as well as rail. The project has direct access to Site Road and Prabhakar Krishanati Patil Marg. The project provides easy access to other amenities such as educational, medical and shopping facilities. Figure 2-1 shows an aerial view of the location.

Figure 2-1 Project Location

2.2 Surrounding Road Network

The project location is surrounded by a planned road network. The project has direct access to Site Road and Prabhakar Krishanati Patil Marg. The location of the proposed development and surrounding road network as discussed above are illustrated in Figure 2-2.

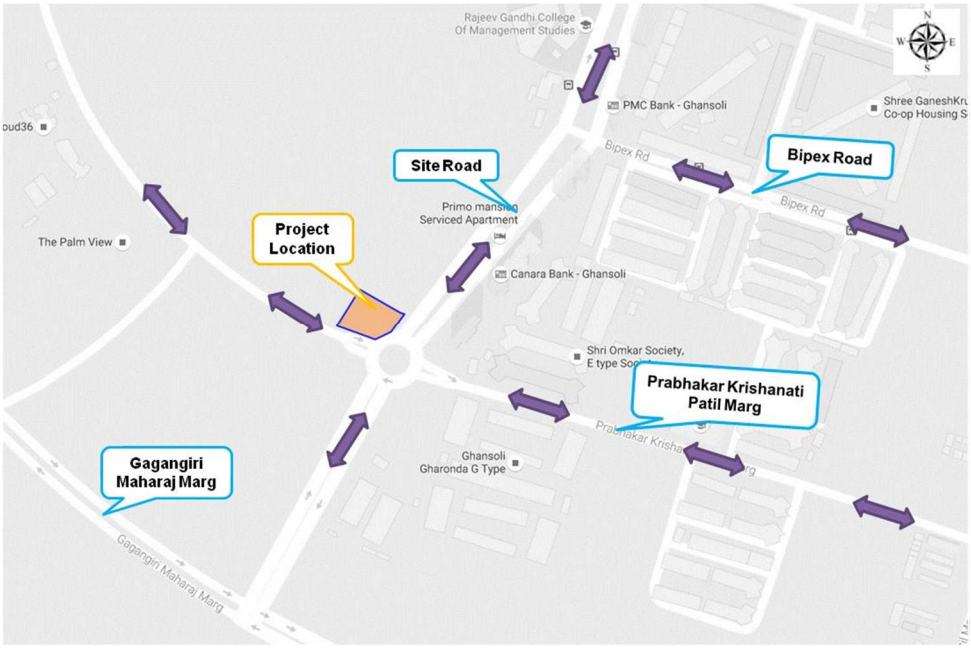

Figure 2-2 Surrounding Road Network and Traffic Survey Location

Following pictures depict the surrounding road network.

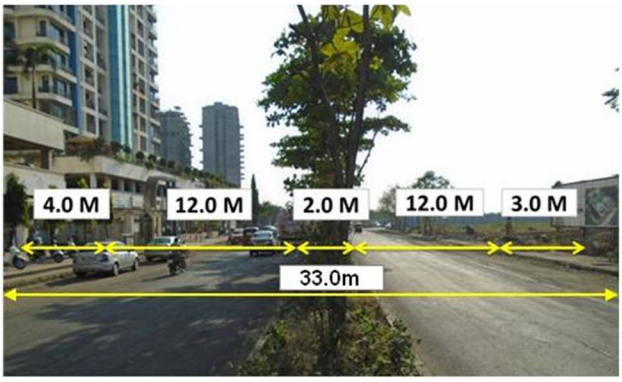

Figure 2-3 Site Road

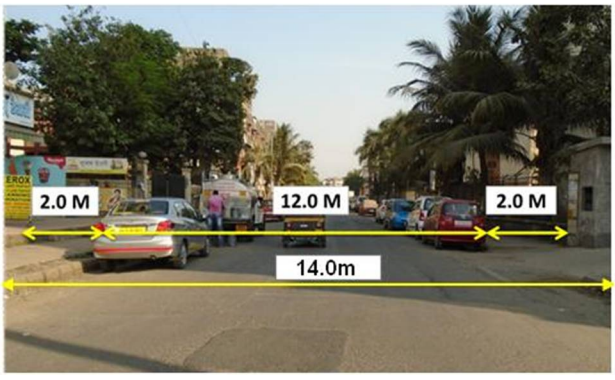

Figure 2-4 Bipex Road

Figure 2-5 Prabhakar Krishanati Patil Marg

The site is well connected to major urban centers around Navi Mumbai via road and rail. It is connected to all basic services like hospital, police station, fire station, post office and others.

2.3 Traffic Surveys

Traffic surveys are necessary to gather base data information about existing traffic and travel pattern on surrounding roads. Traffic surveys were carried out on 18th November, 2016 (Friday) and 19th November, 2016 (Saturday).The traffic surveys included classified traffic volume counts. Traffic survey was conducted at Site Road and Prabhakar Krishanati Patil Marg.

2.4 Base Traffic

Traffic survey was conducted for 24 hours to understand the hourly traffic variation for the roads. The observed peak hour volume for Site Road and Prabhakar Krishanati Patil Marg has been illustrated below. Also modal split along with directional distribution of traffic for each road has been illustrated in the figures below.

Table 2-1 Hourly Traffic Volume on Site Road

Time Period	2W	3W	Cars	Buses	Lcv	2 Axle	3 Axle/ Multi Axle	Total Vehicles	Total PCU
8 to 9	674	271	277	78	48	10	2	1360	1203
9 to 10	777	312	320	89	55	11	2	1566	1382
10 to 11	686	275	282	79	49	10	2	1383	1222
11 to 12	629	252	259	72	45	9	2	1268	1120
12 to 13	572	229	235	66	41	8	1	1152	1016
13 to 14	549	220	226	63	39	8	1	1106	976
14 to 15	515	206	212	59	37	7	1	1037	914
15 to 16	594	238	244	68	42	8	1	1195	1052
16 to 17	686	275	282	79	49	10	2	1383	1222
17 to 18	777	312	320	89	55	11	2	1566	1382
18 to 19	800	321	329	92	57	11	2	1612	1422
19 to 20	743	298	305	85	53	10	2	1496	1319
20 to 21	674	271	277	78	48	10	2	1360	1203
21 to 22	515	206	212	59	37	7	1	1037	914
22 to 23	400	161	165	46	29	6	1	808	714
23 to 24	286	115	118	33	21	4	1	578	511
24 to 1	172	69	71	20	13	3	1	349	311
1 to 2	103	42	43	12	8	2	1	211	190
2 to 3	69	28	29	8	5	1	1	141	127
3 to 4	69	28	29	8	5	1	1	141	127
4 to 5	92	37	38	11	7	2	1	188	170
5 to 6	252	101	104	29	18	4	1	509	451
6 to 7	343	138	141	40	25	5	1	693	614
7 to 8	457	184	188	53	33	7	1	923	817
Total	11434	4589	4706	1316	819	165	33	23062	20373

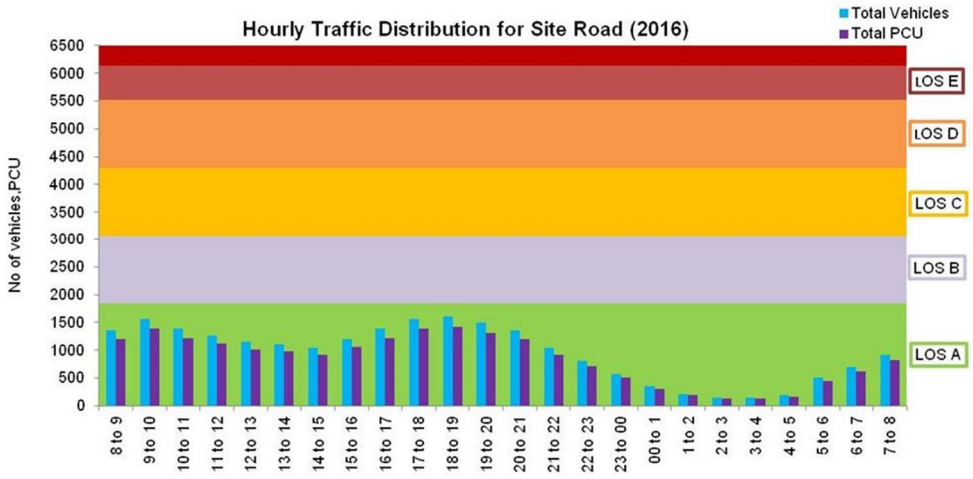

Figure 2-6 Hourly Traffic Distribution for Site Road

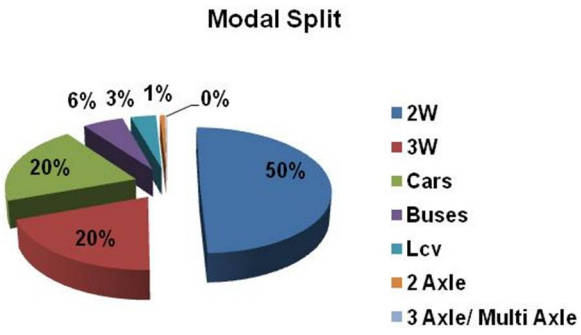

Figure 2-7 Modal Split (vehicles) for Site road

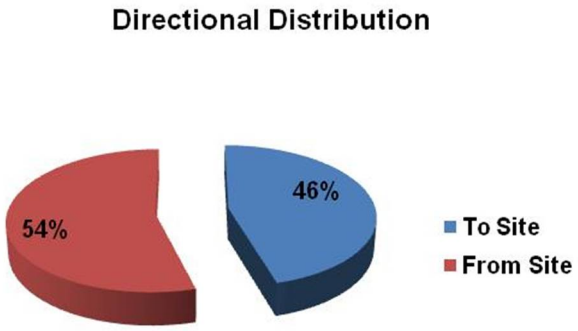

Figure 2-8 Directional Distribution for Site Road

Based on preliminary analysis it was observed that:

- Peak morning traffic was observed between 9 and 10 AM and peak evening traffic was observed between 6 to 7 PM.
- The vehicular traffic predominantly consists of cars and two wheelers.
- Directional distribution analysis indicated that traffic is coming more from site.

Table 2-2 Hourly Traffic Volume on Prabhakar Krishanati Marg

Time Period	2W	3W	Cars	Buses	Lcv	2 Axle	Total Vehicles	Total PCU
8 to 9	338	136	139	39	24	5	680	597
9 to 10	418	167	172	48	30	6	840	738
10 to 11	385	154	158	44	27	5	774	680
11 to 12	339	136	139	39	24	5	681	598
12 to 13	301	121	124	34	21	4	605	532
13 to 14	295	118	121	34	21	4	593	521
14 to 15	318	127	131	36	22	4	639	562
15 to 16	339	136	139	39	24	5	681	598
16 to 17	356	143	146	41	25	5	716	629
17 to 18	390	156	160	45	28	5	783	688
18 to 19	447	179	184	51	32	6	898	789
19 to 20	408	164	168	47	29	6	821	721
20 to 21	351	141	144	40	25	5	706	621
21 to 22	313	125	129	36	22	4	629	553
22 to 23	251	101	103	29	18	3	505	443
23 to 24	188	75	77	22	13	3	378	332
24 to 1	169	68	70	19	12	2	341	299
1 to 2	151	60	62	17	11	2	303	266
2 to 3	125	50	52	14	9	2	252	222
3 to 4	104	41	43	12	7	1	208	183
4 to 5	78	31	32	9	6	1	158	139
5 to 6	90	36	37	10	6	1	182	160
6 to 7	163	65	67	19	11	2	327	287
7 to 8	251	101	103	29	18	3	505	443
Total	6570	2632	2699	752	465	88	13206	11602

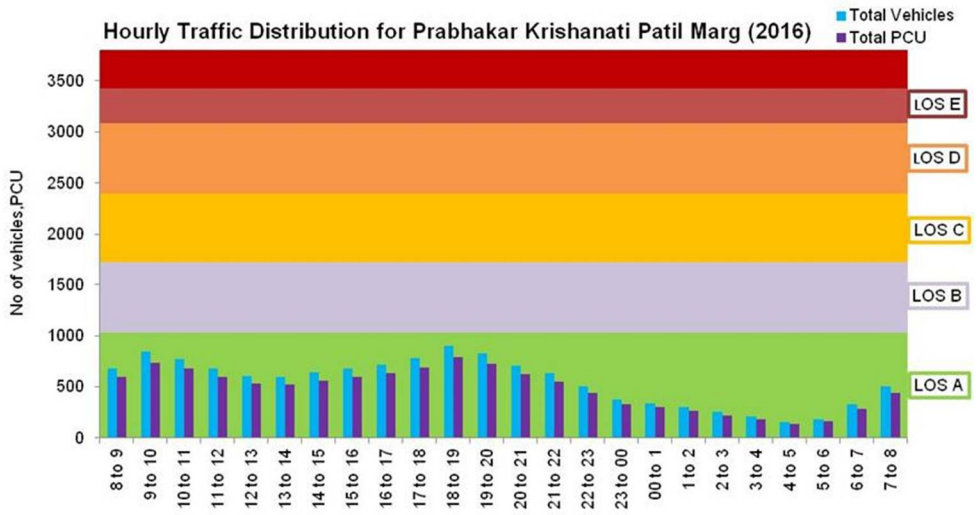

Figure 2-9 Hourly Traffic Distribution for Prabhakar Krishanati Marg

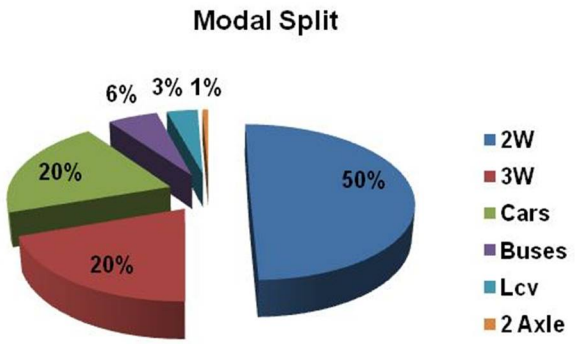

Figure 2-10 Modal Split (vehicles) for Prabhakar Krishanati Marg

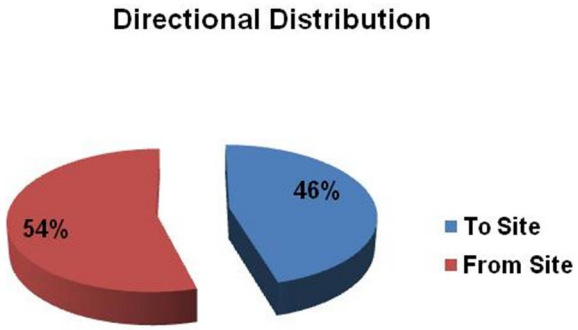

Figure 2-11 Directional Distribution for Prabhakar Krishanati Marg

Based on preliminary analysis it was observed that:

- Peak morning traffic was observed between 9 and 10 AM and peak evening traffic was observed between 6 to 7 PM.
- The vehicular traffic predominantly consists of cars and two wheelers.
- Directional distribution analysis indicated that traffic is coming more from site.

3 PROPOSED DEVELOPMENT

The plot is being developed as a residential project having a total of 174 units comprising of 255 parking spaces.

3.1 Project Connectivity and Access

Provision of access points to drop off /pickup have been planned to facilitate efficient circulation and dispersal of traffic. These access points shall provide entry / exit facility to parking and drop off locations and are strategically located and designed in such a way that it not only adds efficacy to circulation and accessibility but also helps in safety, security and traffic management. The access points provided for the project is illustrated in Figure 3-1.

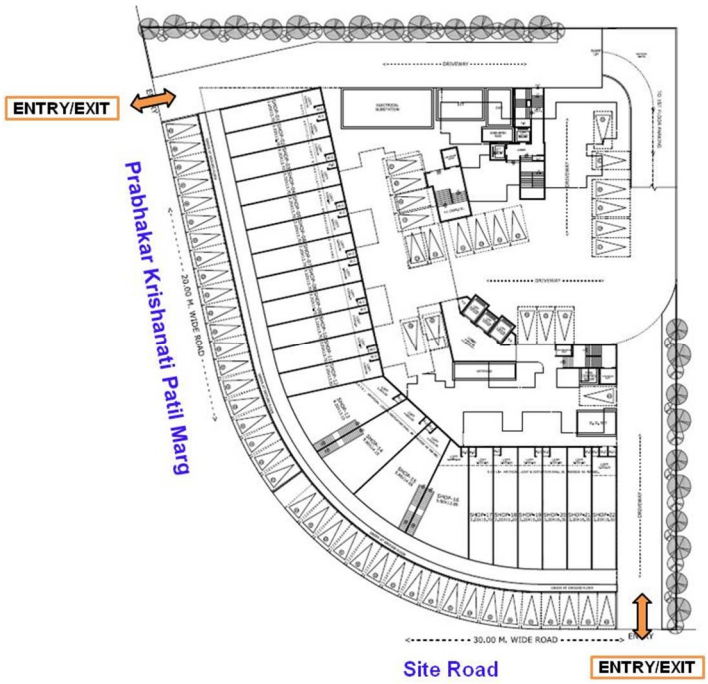

Figure 3-1 Access Points for Project Area

3.2 Unit Statement

The no of units and its configuration is as given below for residential components

Total No of Units	
Residential sale	174
Commercial	1341.151 Sq m

3.3 Parking Statement

All the parking required for the project is being accommodated within the project premises. The parking statement is given in Table 3-1

Table 3-1 Parking Statement

No of Car Parking Spaces	
Third Floor	65
Second Floor	65
First Floor	65
Ground Floor	60
Total	**255**

4 TRAFFIC ANALYSIS

The traffic analysis comprises of:

- Traffic Forecast
- Traffic Impact Analysis
- Traffic Circulation

4.1 Traffic Forecast

Traffic forecasting is the process of estimating the total number of trips generated and attracted by each land-use.

Trip: A trip is an individual's one way travel from one point (origin) to other (destination). The trip can be for various reasons such as work, business, education

Traffic forecasting is done using trip generation rates which are developed to estimate the number of trips generated from specific household and/or land use. For the purpose of this study, ITE trip generation manual were referred for arriving at basic trip generation rates and these rates were further modified suitably to represent Indian conditions. The no of trips include visitors, services and other trips attracted by residential, educational and commercial land use.

The project is expected to be commissioned by the year 2019. This would generate additional trips during day and peak hours. The trips generated by the project are given in table below:

Table 4-1 Trip Generation

Description	AM Peak Hour		PM Peak Hour		Total Trip AM Peak Hour	Total Trip PM Peak Hour
	Trip in	Trip out	Trip in	Trip out		
Residential (174 Flats)	7	29	28	15	37	43
Commercial (1341.151 sq m)	5	1	2	3	6	5

A traffic growth of 5% is considered per year for the surrounding network. Based on this, the traffic has been forecasted and has been summarized in Table 4-4 and Table 4-5.

Table 4-2 Base Traffic Forecast for Project Network Roads

Road Name	Description	Peak Traffic Volume in 2016 (PCU/hr) (A)	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio* (Peak volume /capacity)	LOS
Site Road	6 Lane 2 Way (Sub Arterial)	1422	6143	0.23	A
Prabhakar Prashanati Patil Marg	4 Lane 2 Way (Undivided) (Sub Arterial)	789	3429	0.23	A

This project being of residential land use, once commissioned will be generating predominantly outgoing and incoming traffic during morning and evening peak hours respectively. There will be various modes of vehicles contributing to the traffic.

4.2 Traffic Assignment

Trip distribution essentially describes that how the generated / attracted traffic arrives and departs from the project development site and in which direction. An overall trip distribution was developed for the site after a review of the existing travel patterns in the area. The volume of traffic generated / attracted will have a defined pattern of distribution both for entry and exit. Locations of the residential zones, major roadways and highways that will serve the development have been considered to arrive at trip distribution.

The project site is surrounded by a well planned road network. Existing neighboring roads will carry traffic from and towards the site. The impact of the project traffic would be predominantly on Site Road and Prabhakar Krishanati Patil Marg. Following has been assumed for assignment of trips on existing road network.

Table 4-3 Trip Assignment on Existing Road Network

Road Name	Project Impact (%)
Site Road	30
Prabhakar Krishanati Patil Marg	100

4.3 Vehicle Circulation

The project is a residential project which would accommodate 174 units. Multiple access points for vehicles have been provided in order to ensure smooth vehicle movement. This has been illustrated in Figure 3-1. Also, the floor wise circulation proposed for the project has been illustrated in Figure 4-1 and Figure 4-2.

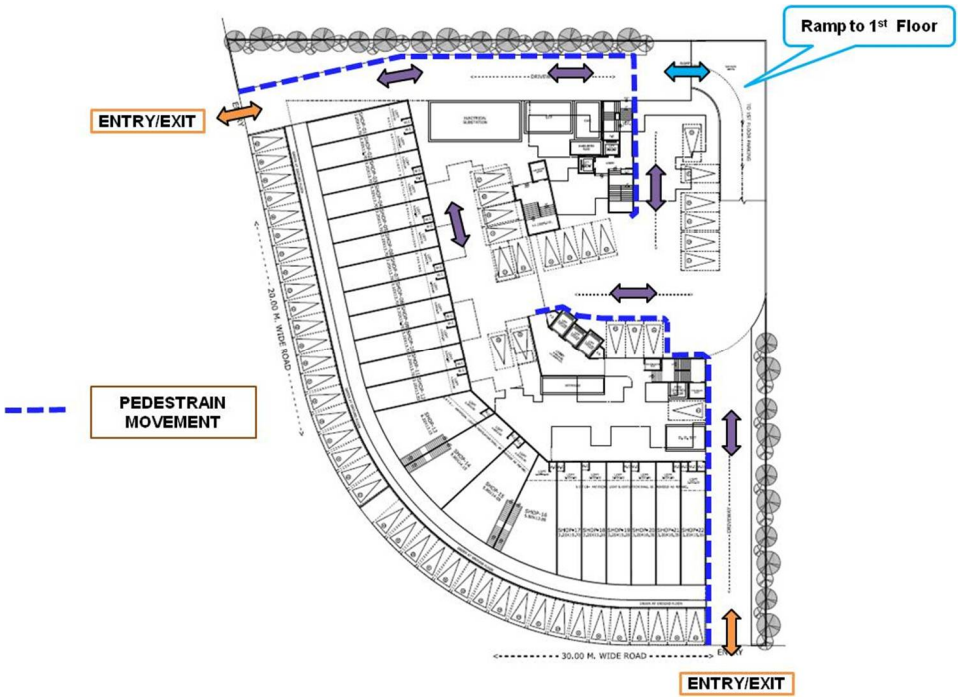

Figure 4-1 Ground Floor Circulation Plan

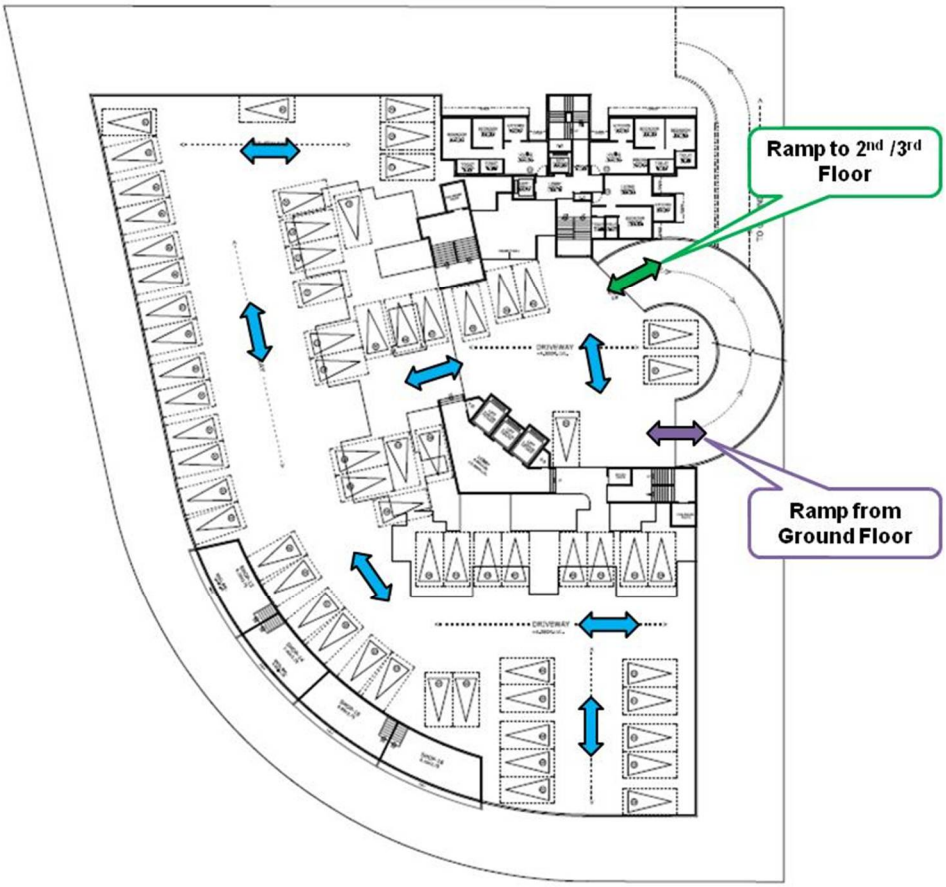

Figure 4-2 1st Floor Circulation Plan

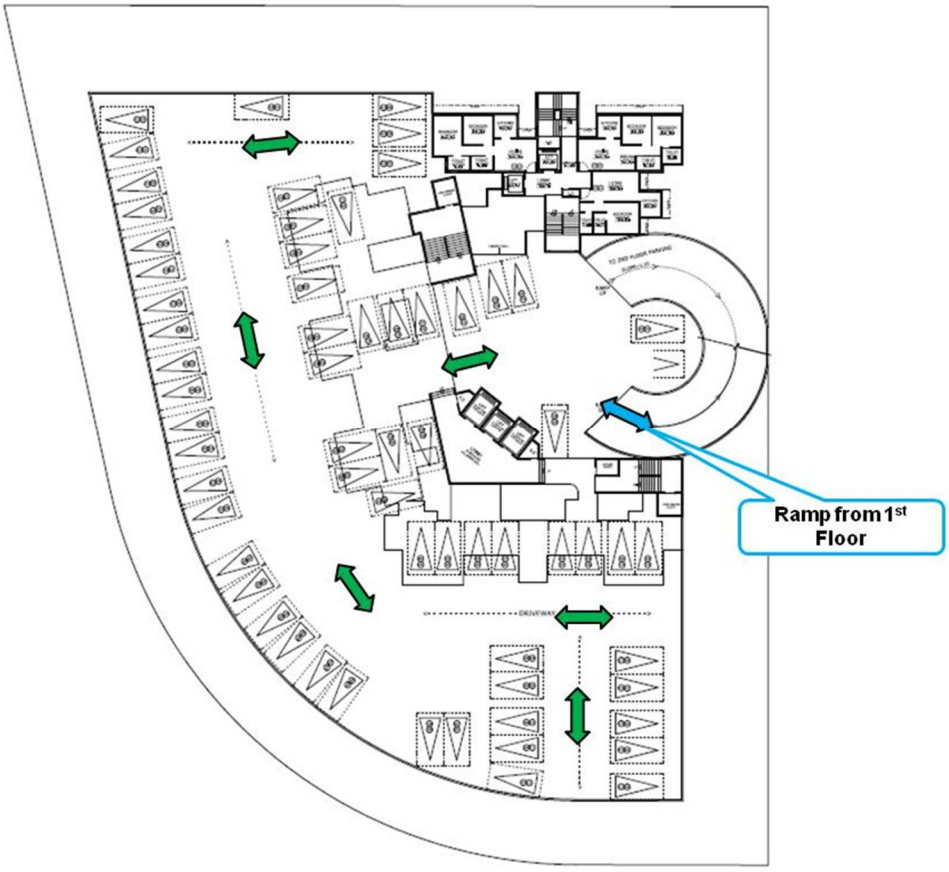

Figure 4-3 2nd and 3rd Floor Circulation Plan (Typical)

4.4 Traffic Impact Analysis

The traffic on Site Road and Prabhakar Krishanati Patil Marg was analyzed to assess its traffic impact on the existing roads.

Future traffic on adjoining roads shall comprise of following two major components:

- Base Road Traffic (forecasted to year 2020 and 2025)
- Project Traffic (2020 and 2025)

The road traffic has been forecasted for year 2020 and 2025. This total traffic on the road is compared with its capacity. This V/C ratio of peak traffic volume and capacity is used as an index to determine level of congestion on link which is likely to occur when projected traffic is operative on link. Pedestrian traffic is assumed to use footpaths and not affect the road capacity. The summary of results for future traffic link flow conditions at different access roads is shown in Table 4-4 and Table 4-5.

Table 4-4 Traffic Capacity Analysis of Access Roads – 2020

Road Name	Peak Traffic Volume in 2020	Project Traffic	Total Traffic in 2020	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio (Peak volume /capacity)	LOS
	(PCU/hr)(A)	(PCU/hr) (B)	(A + B)			
Site Road	1706	10	1716	6143	0.28	A
Prabhakar Prashanati Patil Marg	947	33	980	3429	0.29	A

Table 4-5 Traffic Capacity Analysis of Access Roads – 2025

Road Name	Peak Traffic Volume in 2025	Project Traffic	Total Traffic in 2025	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio (Peak volume /capacity)	LOS
	(PCU/hr)(A)	(PCU/hr) (B)	(A + B)			
Site Road	2062	14	2076	6143	0.34	B
Prabhakar Prashanati Patil Marg	1144	47	1191	3429	0.35	B

**Note: If V/C ratio <1.0, it indicates acceptable level of service (LOS)*

The above results indicated that there are no concerns on account of project traffic and the traffic will continue to run as usual even after commissioning of project in year 2020.

Under present configuration the roads will operate at V/C ratio of maximum 0.29 and 0.35 for the year 2020 and 2025 respectively during the peak hour after completion of the proposed development, which indicates the traffic will continue to run as usual with appropriate vigil during peak hours after commissioning of project by year 2020.

5 OTHER IMPORTANT ASSESSMENTS

5.1 Swept PATH ANALYSIS

It is the analysis of the path of the design vehicle undertaking a movement and/or a turning maneuver. At a basic level this includes calculating the thread of each wheel during the turn and also calculating the maneuvering space needed by the vehicle body (front & rear overhang).

5.2 Objectives

The objectives of performing swept path analysis are as follows:

- To check that the plan layout can accommodate the movement of the design vehicle expected by the development.
- To provide solutions to possible geometric congestions on the site.
- To provide information of the proposed layout and see if it serves the purpose, especially at turns where head room for vehicle maneuvers is limited.
- To provide to local authority and developers precise information and the swept path analysis of vehicles overlaid on the proposed site layout to demonstrate that the vehicles can maneuver safely and efficiently within the site layout.

5.3 TYPICAL FLOOR PLAN

Entry/Exit points hold the key to a well efficient circulation plan. A well defined Entry/Exit area eases out traffic movement and reduces unnecessary congestion during peak hours. Circulation path for fire tender vehicle travelling through entry and exit was analyzed.

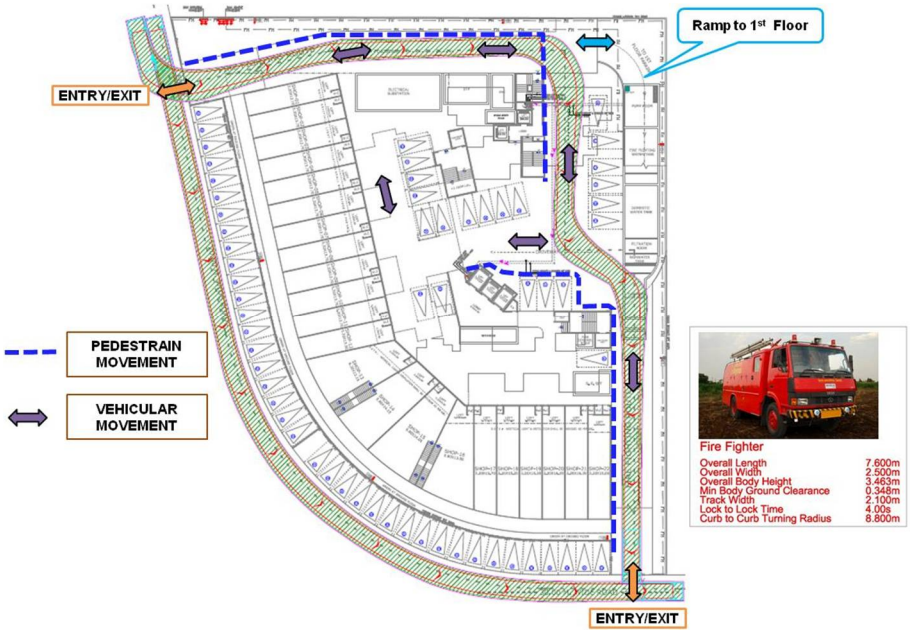

Figure 5-1 Swept Path Analysis Fire Tender Movement

6 TRAFFIC MANAGEMENT PLAN

The improvements to maintain the required level of service can be implemented by adopting traffic management measures for efficient traffic operations. Traffic Management Plan (TMP) indicates traffic routes and the measures for traffic regulation. It indicates the roads for use of certain classes of traffic, the location of traffic control i.e. signage and markings and the directions in which traffic should move. These are necessary for safe and efficient movement of vehicles and pedestrians.

6.1 Traffic Calming

A Traffic Management plan indicating traffic circulation, traffic calming and traffic control is indicated in Figure 6-3.Traffic calming is intended to slow and control motor-vehicle traffic in order to improve safety for pedestrians and bicyclists. Traffic calming measures are of various types like speed tables, curb extension, chicane etc. These are mitigation measures to ensure safety.

Following are the proposed specific improvements for each street.

6.2 Traffic Control Measures

The internal roads are undivided to maintain flexibility of traffic lanes. Minimum 6m wide roadway width has been provided for the movement of vehicles. Recommended design speed on the internal road is 15kmph and on the turns is 10kmph. Speed tables will be provided near the entrance/exit point to control traffic and regulate speed of vehicles.. An illustrative picture is also shown in Figure 6-1. Additionally, the following shall be required to maintain traffic flow at required level of service.

- Road Markings and Signages: Proper road markings (edge, median, arrows, turning, Kerb) and signages (direction, turning, speed, and pedestrian crossings) will be installed and maintained on all roads in the vicinity of project premises.
- On-street parking will be prohibited on all external and internal streets.
- Pick and drop at designated places only.
- Preferably no U-Turn on roadway
- Traffic calming measures – speed tables, signage

Apart from internal signage – it will be requested to provide necessary signage and traffic control measures, on neighboring roads, – such as Speed limit, Left hand curve, pedestrian crossing etc (Refer Table 6-1).

Table 6-1 Traffic Control Measures

Sr. No	Description	Signage
1	Speed Limit	
2	Silence Zone	
3	Pedestrian Crossing	
4	Left Hand Curve	

Figure 6-1 Illustration of a Speed Hump

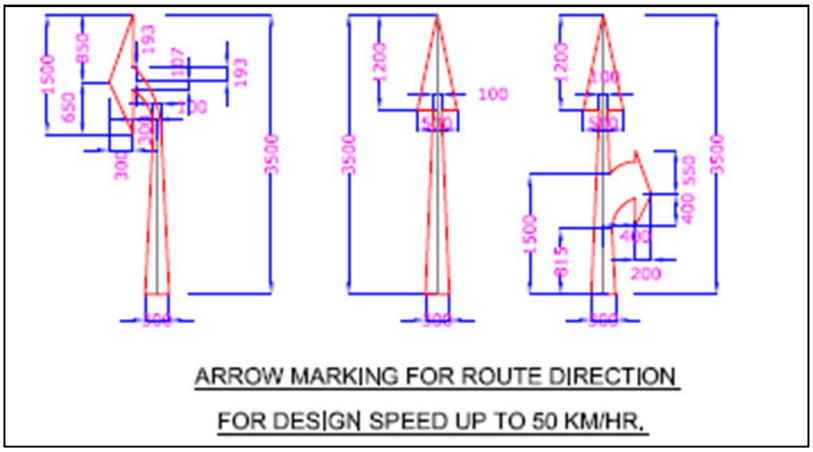

Figure 6-2 Pavement Markings

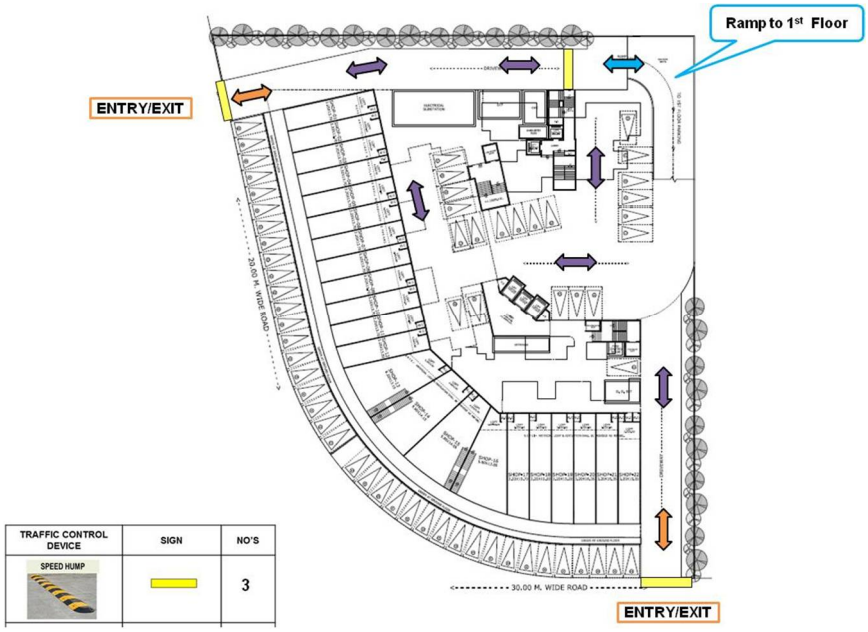

Figure 6-3 Traffic Calming Measures

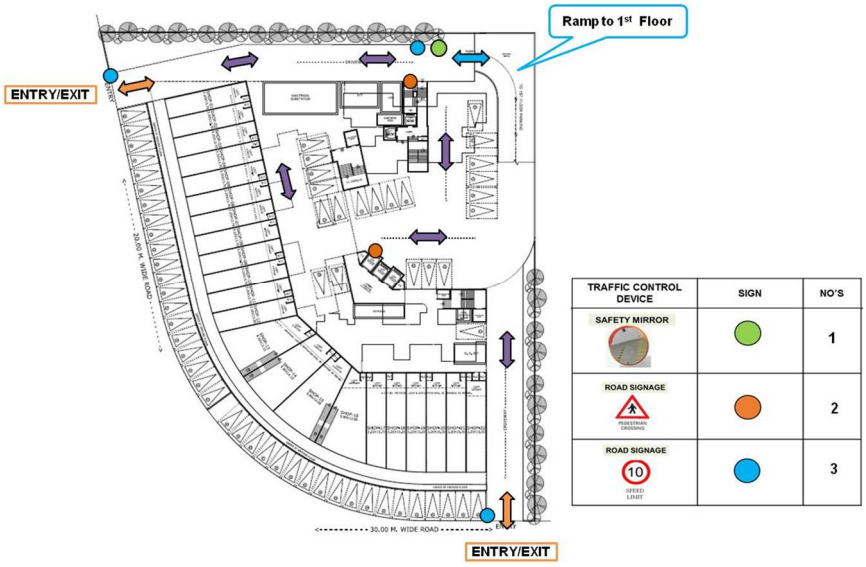

Figure 6-4 Traffic Management Plan

7 CONCLUSIONS & RECOMMENDATIONS

The traffic impact analysis was conducted and the results were discussed in earlier section. The conclusions and recommendations are summarized below:

1) The project traffic has been forecasted for year 2020 and 2025; this has been superimposed along with existing projected traffic to arrive at future traffic for year 2020 and 2025.

2) The forecast traffic on the roads adjoining the project namely Site Road and Prabhakar Krishanati Patil Marg will operate at acceptable level of service in future up to 2025.

3) A Traffic Management Plan in terms of traffic calming measures and traffic control measures has been devised and proposed to maintain adequate level of service and safety of vehicles and pedestrian.

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