

***Environmental Impact Assessment Report  
Of  
Residential Development***

***Project Proponents***

***M/s. Evie Real Estate Private Limited***

***At  
Kanjur Marg (East), Mumbai - 400080***

Prepared By:




**M/s Ultra - Tech**

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**Approved By: NABET- Quality Council of India**



EIA execution Period : August 2019 to October 2019  
Generation of baseline data : 15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018  
Report Released By : Mrs. Deepa Tamhane Karnik  
In the capacity of : EIA Coordinator  
Signature : 

## **PREFACE:**

**This EIA report is prepared as per Standard Terms of Reference (TOR) notified by Ministry of Environment & Forests and Climate Change (MOEF & CC) dt. 10.04.2015 to M/s. Evie Real Estate Private Limited at Village Kanjur, Kanjurmarg (E), Mumbai - 400042. EIA manual prepared by Administrative Staff College of India, Hyderabad is followed while preparing this EIA report.**

## **Disclaimer:**

*This report has been prepared with all reasonable skills, knowledge, care and diligence by M/s. **ULTRA TECH** (Environmental Consultancy & Laboratory Thane) the NABET accredited and national level leading Environmental Consultancy Organization within the terms of the contract with the client (Project Proponents), incorporating their General Terms and Conditions of Business and taking account of the resources devoted to it by Business Agreement. The report was discussed with the project proponent in details before releasing.*

*This EIA report has been prepared using information received from Client, collecting primary data and compilation of secondary data from available resources. We are not responsible for the origin and authenticity of the information, drawings or design details provided by the Client.*

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# EVIE REAL ESTATE PRIVATE LIMITED

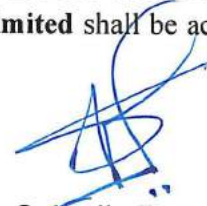
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## DECLARATION BY PROJECT PROPONENT

I Mr. **Subodh Runwal** hereby confirm that M/s. ULTRA TECH (NABET Accredited EIA Consultants, NABET Certificate No. NABET/EIA/1720/RA0094 has prepared the Environment Impact Assessment Report for the *Residential development at village Kanjurmarg.*

I hereby undertake the ownership of EIA report on behalf of **Evie Real Estate Private Limited**; also confirm that **M/s. Evie Real Estate Private Limited** shall be accountable for all the information mentioned in this report.

Signature



Name Mr. Subodh Runwal

Designation Managing Director

**Declaration by Experts contributing to the EIA report for Residential Development at Kanjurmarg (East), Mumbai, Dist. - Mumbai, State – Maharashtra.**

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

**EIA Coordinator:**

Name: Mrs. Deepa Tamhane Karnik

Signature and Date: 

Period of Involvement:

Generation of Baseline data : October 2017 to January 2018,



EIA execution Period: August 2019 to October 2019

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**Functional Area Experts:**


Functional Area Experts involved				
No.	Functional areas	Name of the expert/s	Involvement (Period and task)	Signature and date
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2.	WP	Mrs. Rekha Margam	October 2017 to January 2018 and September 2019	
3.	SHW	Ms. Deepa Tamhane Karnik	October 2017 to January 2018 and September 2019	
4.	SE	Mrs. Mamta Bavaskar	September 2019	
5.	EB	Mrs. Padmini Shinde	October 2017 to January 2018 And September 2019	
6.	SC	Mrs. Padmini Shinde	October 2017 to January 2018	
7.	AQ	Mr. Satish Yewale	September 2019	
8.	NV	Mr. Chintan Athalye	October 2017 to January 2018 and September 2019	
9.	LU	Mr. Yogesh Raskar	October 2017 to January 2018 and September 2019	
10.	RH	Mr. Bonde	September 2019	

**Other Experts Involvement:**

Area	Name of expert	Organization	Sign
Hydrogeological study	Dr. Vinay Nikam	Enviro-con Urban Hydro Environment Centre	
Geotechnical Investigation Study	Mr. Jaydeep Wagh	GEOCON INTERNATIONAL PVT. LTD.	

**Declaration by the Head of the Accredited Consultant Organization/ authorized person**

I, Mrs. Deepa Tamhane Karnik hereby, confirm that the above mentioned experts prepared the EIA for **Residential Development** at Kanjurmarg (East), Mumbai, Dist.- Mumbai , State – Maharashtra . I also confirm that the consultant organization shall be fully accountable for any misleading information mentioned in this statement.

Signature: 

Name: Mrs. Deepa Tamhane Karnik

Designation: Director

Name of the EIA Consultant Organization: **ULTRA TECH**

**NABET Certificate No. & Issue Date: NABET/EIA/1720/RA0094 Dated 28/05/2018**

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<b>No.</b>	<b>Enclosure</b>	<b>Remarks</b>
1.	Environmental Clearance (dt. 21.09.2016 and dt. 14.02.2019)	Due to size limitation shall be submitted in hard copy
2.	DP Remarks	
3.	NOC for user change	
4.	Layout plan	Attached
5.	Plan showing location of D.G. Sets	Due to size limitation shall be submitted in hard copy
6.	Contour Map	
7.	List of Existing Tree Inventory	
8.	Traffic study report	
9.	Plan showing location of RWH Tanks, STP, SWD system and Solid waste management	
10.	Tree Plantation plan	
11.	Storm water study drainage report	
12.	Extract of Geotechnical Investigation Report	
13.	ECBC study report	
14.	Wind, Shadow, Heat island and Day light ventilation analysis report	
15.	Safety Standard Operating Procedures	Attached
16.	Methodology for Soil, Water, Air and Noise	
17.	Lab reports	
18.	Standard TOR	

# *Executive Summary*

# EXECUTIVE SUMMARY

## 1.0 INTRODUCTION

The project site under reference is located at Village Kanjur, Kanjurmarg (E), Mumbai - 400 042 and falls under the jurisdiction of Municipal Corporation of Greater Mumbai (MCGM).

This project has received Environmental Clearance (EC) in September 2016 and amendment in Environmental Clearance dt. 14<sup>th</sup> February 2019 from SEIAA, Maharashtra. Copies of EC are attached as Enclosure. The Project Proponents have reapplied for Environmental Clearance in lieu of increase in permissible FSI as per **DCPR 2034**. Received amended IOD & CC from M.C.G.M. dt. 18.03.2019.

Project proponents have planned a residential development. Along with Sale Component this project also offers flats for Economically Weaker Section (EWS) which will facilitate living conditions for this section of the society.

As per the Environment Impact Assessment (EIA) Notification dated 14<sup>th</sup> September 2006 the proposed project falls under '**Category B**' with project or activity type number '**8 (b)**', which require preparation of EIA Report

This EIA Report addresses the probable environmental impacts due to this project and proposes mitigation measures for the same. The EIA Report is prepared, based on Standard Terms of Reference (ToR) notified by Ministry of Environment & Forests and Climate Change (MoEF & CC) dt. 10.04.2015.

## 1.1 PROJECT DESCRIPTION

### i) Location and Settings:

Project site is located in village Kanjur at Kanjurmarg, at latitudes of 19°7'55.57"N and longitudes of 72°55'56.88"E.

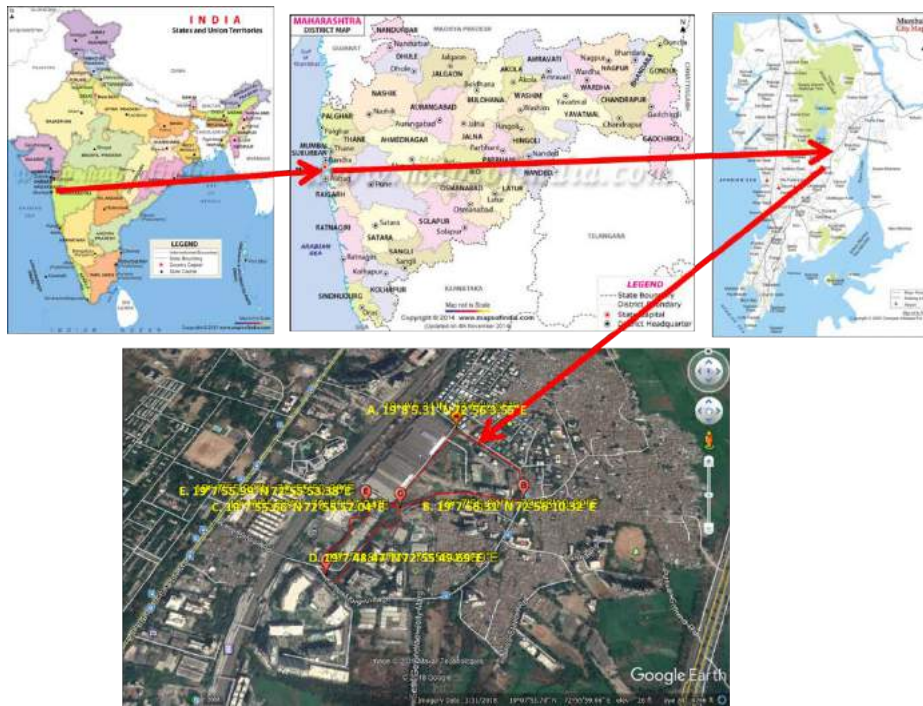
The site is surrounded by the following:

- East: Residential area
- West: Residential / Industry area
- North: Residential area
- South: Road

The nearest railway station is Kanjurmarg railway station (Within 1.00 km) on the main line of Central Railway of Mumbai.

Latitude and Longitude of the project site are given as below:

Points as shown in Figure 1	Latitude	Longitude
A.	19°8'5.31"N	72°56'3.55"E
B.	19°7'56.31"N	72°56'10.32"E
C.	19°7'55.66"N	72°55'57.04"E
D.	19°7'48.47"N	72°55'49.69"E
E.	19°7'55.99"N	72°55'53.38"E



**Fig. 1: Project Location**



**Fig. 2: Study area of Proposed Project  
10 Km radius around the plot boundary (Scale - 1: 1000)**

ii) **Demolition and Development Strategy:**

- Part demolition of existing structure is completed, remaining structures shall be demolished.
- The construction period for project is approximately 7 years.

iii) **Project Proposal:** The area statement for the project is as follows

**Table 1: Area Statement**

No.	Description	Area (Sq. mt.)
1.	Total Plot Area	92,398.41
2.	Deductions (Road setback in R zone + Road set back in I3 Zone + ROS 1.5 reservation in R zone + Amenity area+ Road set back as per DCR 2034)	33,435.38
3.	Net Plot Area	58,963.01
4.	Ground Coverage Area	17,392.13
5.	Recreational Ground (R.G.) Area	15,507.63
6.	<b>Built – up Area as per FSI (including Fungible area)</b>	<b>1,59,514.12</b>
7.	<b>Built – up Area as per NON FSI</b>	<b>2,36,765.13</b>
8.	<b>Total Construction Built – up Area (FSI + NON FSI)</b>	<b>3,96,279.25</b>

**Table 2: Parking Statement**

Building	Parking Space Provision (Nos.)	
	4W	2W
<b>Building 1</b>	1883	465
<b>Building 2</b>	1212	306
<b>Total</b>	<b>3095</b>	<b>771</b>

**Table 3: Project Proposal & occupancy**

Buildings	Building Configuration	No. of Flats	Occupancy
<b>2 Buildings having total 8 wings &amp; total Flats: 2425 Nos.</b>			
<b>Building 1</b>	<b>Wing A:</b> 2 Basements + 4 Podia + 50 Upper Floors	293	6775
	<b>Wing B:</b> 2 Basements + 4 Podia + 50 Upper Floors	293	
	<b>Wing C:</b> 3 Basements + 4 Podia + 50 Upper Floors	193	
	<b>Wing D:</b> 3 Basements + 4 Podia + 50 Upper Floors	281	
	<b>Wing E:</b> 3 Basements + 4 Podia + 43 Upper Floors	252	
<b>Building 2</b>	<b>Wing I:</b> 3 Basements + 4 Podia + 51 Upper Floors	371	5130
	<b>Wing J:</b> 3 Basements + 4 Podia + 51 Upper Floors	371	
	<b>Wing K:</b> 3 Basements + 4 Podia + 51 Upper Floors	371	
<b>TOTAL</b>		<b>2425</b>	<b>11905</b>

*Reference (for occupancy): National Building Code (NBC) -2016 – Part 9, Page 11, Occupant Load*

The utilities such as electric supply, water supply and their sources, sewage treatment plants, rain water harvesting, solid waste management, etc. are listed in following table.

**Table 4: Details about utilities & environmental liabilities**

No.	Component	During Construction Phase	During Operation Phase				
1	Electrical Supply	Source: Maharashtra state Electricity Distribution company Ltd. (MSEDCL)	Source: Maharashtra state Electricity Distribution company Ltd. (MSEDCL) <table border="1"> <tr> <td><b>Connected Load</b></td> <td>15777 KW</td> </tr> <tr> <td><b>Maximum Demand</b></td> <td>7352 KW</td> </tr> </table>	<b>Connected Load</b>	15777 KW	<b>Maximum Demand</b>	7352 KW
	<b>Connected Load</b>	15777 KW					
	<b>Maximum Demand</b>	7352 KW					
DG sets for emergency backup during power failure	As per requirement	2 DG sets of 750 kVA each and 2 DG sets of 500 kVA each					
Energy Saving	--	With the use of various energy conservation methods and non-conventional (i.e. solar) methods energy shall be saved. <ul style="list-style-type: none"> <li>• <b>Energy saved as per Conventional Base Case is 22%</b></li> <li>• <b>Saving through renewable energy 4.52%</b></li> </ul>					
2	Water Supply & sources	i. For workers : 74 KLD : Source: Municipal Corporation of Greater Mumbai (M.C.G.M.) ii. For construction purpose: 60-70 KLD: Source: Water tankers	<b>Fresh Water Supply:</b> 1072 KLD [For Domestic: From M.C.G.M.] and 26 KLD [For Swimming pool make up from tanker water of potable quality].  <b>Secondary requirements: 645 KLD</b> <ul style="list-style-type: none"> <li>▪ Flushing = 536 KLD</li> <li>▪ Gardening = 109 KLD</li> </ul>				
3	Sewage Generation, Collection, Treatment	i. Quantity of Sewage : 72 KLD ii. Disposal: Disposal to existing sewer line	Sewage generation from the project will be 1394 KLD and will be treated in 3 Sewage Treatment Plants of total capacity 1464 KL. The treated sewage shall be reused for gardening (109 KLD) and flushing (536 KLD) Excess treated sewage shall be disposed to the sewer line.				
4	Solid waste Management	<ul style="list-style-type: none"> <li>• There is provision of designated storage space for excavated earth, construction waste and hazardous wastes.</li> <li>• Segregation and storage for all solid waste streams is being practiced</li> </ul>	<ul style="list-style-type: none"> <li>• Segregation at source for all solid waste streams</li> <li>• Total 349 Sq.mt. of space for solid waste management shall be earmarked. This includes the space required for collection, segregation, OWC for treatment, curing and storage of manure</li> </ul>				
		<ul style="list-style-type: none"> <li>• Disposal of segregated solid waste to M.C.G.M. for further disposal</li> <li>• Disposal of Hazardous waste to authorized CHWTSDF sites.</li> </ul>	<b>Municipal Solid waste:</b> <ul style="list-style-type: none"> <li>• Biodegradable waste will be treated by composting in OWCs</li> <li>• The non-biodegradable waste shall be handed over to recyclers</li> <li>• Dried sludge from STP will be used as manure.</li> </ul>				

No.	Component	During Construction Phase	During Operation Phase
5	Rain Water Harvesting	--	Provision of 2 RWH tanks of total capacity 160 KL
6	Storm Water Drainage	<ul style="list-style-type: none"> <li>• Proper management of channelization of storm water from site by using proper internal SWD system and discharge point of having adequate capacity</li> <li>• Adequate carrying capacity of road side drain and main drain of carrying storm water from plot and adjoining areas</li> <li>• Use of screens and silt traps to SWD and proper maintenance of storm water drainage to avoid choking of drains and flooding on site</li> <li>• Surface rainwater to be passed through oil &amp; grease trap &amp; desilting chamber and then transferred to municipal storm water drain of adequate capacity</li> </ul>	

## 1.2 DESCRIPTION OF ENVIRONMENT:

### i) Environmental sensitive places in the study Area:

**Table 5: Environmental Sensitive Places within 10 km**

Environmental Sensitive Places	Locations	Aerial distance (in km) from Plot boundary
National Park / Wildlife Sanctuary	Sanjay Gandhi National Park	2.00
	Thane Creek Flamingo Sanctuary	3.00
Nature Parks /Mangroves vegetation	Mangroves	1.00
Water bodies	Mithi River	6.00
	Thane Creek	3.00
	Yoor Lake	10.00
	Tulsi Lake	6.00
	Powai Lake	2.00
	Vihar Lake	2.00
	Upvan Lake	10.00
	Chandivali Lake	4.00
	Ambe Ghosle Lake	9.00
	Jail Lake	9.00
	Brahmala Lake	9.00
	Makhmali Talao	8.00
	Siddheshwar Lake	8.00
	Masunda Lake	8.00
	Kachrali Lake	8.00
	Hariyali Lake	7.00
	Raila Devi Lake	7.00
	Digha Lake	8.00
Mogliche Lake	9.00	
Juhu Village lake	9.00	
DAKC lake	8.00	
Ghansoli Lake	7.00	
Gothivali Khadan Lake	7.00	
Archaeological sites	Kondivate (Mahakali) Caves	7.00
	Kanheri Caves	9.00

## ii) Methodology for classification of the Study Area:

Classification of the study area for generating the baseline data is as per Guidance Manual for Building, Construction projects approved by MoEF & CC for preparation of EIA report and as per the Standard Terms of Reference (ToR) notified on dt. 10/04/2015 for Building and Large Construction projects by MoEF & CC. This is tabulated as follows:

**Table 6: Methodology for classification of the Study Area**

No.	Study Area	Type of Baseline data collection	Attributes
1.	Project Site	Primary	Ambient air quality, Ground water, Surface water, Noise levels, Flora, Fauna, Socio economic aspects, Traffic studies.
2.	Area with angular distance of 500 meters surrounding the project site	Primary	Ambient air quality, Ground water, Surface water, Flora, Fauna, Noise levels (100 m radius from site), Traffic study
3.	Area with angular distance of 500 meters upto 10 km surrounding the project site	Secondary data from various reliable sources.	Meteorological data, Surface water bodies, Flora, Fauna, Socio economic aspects, Land environment.  Whenever the secondary data is not available primary data collection to be done for the respective attribute.

### • Generation of Baseline Data:

Baseline information with respect to air quality, noise level, water and soil quality, biological environment in the study area were collected by conducting primary sampling / field studies during 15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018 (Post-monsoon season) for obtaining previous Environmental Clearance. Baseline status of Land and Socio-economic environment were also studied simultaneously and subsequently. Traffic survey was conducted and detailed Traffic study was carried out. Detailed report is enclosed.

The environmental attributes studied are detailed out in Table 9.6 as follows:

**Table 7: Environmental Attributes**

Sr. No.	Attributes	Data Collection and Source		Results/ Major findings and Interpretation of Baseline Data																																																						
		Project Site to 500 m radius	500 m radius to 10 km radius from Project Site																																																							
<b>1</b>	<b>Air Environment</b>																																																									
<b>i</b>	<b>Ambient air quality</b>	<b>Type of data:</b> Primary data <b>Sampling Locations:</b> Total 5 locations including project site <b>Period:</b> 15 <sup>th</sup> October 2017 to 15 <sup>th</sup> January 2018	--	<table border="1"> <thead> <tr> <th rowspan="2">Station Code</th> <th rowspan="2">AAQM Station</th> <th>PM<sub>10</sub> (24hr.) (µg/m<sup>3</sup>)</th> <th>PM<sub>2.5</sub> (24 hr) (µg/m<sup>3</sup>)</th> <th>SO<sub>2</sub> (24hr.) (µg/m<sup>3</sup>)</th> <th>NO<sub>x</sub> (24hr) (µg/m<sup>3</sup>)</th> <th>CO (1 hr) (mg/m<sup>3</sup>)</th> </tr> <tr> <th>Average</th> <th>Average</th> <th>Average</th> <th>Average</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>AAQM1</td> <td>Project site</td> <td>46</td> <td>83</td> <td>18</td> <td>24</td> <td>0.9</td> </tr> <tr> <td>AAQM2</td> <td>Near Datar Colony, Bhandup(E)</td> <td>54</td> <td>86</td> <td>29</td> <td>37</td> <td>1.5</td> </tr> <tr> <td>AAQM3</td> <td>Near Yashwantrao Chavan Udyan, Kanjurmarg</td> <td>45</td> <td>77</td> <td>20</td> <td>27</td> <td>1.1</td> </tr> <tr> <td>AAQM4</td> <td>Near Klick to Buy Ventures (p) Ltd. Kanjurmarg</td> <td>56</td> <td>84</td> <td>27</td> <td>37</td> <td>2.2</td> </tr> <tr> <td>AAQM5</td> <td>At Ambedkar Nagar Nr. Gundecha Heights, Kanjurmarg</td> <td>50</td> <td>79</td> <td>26</td> <td>36</td> <td>1.1</td> </tr> </tbody> </table> <p>After tabular representation of Ambient Air quality it can be observed that:</p> <ul style="list-style-type: none"> <li>○ The average values of PM<sub>2.5</sub> ranged in between 45 µg/m<sup>3</sup> to 56 µg/m<sup>3</sup> and PM<sub>10</sub> ranged in between 77 µg/m<sup>3</sup> to 86 µg/m<sup>3</sup></li> <li>○ The average values of SO<sub>2</sub> was in between 18 µg/m<sup>3</sup> to 29 µg/m<sup>3</sup>, NO<sub>x</sub> was in between 24 µg/m<sup>3</sup> to 37 µg/m<sup>3</sup> and CO ranged in between 0.9 mg/m<sup>3</sup> and 2.2 mg/m<sup>3</sup></li> <li>○ All the parameters were found to be within the desired limits specified by CPCB</li> </ul>	Station Code	AAQM Station	PM <sub>10</sub> (24hr.) (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (24 hr) (µg/m <sup>3</sup> )	SO <sub>2</sub> (24hr.) (µg/m <sup>3</sup> )	NO <sub>x</sub> (24hr) (µg/m <sup>3</sup> )	CO (1 hr) (mg/m <sup>3</sup> )	Average	Average	Average	Average	Average	AAQM1	Project site	46	83	18	24	0.9	AAQM2	Near Datar Colony, Bhandup(E)	54	86	29	37	1.5	AAQM3	Near Yashwantrao Chavan Udyan, Kanjurmarg	45	77	20	27	1.1	AAQM4	Near Klick to Buy Ventures (p) Ltd. Kanjurmarg	56	84	27	37	2.2	AAQM5	At Ambedkar Nagar Nr. Gundecha Heights, Kanjurmarg	50	79	26	36	1.1							
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		project site within 100 mt from project site		<table border="1"> <tr> <td>ANQM2</td> <td>Damle colony , Kanjur village</td> <td>Residential</td> <td>73 m.</td> <td>69</td> <td>56</td> </tr> <tr> <td>ANQM3</td> <td>Junction of Kanjur village road and Shah colony road</td> <td>Residential</td> <td>68 m</td> <td>71</td> <td>58</td> </tr> <tr> <td>ANQM4</td> <td>Backside of Crompton Greaves Ltd.</td> <td>Residential</td> <td>70 m</td> <td>68</td> <td>53</td> </tr> <tr> <td>ANQM5</td> <td>Near IES School, Kanjur</td> <td>Residential</td> <td>94 m</td> <td>58</td> <td>48</td> </tr> </table> <p>Comparison of the ambient noise levels with the standards specified by CPCB reveals that the day time and night time noise readings at all the locations are exceeding CPCB standards owing to vehicular movement in nearby roads.</p>	ANQM2	Damle colony , Kanjur village	Residential	73 m.	69	56	ANQM3	Junction of Kanjur village road and Shah colony road	Residential	68 m	71	58	ANQM4	Backside of Crompton Greaves Ltd.	Residential	70 m	68	53	ANQM5	Near IES School, Kanjur	Residential	94 m	58	48
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iii	<b>Meteorological Data</b>	--	<b>Type of data :</b> Secondary <b>Source:</b> Indian Meteorological Department (IMD), Mumbai	Meteorological data for one full year of Mumbai have been collected from IMD for year 2018. The parameters for which data have been collected are: <ul style="list-style-type: none"> <li>• Wind speed</li> <li>• Wind direction</li> <li>• Temperature</li> <li>• Relative humidity</li> </ul>																								
<b>2</b>	<b>Water Environment</b>																											
i	<b>Surface water</b>	No surface water bodies were observed within the project site boundary and within 500 m radius from project site	Total 4 locations namely Mithi River, Thane Creek, Yeoor Lake, Powai Lake for which primary sampling has been done.	The Classes of the water bodies found in study area are defined as per the CPCB guidelines. Depending on the same water quality criteria have been specified to determine its suitability for particular purpose.																								
ii	<b>Ground water</b>	<b>Type of data :</b> Primary <b>Sampling location:</b> Project site <b>Frequency:</b> Once during the study period	--	The ground water is not polluted. <ul style="list-style-type: none"> <li>○ pH of ground water samples within the range</li> <li>○ Total Dissolved Solids (TDS) found within the acceptable limit</li> <li>○ Major ions like Ca, Mg, Cl<sup>-</sup> and SO<sub>4</sub><sup>-2</sup> within the acceptable limit</li> </ul>																								

3	Land Environment																																		
i	<b>Contour and Drainage Pattern of the site and surroundings</b>	Contour plan of project site & surrounding Drainage Map of 1 KM radius from the project site.	The site is flat land. Detailed drainage pattern study is carried out.																																
ii	<b>Land use</b>	<b>GIS Study</b> Date of Pass: 3 <sup>rd</sup> March 2017	<p>The land use of the study area: (10 km) Six different land use/land cover classes have been identified in the area under study as follows:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Land use</th> <th>Area (Ha)</th> <th>Area (%)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Barren Land</td> <td>40.22</td> <td>12.1</td> </tr> <tr> <td>2</td> <td>Built up Land</td> <td>79.58</td> <td>24.0</td> </tr> <tr> <td>3</td> <td>Forest Vegetation</td> <td>42.28</td> <td>12.8</td> </tr> <tr> <td>4</td> <td>Mangrove Vegetation</td> <td>30.57</td> <td>9.2</td> </tr> <tr> <td>5</td> <td>Open Land</td> <td>119.48</td> <td>36.1</td> </tr> <tr> <td>6</td> <td>Water Body</td> <td>19.23</td> <td>5.8</td> </tr> <tr> <td></td> <td><b>Total Area</b></td> <td><b>331.36</b></td> <td><b>100</b></td> </tr> </tbody> </table> <p><b>Land use of project site:</b> Project site is partly in residential zone as per DP remarks and partly in industrial zone for which received NOC for change in Land use from Industrial (I) to Residential (R) zone.</p>	No.	Land use	Area (Ha)	Area (%)	1	Barren Land	40.22	12.1	2	Built up Land	79.58	24.0	3	Forest Vegetation	42.28	12.8	4	Mangrove Vegetation	30.57	9.2	5	Open Land	119.48	36.1	6	Water Body	19.23	5.8		<b>Total Area</b>	<b>331.36</b>	<b>100</b>
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iii	<b>Soil analysis</b>	<b>Sampling Location:</b> Project site	-- Results of soil analysis show that the soil is not polluted.																																
4	<b>Socio – Economic Environment</b>	Project site	<p>For Demographic details of Mumbai <b>Source :</b> ‘Census of India’ 2011 For Demographic details of S Ward of MCGM,</p> <p><b>Major Findings of the Socio – economic survey:</b></p> <ul style="list-style-type: none"> <li>• Project proponent should take appropriate steps to keep site environment clean during construction phase</li> <li>• There is labour colony for residential workers at project site</li> <li>• The basic facilities available at project site, in the labour camp such as proper sanitation, and toilet facility</li> <li>• Drinking and bathing water facility available in the labour colony for site workers</li> <li>• Safety and medical awareness posters are displayed in labour camp.</li> <li>• All necessary personal protective and safety equipment’s were provided to labours.</li> </ul>																																

			<p>Mumbai <b>Source:</b> Official website of MCGM (as per 'Census of India' -2011)</p>	<ul style="list-style-type: none"> <li>• Adequate first aid facilities were provided in the case of emergency treatment of injured persons.</li> <li>• There are security cabins for the watchmen's at project site</li> </ul>
5	<b>Biological Environment</b>	<p><b>Type of data :</b> Primary data <b>Period:</b> Once during the study period</p>	<p>The data pertaining to flora and fauna have been collected based on discussion with concerned forest department officials, local people and NGOs.</p>	<p>Details are given in <b>section 3.6 of Chapter 3 of the EIA report.</b></p>
6	<b>Traffic study</b>	<p>Traffic survey was carried out by M/s. Transportation and Traffic Engineering Consultants</p>		<ul style="list-style-type: none"> <li>• It is expected that the residential development will attract and generate an increase of vehicular traffic coming into the area.</li> <li>• It is estimated that the proposed development will attract and generate some 1200-1225 PCU's per hour from Building-1 (i.e. Tower A, B, C, D &amp; E) and Building- 2 (i.e. Tower I, J &amp; K).</li> <li>• This will include the traffic entering and exiting the proposed development. The traffic generated from the Residential development will be loaded on two different roads (i.e. Veer Savarkar Road and Kanjur Village Road).</li> <li>• As per existing condition Veer Savarkar road is 2-lanes, 2-way road. It is proposed as 18.3m wide DP Road. The widening of the road will improve the level of service. The traffic impact will be mitigated with the upcoming of new DP Roads in future.</li> <li>• These roads are planned as per the Development Plan (DP) Map of Mumbai. Moreover the proposed Metro Alignment along Lal Bahadur Shastri Road and Jogeshwari Vikhroli Link Road will reduce the traffic on surrounding roads and will further mitigate the traffic impact on surrounding roads.</li> </ul> <p>Detailed report stating impact and proposed mitigation measures is attached as Enclosure.</p>

### 1.3 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:

Impact identification for this project was done by using modified Delphi Technique. The modified Technique used considers 23 attributes and five weightages. Since with the methodical working of sensitivity index and weight-ages, the total scope of pollution potential has come to **363**, the project site fits into “**LOW**” Pollution Potential as per the ranking system suggested in Delphi technique. The activities that take place during construction phases and operation phase of the project and the potential impacts and mitigation measures are summarized as follows.

#### ➤ **Land and Air Environment:**

- Disposal of demolition debris (6000 cum) to authorized landfill site and steel (450 Ton) to authorized recyclers.
- Use of Construction waste (Brick, blocks, ceramic tiles, marbles etc.) for waterproofing work, paving & landscaping areas
- As on date 91876 cum excavated material has been generated. Reuse of 3900 cum material on site and disposal of remaining excavation material (87976 cum) to authorized landfill site as per permission from M.C.G.M.
- In future total 180594 cum excavation material shall be disposed to authorized landfill site as per permission from M.C.G.M.
- Measures shall be taken during transportation of demolition & construction Waste: (As per C & D Waste Management Rules 2016)
- Collection & Storage of Demolition & Construction Waste Management as per C & D Waste Management Rules 2016)
- Mandatory implementation of dust suppression of C & D Waste as per the Environment (Protection) Amendment Rules, 2018)

#### ➤ **Water Environment:**

- Use of water saving practices like dual flush cisterns, low loss plumbing fixtures to reduce water consumption
- Treatment of sewage into three Sewage Treatment Plants of total capacity 1464 KL; and its reuse for secondary requirements like flushing (536 KLD) and gardening (109 KLD) within site & excess treated sewage shall be disposed to the existing sewer line
- To keep a daily watch on pH, BOD, COD and TSS & O & G of the STP outlet to ensure good treatment of waste water with the help of onsite sensors and its reuse
- Rain water collection from terraces into 2 RWH tanks of total capacity 160 KL and its reuse thereby reducing the fresh water demand in monsoon season up to 35%.
- Provision of internal Storm water drainage system of total capacity 4.24 m<sup>3</sup>/s.
- External Storm water drainage of adequate capacity (43.34 m<sup>3</sup>/sec)
- Surface rainwater shall be passed through oil & grease trap & desilting chamber and then transferred to municipal storm water drain
- Proper maintenance of storm water drainage to avoid choking of drains and flooding on site

### 1.4 ENVIRONMENTAL MONITORING PROGRAMME:

During construction and operation phase Ambient Air Quality, Exhaust from DG Set, Noise Level, Water Analysis & Sewage Analysis shall be regularly done at the locations and frequencies specified in the statutory guidelines. Outside MOEF approved Laboratory is appointed for the regular monitoring.

The costing for environmental monitoring during construction phase shall be **Rs. 9.94 Lacs** and during operation phase shall be **Rs. 4.37 Lacs**.

## **1.5 ADDITIONAL STUDIES:**

Risk assessment and Disaster management plan has been carried out and given in Chapter 6 of EIA report.

Detailed DMP plan is prepared. PP will periodically review and update the Plan and will take the initiative to institutionalize the relationship between all Emergency Security and Rescue Forces (e.g. Police, Municipality, Fire Brigade, Medi-Care Centers etc.)

## **1.6 PROJECT BENEFITS:**

- Main vision of the project is to offer residential development within gated community, setting a new standard of living
- The project offers EWS housing for economically weaker section of society which will facilitate living conditions for this section.
- The project envisages bringing various other communities to the area and thereby enabling rapid enhancement of an urban environment.
- This project has generated temporary employment to many unskilled and semi-skilled laborers in nearby areas for construction and other related works
- Employment opportunities for local people in the operational phase as security guard, driver, maid/servant, sweeper, gardener etc.

## **1.7 ENVIRONMENTAL MANAGEMENT PLAN:**

Adequate environmental management measures will be incorporated during the entire planning, construction and operating stages of the project to minimize any adverse environmental impact and assure sustainable development of the area. The EMP's that will be put into place consist of those during construction and operating stages of the project and includes the following elements:

- Air Pollution Control and Management
- Noise Control and Management
- Water Conservation
- Sewage Treatment and Operation and Maintenance
- Storm water management
- Solid, Hazardous and E Waste Management
- Energy Conservation and use of Non-conventional energy
- Traffic Management
- Plantation, Landscaping and Land Management
- Management of Social Issues Occupational, Safety and Health issues
- Environmental Monitoring
- Emergency Response Plans for emergency scenarios
- Environmental Management System

For the effective and consistent functioning of the project, an Environmental Management System (EMS) will be established at the site. The following components will be part of the EMS:

- Environmental Policy
- Objectives & Targets
- Structure and Responsibility
- Emergency Planning
- Environmental Monitoring Program
- Operation of and Maintenance of Environmental Management Facilities like STP, Rain Water Harvesting, Solar Systems, Landscape Development, Solid Waste Management System.
- Non-conformance & Corrective and Preventive Action
- Short term and long term budgetary provisions for the EMP

- Submission of six monthly report to Regional office, MoEF for compliance of conditions in Environmental Clearance

**Budgetary allocation for Environment Management:**

The expenditure to be incurred by **M/s. Evie Real Estate Private Limited**, on environmental matters during construction and operational phase is given as follows.

**Total expenditure envisaged on Environment Management:**

During Construction phase total cost: Approximately **Rs. 110.20 Lacs**.

During Operation Phase total set up cost: **Rs. 633.14 Lacs** and Operation & Maintenance cost shall be **Rs. 86.56 Lacs/year**.

**1.8 CER DETAILS:**

As per CER programme envisaged in MoEF & CC's office memorandum dt. 1<sup>st</sup> May 2018, we hereby commit to provide cost of Rs. 4.90 Crores towards CER activities

**1.9 CONCLUSION:**

Based on the environmental assessment, the associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA and EMPs.

\*\*\*\*\*

*Chapter 1*  
*Introduction*

## CHAPTER: 1

### INTRODUCTION

#### 1.0 PURPOSE OF THE REPORT:

The project site under reference is located at Village Kanjur, Kanjurmarg (E), Mumbai - 400 042 and falls under the jurisdiction of Municipal Corporation of Greater Mumbai (MCGM).

This project has received Environmental Clearance (EC) in September 2016 and amendment in Environmental Clearance dt. 14<sup>th</sup> February 2019 from SEIAA, Maharashtra. Copies of EC are attached as Enclosure. The Project Proponents have reapplied for Environmental Clearance in lieu of increase in permissible FSI as per **DCPR 2034**. Received amended IOD & CC from M.C.G.M. dt. 18.03.2019.

Changes as per revised proposal are as follows:

- Increase in floors and flats
- Increase in Built up Area as per FSI and NON FSI
- Increase in Total Construction Built up Area
- Provision of Club House

Comparative statement of the EC received and revised proposal is given as below:

No.	Description	Details		Remarks
		As per EC received dt. 14.02.2019	Seeking revised EC	
<b>A. PROJECT PROPOSAL</b>				
1.	<b>Building Nos. and Configuration</b>	<b>Two building with total 8 Wings</b>	<b>Two building with total 8 Wings</b>	No change in no. of building and wings
		<b>Building 1 with Wing A, B, C, D and E:</b>  <b>Wing A &amp; B:</b> 2 Basements + 4 Podia + 43 Floors <b>Wing C &amp; D:</b> 3 Basements + 4 Podia + 42 Floors <b>Wing E:</b> 3 Basement + 4 Podia + 30 Floors	<b>Building 1 with Wing A, B, C, D and E:</b>  <b>Wing A &amp; B:</b> 2 Basements + 4 Podia + 50 Floors <b>Wing C &amp; D:</b> 3 Basements + 4 Podia + 50 Floors <b>Wing E:</b> 3 Basement + 4 Podia + 43 Floors	<ul style="list-style-type: none"> <li>• Proposed increase by 7 no of floors</li> <li>• Proposed increase by 8 no. of floors</li> <li>• Proposed increase by 13 nos. of floors</li> </ul>
		<b>Building 2 with Wings I, J and K:</b>  3 Basement + 4 Podia + 51 Floors	<b>Building 2 with Wings I, J and K:</b>  3 Basement + 4 Podia + 51 Floors	No change
		--	Club House	Not Proposed earlier
2.	<b>No. of Flats</b>	2197 Nos.	2425 Nos.	Proposed increase by 228 nos. (10 %)
3.	<b>Parking requirement (Nos.)</b>	4W: 3053 Nos. 2W: Nil	4W: 2763 Nos. 2W: Nil	Requirement in line with DC regulations

No.	Description	Details		Remarks
		As per EC received dt. 14.02.2019	Seeking revised EC	
4.	<b>Parking Spaces Provision (Nos.)</b>	<b>4 Wheelers:</b> 3095 Nos. <b>2 Wheelers:</b> 771 Nos.	<b>4 Wheelers:</b> 3095 Nos. <b>2 Wheelers:</b> 771 Nos.	No Change

No.	Description	Details		Remarks	
		As per EC received dt. 14.02.2019	Seeking revised EC		
<b>B. AREA STATEMENT</b>					
1.	Total plot area (Sq. mt.)	92,398.41	92,398.41	No Change	
2.	Deduction (Sq.mt.)	Road setback in R zone	1419.05	1419.05	No change
		Road setback in I3 zone	582.20	582.20	No change
		ROS 1.5 reservation in R zone	19407.49	19391.96	Proposed decrease by 15.53 sq.mt. due to additional road set back of 18.30 mt. wide proposed road.
		I3 to R change of user amenity	10230.02	10230.02	No change
		Road set back as per 2034	--	1812.15	Proposed as per DCR 2034
		<b>Total</b>	<b>31,638.76</b>	<b>33,435.38</b>	<b>Proposed increase by 1796.62 sq.mt.</b>
3.	Net plot area (Sq. mt.)	60,759.65	58,963.01	Proposed decrease by 1796.64 sq.mt. due to deduction of additional road set back area	
4.	Ground Coverage Area (Sq.mt.)	16,567.95	17392.13	Proposed increase by 824.18 sq.mt. due to provision of Club House	
5.	Requirement of RG Area (Sq.mt.)	15189.92	14740.75	Decreased by 449.17 sq.mt.	
6.	Provision of RG Area (Sq. mt.)	15,506.32	15,507.63	Provision of RG area as per DCR 2034	
7.	Permissible Build-up Area as per FSI (Sq.mt.)	186627.51	199000.23	Proposed increase by 12372.72 Sq.mt. due to additional benefit of TDR as per DCPR 2034	
8.	Built-up Area as per FSI (Including fungible area) (Sq. mt.)	1,42,533.12	1,59,514.12	Proposed increase by 16981.00 Sq.mt. as per permissible built-up area	
9.	Built-Up Area as per Non FSI Area (Sq. mt.)	2,17,064.00	2,36,765.13	Proposed increase by 19701.13 Sq.mt.	
10.	Total Construction Built – up Area (Sq. mt.)	3,59,596.92	3,96,279.25	Proposed increase by 36682.33 Sq.mt. (10 %)	

No.	Description	Details		Remarks
		As per EC received dt. 14.02.2019	Seeking revised EC	
<b>C. ENVIRONMENTAL PARAMETERS</b>				
1.	<b>Occupancy (Nos.)</b>	10972 Nos.	11905 Nos.	Proposed increase by 933 due to increase in flats
2.	<b>Total Water Requirement (KLD)</b>	1553 KLD	1743 KLD	Proposed increase by 190 due to increase in occupancy
3.	<b>Sewage Generation (KLD)</b>	1284 KLD	1394 KLD	Proposed increase by 109 due to increase in water requirement
4.	<b>STP Capacity (KL)</b>	3 STPs of total capacity 1334 KL	3 STPs of total capacity 1464 KL	Increase in capacity of STP due to increase in sewage generation
5.	<b>Solid Waste Generation (Kg/day)</b>	<b>Biodegradable:</b> 1975 kg/day <b>Non-Biodegradable:</b> 2962 kg/day <b>Total:</b> <b>4937 kg/day</b>	<b>Biodegradable:</b> 2143 kg/day <b>Non-Biodegradable:</b> 3214 kg/day <b>Total:</b> <b>5357 kg/day</b>	Proposed increase in total solid waste generation by 420 due to increase in occupancy
6.	<b>Energy</b>	<b>Connected Load:</b> 14347 KW <b>Demand Load:</b> 7065 KW	<b>Connected Load:</b> 15778 KW <b>Demand Load:</b> 7352 KW	Increase in energy demand by 287 KW due to increase in no. of flats. However Energy saving measures shall be undertaken to reduce the energy demand.

As per the Environment Impact Assessment (EIA) Notification dated 14<sup>th</sup> September 2006 as amended, the proposed project falls under '**Category B**' with activity number '**8**', which require preparation of EIA Report.

This EIA Report addresses the environmental impacts of the proposed project and proposes the mitigation measures for the same. The Report is prepared, based on the Standard Terms of Reference (TOR) published by MoEF vide order dated 10/04/15.

### 1.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENTS:

This project involves residential development along with flats for Economically Weaker Section (EWS). There is no litigation pending against the project.

Type of Project	Residential Development
Name, contact number & address of Project Proponents	<b>M/s. Evie Real Estate Private Limited</b> <b>Mr. Subodh Runwal (Director)</b> 4 <sup>th</sup> Floor, Runwal & Omkar Esquare, Opp. Sion Chunnabhatti Signal, Off Eastern Express Highway, Sion (E), Mumbai – 400 022 <b>Tel. Nos. :</b> 022 - 61162000 <b>Fax Nos.:</b> 022 - 24033702 <b>E- mail :</b> <a href="mailto:subodhrunwal@runwal.com">subodhrunwal@runwal.com</a>
Name, contact number & address of Consultants	<b>Environmental Consultants :</b> <b>M/s. ULTRA TECH</b> <b>(An ISO 9001-2015 Company, Accredited by NABET , Lab : Gazetted by MOEF, GoI)</b> Unit No. 206, 224, 225, Jai Commercial Complex, Eastern Express Highway, Opp. Cadbury Factory, Khopat,

	Thane (W) – 400601 Tel.: 91-22-25342776, 25380198, 25331438. Fax : 91-22-25429650 Email : <a href="mailto:deepa@ultratech.in">deepa@ultratech.in</a> , <a href="mailto:shekhartamhane@ultratech.in">shekhartamhane@ultratech.in</a> Website : <a href="http://www.ultratech.in">www.ultratech.in</a>
<b>Location of the project</b>	CTS. No. 1004, 1005, 1005/1, 1006, 1007(pt), 1007/3(pt), 1007/4, 1009(pt), 1009/5 & 6, 1010(pt), 1013(pt), 1014(pt), 1014/1 to 6, 1017, 1017/1 to 6, 1018, 1018/1 to 9, Kanjur Marg (E), Mumbai
<b>Site conditions</b>	Part construction completed as per earlier EC.
<b>Total Plot Area</b>	92,398.41 Sq.mt.
<b>Total Construction Built-up Area</b>	3,96,279.25 Sq.mt.

## 1.2 APPLICABLE ENVIRONMENTAL REGULATIONS:

With respect to prevention and control of environmental pollution, the following Acts and Rules of Ministry of Environment Forest and Climate Change, Government of India governs the proposed project:

- Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988
- Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987
- Environment (Protection) Act, 1986 amended in 1991 and Environment (Protection) rules, 1986 and amended
- Wildlife (Protection) Act, 1972 as amended
- EIA Notification dated 14.09.2006 as amended
- Solid Waste Management Rules, 2016
- E-waste (Management) Amendment Rules, 2018
- The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
- The Noise Pollution (Regulation and Control) Rules, 2000 and as amended
- Construction & Demolition Waste Management Rules, 2016

## 1.3 OBJECTIVE & SCOPE OF EIA STUDY:

EIA integrates the environmental concerns in the developmental activities and enables the integration of environmental concerns and mitigation measures in project development.

The study included detailed characterization of existing status of environment in an area of 10 km radius around project site to evaluate environmental and social impact, suggests mitigation measures & formulate Environmental Monitoring Plan & Environmental Management Plan during Construction and Operation Phase.

In order to identify the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment are studied/ monitored. Environmental baseline monitoring has been carried out during 15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018 and used to identify potential significant impacts.

## 1.4 TERMS OF REFERENCE

No.	Particular	EIA Report reference
<b>Standard Terms of Reference (ToR) by Ministry of Environment &amp; Forest and Climate Change (MoEF &amp; CC)</b>		
1.	Examine details of land use as per Master Plan and land use around 10 km radius of the Project site. Analysis should be made based on latest satellite imagery for land use with raw images. Check on flood plain of any river.	Refer Ch 3 sec 3.2
2.	Submit details of environmentally sensitive places,	Refer Ch 3, Table 3.1 environmentally sensitive

No.	Particular	EIA Report reference
	land acquisition status, rehabilitation of communities/villages and present status of such activities	places Ch. 2 sec 2.1
3.	Examine baseline environmental quality along with projected incremental load due to the project	Refer Ch.4, Sec. 4.1, Sub Sec. 4.1.3.1
4.	Environmental data to be considered in relation to the project development would be (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health.	Refer Ch. 3 & 4
5.	Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area. Any obstruction of the same by the project	Contour plan with slopes, drainage pattern of the site and surrounding area is elaborated in detailed storm water disposal system study report.
6.	Submit the details of the trees to be felled for the project.	Existing trees on site: 431 Nos. Cut trees: 24 Nos. Trees to be cut or transplant: 171 Nos. Retained trees: 236 Nos. New tree plantation: 1037 Nos. Please refer Ch 4, Section 4.2.5
7.	Submit the present land use and permission required for any conversion such as forest, agriculture etc.	Project site is partly in residential zone as per DP remarks and partly in industrial zone for which received NOC for change in Land use from Industrial (I) to Residential (R) zone. DP remarks and NOC for user change is attached as Enclosure.
8.	Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.	Refer Ch 8 sec 8.4
9.	Ground water classification as per the Central Ground Water Authority.	The project is located at Kanjurmarg, Mumbai, Maharashtra which is in safe zone as per the Central Ground Water Authority classification nevertheless no withdrawal of ground water is planned in the project.
10.	Examine the details of Source of water, water requirement, use of treated waste water and prepare a water balance chart.	Refer Ch 2, sec 2.6, sub sec 2.6.1
11.	Rain water harvesting proposals should be made with due safeguards for ground water quality. Maximize recycling of water and utilization of rain water. Examine details.	Refer Ch 4, sub sec 4.2.1 Provision of 2 RWH tanks of total capacity 160 KL. Ground water recharging is not proposed. Layout showing RWH scheme is attached as Enclosure
12.	Examine soil characteristics and depth of ground water table for rainwater harvesting.	<b>Ground water table:</b> The ground water table at the project site is between 5.1 to 6.0 m. which is high hence ground water recharging is not proposed.  <b>Soil Type at project site:</b> Brown colored soil with Low Productivity and Moderate Absorptivity  <b>On site subsurface layers:</b>

No.	Particular	EIA Report reference
		Layer I – Fill consisting mostly of Clay with boulders Layer II: Residual Soil consisting of Yellowish/ Reddish brown Clay Layer III: Completely Weathered rock Layer IV: Hard Basalt Bedrock  Soil sampling was done to further establish the baseline characteristics. The details are given in Sec 3.1.2 of Ch 3
13.	Examine details of solid waste generation treatment and its disposal	<b>During Construction Phase :</b> Ch 2, sub section 2.4 and Chapter 4 sub section 4.2.3.2  <b>During Operation Phase :</b> Ch 2, sub section 2.6 and Chapter 4 sub section 4.2.3.3
14.	Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption. Energy conservation and energy efficiency.	Detailed ECBC compliance report is attached as Enclosure.
15.	DG sets are likely to be used during construction and operational phase of the project. Emissions from DG sets must be taken into consideration while estimating the impacts on air environment. Examine and submit details.	We have carried out air quality modeling considering impact of Vehicular movement and DG sets emission. The DG sets will have inbuilt acoustic enclosure and stack height shall be as per CPCB. Refer Ch 4, sub sec 4.1.3.1
16.	Examine road/rail connectivity to the project site and impact on the traffic due to the proposed project. Present and future traffic and transport facilities for the region should be analysed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.	A detailed traffic Impact study of the project site is attached as Enclosure.
17.	A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.	
18.	Examine the details of transport of materials for construction which should include source and availability.	<b>During Construction Phase :</b> Ch 2, sub section 2.4 and Chapter 4 sub section 4.2.3.2
19.	Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.	Refer Ch 8 Sec 8.3 EMP Costing: Table 8.1 and 8.2
20.	Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster	Refer Ch 6
21.	Details of litigation pending against the project, if any, with direction/ order passed by any Court of Law against the Project should be given	No litigation pending against the project
22.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	Refer Ch 8

## 1.5 STRUCTURE OF EIA REPORT

The report is organized in following ten chapters:

- **Declaration by Project Proponents**
- **Declaration by Experts contributing to the EIA report**
- **Executive summary of the EIA report**
- **Chapter 1 : Introduction**

This chapter describes objectives and methodology for EIA and Terms of Reference (ToR)

- **Chapter 2 : Project Description**

This chapter gives a brief description of the location, approachability, amenities, layout, area statement, project proposal, occupancy, utilities and the quantities discharges/ wastes generated in this project along with building materials which will be used during construction activity. This chapter also covers Shadow, Wind, Day Light and Ventilation analysis.

- **Chapter 3 : Description of The Environment**

This chapter presents details of the baseline environmental status of existing land use of study area, water environment, air environment, biological environment and socio-economic environment etc. Traffic and transportation studies are also included in this chapter. This chapter also includes study of Computation of the external catchment area contributing the project site and subsequently estimation of the contributing runoff & capacities of external drain.

- **Natural Environment:** The Topography, Geology, Rainfall, Climate, Temperature, Humidity, Winds, Soil, Land-use, Water bodies, Flora, Fauna
- **Manmade Environment:** Human settlement, Housing, Habitation, Employment & Wages, Occupation, Industries, Transport System, Literacy, Demography
- Monitoring results of various facets of Environment in Study area

- **Chapter 4 : Anticipated Impact And Mitigation Measures**

This chapter discusses the possible sources of pollution and environmental impacts due to the project during construction and operation phases and suggests the mitigation measures. It also includes air emission, dispersion and noise modeling study. This chapter also covers details of Building performance analysis (ECBC) studies

- **Chapter 5 : Environmental Monitoring Programme**

This chapter discusses the details about the environmental monitoring programme during construction and operation phases.

- **Chapter 6 : Additional Studies**

This chapter covers Risk Assessment Studies for the construction and operation phase, the safety precautions that are taken during construction phase and the Disaster Management Plan and Emergency Preparedness Plan Onsite and Offsite.

- **Chapter 7 : Project Benefits**

This chapter presents the benefits from this project.

- **Chapter 8 : Environmental Management Plan**

This chapter deals with the Environmental Management Plan (EMP) for this project and indicates measures proposed to minimize the likely impacts on the environment during construction and operation phases and budgetary allocation for the same.

- **Chapter 9 : Summary and Conclusion**

This chapter gives the summary of the EIA report.

- **Chapter 10 : Disclosure Of Consultants**

This chapter deals with the details of consultants engaged and the National Accreditation Board for Education and Training (NABET) accreditation details of Environmental Consultants.

*Chapter 2*  
*Project Description*

## CHAPTER: 2

### PROJECT DESCRIPTION

#### 2.0 PREAMBLE:

The project site is located nearby Kanjur Village road and is under the jurisdiction of Municipal Corporation of Greater Mumbai (M.C.G.M.). Project proponents have planned a Residential development. Along with Sale Component this project also offers flats for Economically Weaker Section (EWS) which will facilitate living conditions for this section of the society.

#### 2.1 SITE LOCATION & SURROUNDING DETAILS:

##### 2.1.1 Location of the Project:

Project site is located in village Kanjur at Kanjurmarg. It will be well connected to 27.45 mt. DP Road to the South-East and Veer Savarkar Road to the North-East. Latitude and Longitude of the project site are given as below:

Points as shown in Figure 2.1	Latitude	Longitude
A.	19°8'5.31"N	72°56'3.55"E
B.	19°7'56.31"N	72°56'10.32"E
C.	19°7'55.66"N	72°55'57.04"E
D.	19°7'48.47"N	72°55'49.69"E
E.	19°7'55.99"N	72°55'53.38"E

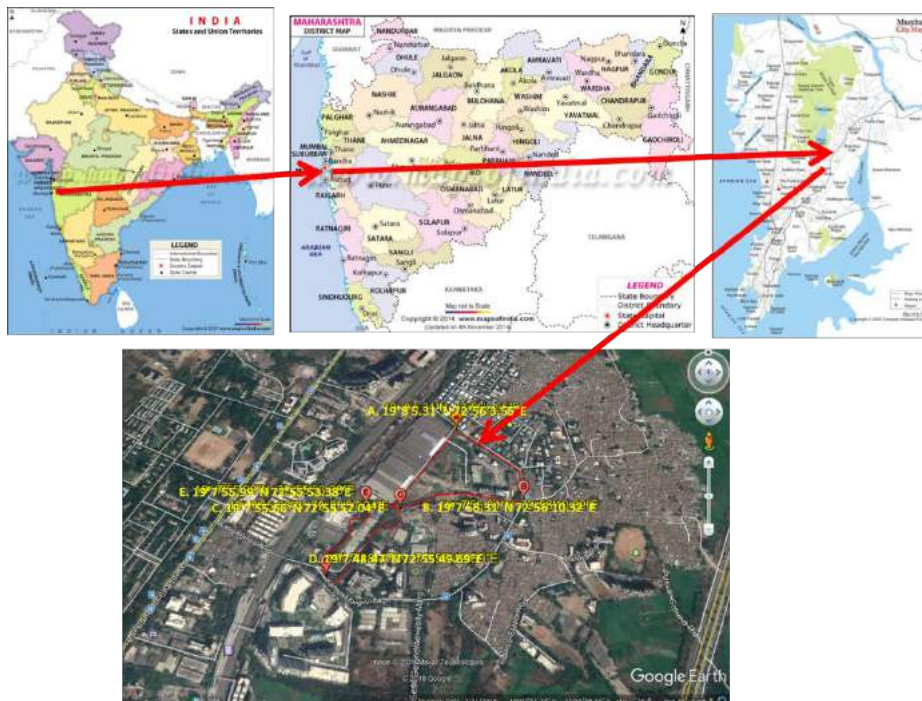
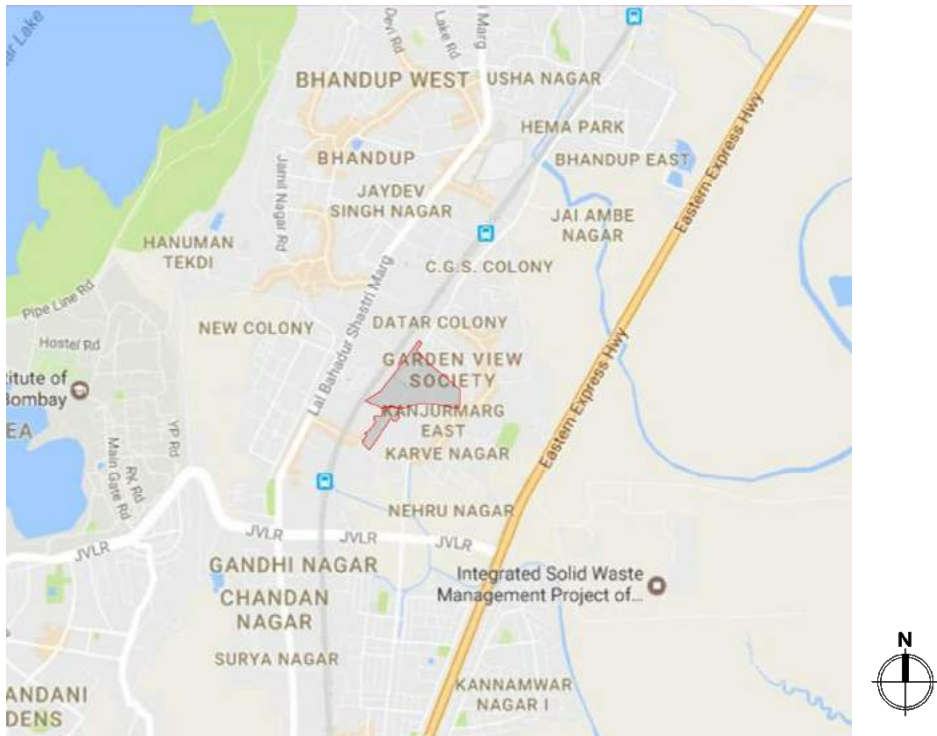


Fig. 2.1: Project Location

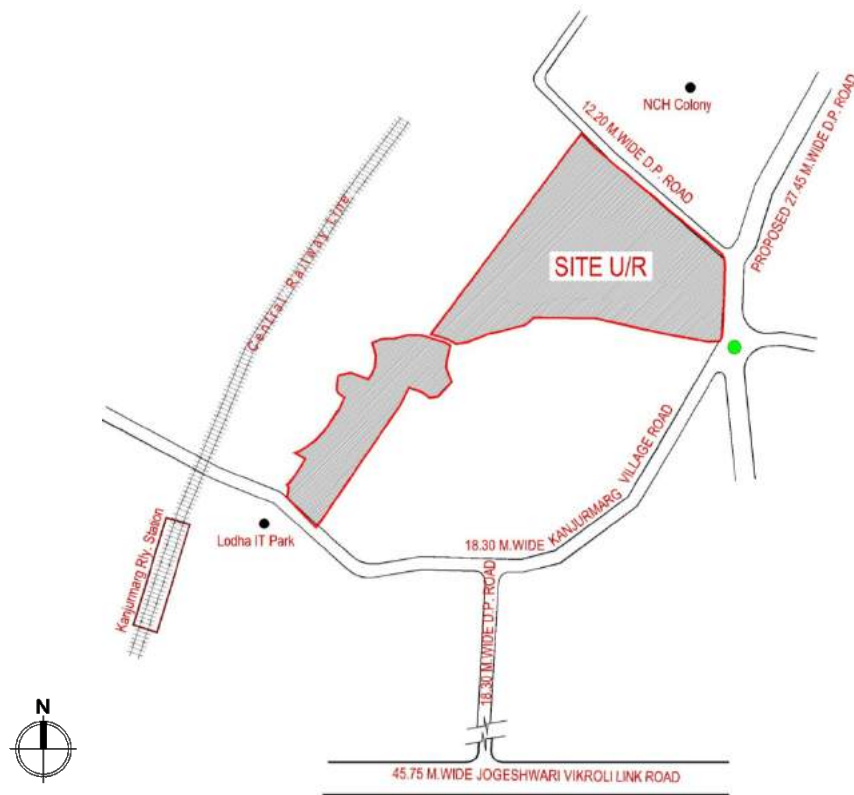
The site is surrounded by the following:

- East: Residential area
- West: Residential / Industry area
- North: Residential area
- South: Road

The nearest railway station is Kanjurmarg railway station (Within 1.00 km) on the main line of Central Railway of Mumbai.



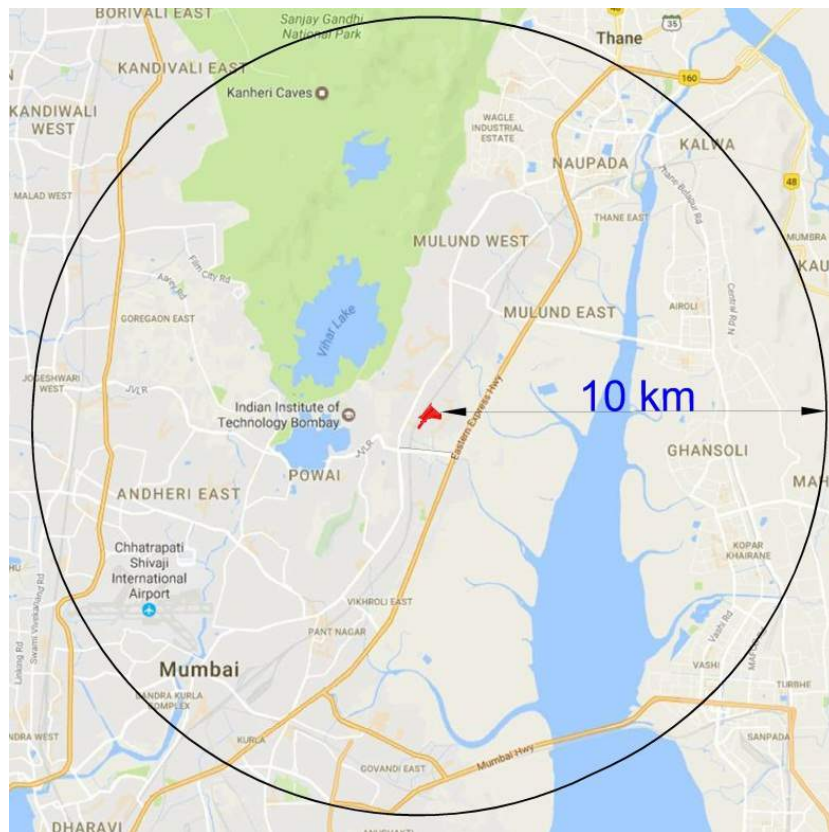
**Fig. 2.2: Location Plan**



**Fig. 2.3: External Road Network**



**Plate 2.1: Photographs of the Project Site**



**Fig. 2.4: Study area of Proposed Project  
10 Km radius around the plot boundary (Scale - 1: 1000)**

The proximities to the amenities are as follows:

**Table 2.1: Proximities to the amenities**

Amenities	Name	Approx. Road distances (Km)
Airport	Mumbai Chhatrapati Shivaji Maharaj Terminal (International Airport)	13.00
Nearest Railway Station	Kanjurmarg Railway Station	1.00
Bus Depot	Nehru Nagar Bus Stop Kannamwar Nagar Bus depot	Abutting 2.00

Amenities	Name	Approx. Road distances (Km)
Highway	Eastern Express Highway	2.00
Post office	Post Office, Kanjurmarg East, Tagore Nagar Post Office	1.00 2.00
Fire Station	Vikhroli Fire Station	5.00
Police Station	Police Station Rd, Kanjurmarg East	0.50

### 2.1.2 Social Infrastructure:

The details of social infrastructure in the nearby area are given below:

**Table 2.2: Social Infrastructure**

Infrastructure	Names
<b>Schools</b>	Pawar Public School, St. Marys Convent High School, Powai English High School, St. Joseph High School, Udayachal High School, Podar International School, Dnyanmandir School, Dharmaveer Sambhaji Vidyalaya, Shivai Vidya Mandir
<b>Colleges</b>	IES Secondary School, St Xavier's High School and Junior College, St. Xaviers High School, Dnyandeep Vidya Mandir, St. Francis Xavier's High School, Saraswati Vidyalaya, Dr. Datta Samant Vidyalaya, Ramanand Arya DAV College, Kendriya Vidyalaya Bhandup, G G Singh School, Jijamata Vidhya Mandir, Vikhroli Vidyalaya, Dharmaveer Sambhaji Vidyalaya, I. D. U. B. S. Junior College, Brahman Vidyalaya, Sandesh School and Junior College, Dnyanmandir School, Madhyamik Vidyalaya, Pawar Public School, NES High School, Vikas School and Night College, NES Primary School, NES Sunbeam School, G S Shetty International School, Bright High School, St. Joseph High School, Kumari Kasturi Vidhyalaya, Sri Ram College, Udayachal Primary School, Shivai Vidya Mandir
<b>Hospitals</b>	Aniket Hospital, Ankur Hospital, Aarogam Cancer Hospital, Naval Hospital, NuLife Hospital, Atul Lok Hospital, Dr Babasaheb Ambedkar Hospital, Shrenik Hospital And Maternity House, Padmalaya Maternity & Surgical Home, Chandan Charitable Hospital, Dr.Hegde skin clinic, Nihal Nursing Home, Thakare Hospital & Alcohol Rehabilitation Research Centre, Dr Seema Patil & Bhatia Ruby Hospital, Central Health Home, Mahatma Phule Hospital, S S Hospital, Sai Kripa Hospital, Chandan Hospital, Srushti Authatic Hospital, Dr. Thakur's Ear,Nose and Throat Hospital, Yashwant Hospital, International Oncology Centre, LH Hiranandani Hospital.

### 2.1.3 Historical, religious and tourist centers:

This project site is situated in S - ward of M.C.G.M. There are no historical and religious places in the S-ward. There are 2 centers of tourist places in S ward. Details of which are given below.

**Table 2.3: Name of tourist places**

Name	Location
Powai Garden	Powai
Vihar Lake	Vihar-Powai

**Source:** Official website of M.C.G.M. Ward details: 'S' Ward

### 2.1.4 Land Utilization:

Part construction is completed on site as per the earlier EC received.

Project site is partly in residential zone as per DP remarks and partly in industrial zone for which received NOC for change in Land use from Industrial (I) to Residential (R) zone. DP remarks and NOC for user change is attached as Enclosure.

## 2.2 PROJECT IMPLEMENTATION SCHEDULE:

### 2.2.1 Demolition and Development Strategy:

- Part demolition of existing structure is completed, remaining structures shall be demolished.
- The construction period for project is approximately 7 years.

## 2.3 RESOURCE REQUIREMENT:

### 2.3.1 Construction Equipments and Building Materials:

- **Details of construction Equipments:**

**Table 2.4: Details of Major Equipment and Machinery**

No.	Equipment / Machinery	Quantity
1.	Tower Crane ECB85	3
2.	Tower Crane MC205	1
3.	Auto Level	2
4.	Hydra	1
5.	Cutting Bending Machine	8
6.	Concrete Pump	2
7.	*Batching Plant	1

\*Consent to operate for the Batching plant is obtained from Maharashtra Pollution Control Board (MPCB).

- **Building materials:**

The material used in the building construction will be chosen on the basis of its manufacturing place being within 500 km radius from the construction site. Supporting the regional economy and reducing the environmental impacts resulting from transportation

**Table 2.5: Details of Building Materials**

Use	Material
Civil works	Ready Mix Concrete/ Bricks
	Concrete Blocks
	Brick bats
	Gypsum plaster
	Natural sand
	Portland pozzolona cement/Slag cement
Finishing works	Water
	Natural marble/Imported natural marble/Agglomerated marble
	Vitrified tiles/Ceramic tiles/Glazed tiles
	Granite stone for kitchen platform
	Natural sand
	Portland pozzolona cement/Slag cement
	Water
	Paver blocks/Chequered tiles
	External synthetic paints/Plastic paint/Oil paint
	Gypsum boards
	Teak wood Flush
Doors	
Plywood/Veneers	
Glass	
Glazing/ Façade works	Glass
	Aluminium members

Use	Material
	Aluminium composite panels

The conservation material & resources strategy will be achieved through the following:

- Reducing and Reusing of Waste
- Using recycled material in construction
- Use of Regional Material in construction
- Use of Fly Ash in Concrete
- Use of Pozzolana Cement containing up to 20% fly ash for plaster, masonry, flooring
- Use of old bricks for water proofing
- Brick Bat Coba water proofing done with old bricks
- Use of Low VOC (volatile organic compound) paints.
- Use of china mosaic for roofing
- Utilization of Energy efficient materials and systems.
- Building envelope as per ECBC

### 2.3.2 Manpower Requirement:

Proposed project requires manpower during construction phase & operation phase thereby creating job opportunities. Local skilled and unskilled laborers will have an opportunity for employment directly or indirectly. On an average 550 nos. of residential workers are envisaged during construction phase.

## 2.4 INFRASTRUCTURE AND FACILITIES / UTILITIES: DURING CONSTRUCTION PHASE:

Infrastructure and facilities / utilities during construction phase are detailed as follows:

**Table 2.6: Infrastructure and facilities / utilities during construction phase**

Component	Details
<b>Electrical Supply</b>	Maharashtra State Electricity Distribution Company Limited (MSEDCL)
<b>Backup during power failure for emergency services</b>	As per requirement
<b>Water Requirement</b>	i. For workers: 74 KLD: Source: Municipal Corporation of Greater Mumbai (M.C.G.M.) ii. For construction purpose: 60-70 KLD: Source: Water tankers
<b>Sewage Generation, and Disposal</b>	i. Quantity of Sewage: 72 KLD ii. Disposal: Disposal to existing sewer line
<b>Solid Waste Generation during demolition/ Excavation/ Construction</b>	Demolition debris generated due to demolition of remaining structures shall be disposed to Authorized landfill site as per NOC received from M.C.G.M. Waste generated during construction phase shall be partly reused/recycled on site and remaining shall be disposed to authorized landfill site with permission from M.C.G.M. The excavation waste quantities and its management is explained in detail in chapter 4 section 4.2.3.2
<b>Storage space for Construction, Hazardous wastes</b>	Designated storage space for Hazardous waste and disposal to authorized common hazardous waste site for further treatment and disposal. Adequate and separate covered storage for construction waste and materials like masonry blocks, etc.
<b>Solid waste generation by workers (Garbage)</b>	Biodegradable garbage: 22 kg/day Non-biodegradable garbage: 33 kg/day

Component	Details
	Total: 55 kg/day  <b>Considerations for solid waste generation as per NBC 2016:</b> <i>For Workers: 40% biodegradable garbage and 60% non-biodegradable garbage out of total 0.100 Kg/person/day</i>
<b>Disposal of garbage</b>	Segregation of waste into biodegradable and non-biodegradable Disposal of segregated garbage to recyclers
<b>E waste</b>	Separate storage space within project site and subsequently it shall be handed over to authorized recyclers.
<b>Facilities for workers</b>	Labour colony for residential workers Drinking water facility and toilet & bathing facilities Health checkup facilities Personal protective and safety equipments
<b>Site Sanitation Measures</b>	For sewage disposal: Connection to existing sewer line For storm water: Proper management of channelization of water to avoid water logging at site Provision of silt trap and oil & grease trap at the discharge point before disposal to external drain Regular pest control at site

## 2.5 DETAILS ABOUT THE PROJECT DURING OPERATION PHASE:

### 2.5.1 Area statement:

The area statement explaining the total plot area, net plot area available for development, green areas is as per **Table 2.7**. In this table the built up area as per Floor Space Index (FSI) and the construction built up area which includes FSI and non FSI area is also explained.

**Table 2.7: Area Statement**

No.	Description	Area (Sq. mt.)
1.	Total Plot Area	92,398.41
2.	Deductions (Road setback in R zone + Road set back in I3 Zone + ROS 1.5 reservation in R zone + Amenity area+ Road set back as per DCR 2034)	33,435.38
3.	Net Plot Area	58,963.01
4.	Ground Coverage Area	17,392.13
5.	Recreational Ground (R.G.) Area	15,507.63
6.	<b>Built – up Area as per FSI (including Fungible area)</b>	<b>1,59,514.12</b>
7.	<b>Built – up Area as per NON FSI</b>	<b>2,36,765.13</b>
8.	<b>Total Construction Built – up Area (FSI + NON FSI)</b>	<b>3,96,279.25</b>

Detailed layout indicating plot boundary, construction area boundary and green area boundary is attached as **Enclosure**.

### 2.5.2 Buildings Details :

The building details are as follows:

**Table 2.8: Building Details and Occupancy**

Buildings	Building Configuration	No. of Flats	Occupancy
<b>2 Buildings having total 8 wings &amp; total Flats: 2425 Nos.</b>			
<b>Building 1</b>	<b>Wing A:</b> 2 Basements + 4 Podia + 50 Floors	293	6775
	<b>Wing B:</b> 2 Basements + 4 Podia + 50 Floors	293	
	<b>Wing C:</b> 3 Basements + 4 Podia + 50 Floors	193	
	<b>Wing D:</b> 3 Basements + 4 Podia + 50 Floors	281	
	<b>Wing E:</b> 3 Basements + 4 Podia + 43 Floors	252	
<b>Building 2</b>	<b>Wing I:</b> 3 Basements + 4 Podia + 51 Floors	371	5130
	<b>Wing J:</b> 3 Basements + 4 Podia + 51 Floors	371	
	<b>Wing K:</b> 3 Basements + 4 Podia + 51 Floors	371	
<b>TOTAL</b>		<b>2425</b>	<b>11905</b>

*Reference (for occupancy): National Building Code (NBC) -2016 – Part 9, Page 11, Occupant Load*

**2.6 INFRASTRUCTURE AND FACILITIES / UTILITIES: DURING OPERATION PHASE**

Infrastructure and facilities / utilities during operation phase are detailed as follows:

**Table 2.9: Details about utilities & environmental liabilities during operation phase**

Component	Details		
<b>Onsite Parking Facility</b>	<b>Building</b>	<b>Parking Space Provision (Nos.)</b>	
		<b>4W</b>	<b>2W</b>
	<b>Building 1</b>	1883	465
	<b>Building 2</b>	1212	306
	<b>Total</b>	<b>3095</b>	<b>771</b>
<b>Electrical Supply</b>	From Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) Details of Electrical load is given as follows :		
	<b>Details</b>		<b>Total</b>
	<b>Connected Load</b>		15777 KW
	<b>Maximum Demand</b>		7352 KW
<b>Backup during power failure for emergency services</b>	<b>Building</b>	<b>DG sets</b>	
	<b>Building 1</b>	2 DG sets of 750 kVA each	
	<b>Building 2</b>	2 DG sets of 500 kVA each	
	The diesel generators sets will be provided with stacks as per CPCB norms Layout showing location for DG sets is enclosed.		
<b>Water Supply &amp; Storage</b>	Fresh Water Supply (for domestic): M.C.G.M. Secondary requirements (flushing and gardening) : STP treated sewage Details of water requirement is given in <b>Table 2.10</b> Provision of adequate storage tanks		
	<b>UG Tank</b>	<b>Building 1</b>	<b>Building 2</b>
	<b>Firefighting</b>	400 KL	400 KL
	<b>Domestic</b>	416 KL	297 KL
	<b>Flushing</b>	260 KL	185 KL
	<b>OH Tank</b>	<b>Building 1</b>	<b>Building 2</b>
	<b>Firefighting</b>	230	150
	<b>Domestic</b>	466	331

Component	Details			
	<b>Flushing</b>	355	248	
<b>Rain water harvesting System</b>	<b>Building</b>	<b>RWH Tank (KL)</b>		
	<b>Building 1</b>	100		
	<b>Building 2</b>	60		
<b>Storm Water Drainage</b>	Adequately designed SWD network within the site to cater the runoff (1.84 m <sup>3</sup> /sec), which shall be connected to existing main drain of adequate capacity (39.80 m <sup>3</sup> /sec)			
<b>Sewage Quantity and Treatment</b>	<b>Building</b>	<b>Sewage Generation</b>	<b>STP Capacity</b>	
	<b>Building 1</b>	793 KLD	830 KL	
	<b>Building 2</b>	601 KLD	2 STP of capacity 317 KL each	
	<b>Total</b>	<b>1394 KLD</b>	<b>3 STPs of total capacity 1464 KL</b>	
<i>Reference: For calculation of quantity of sewage generation Manual on norms and standards for EC of large construction projects suggested by MoEF &amp; CC is referred</i>				
<b>Drainage (Sewer) System</b>	Treated water shall be reused for secondary requirement of flushing (536 KLD) and gardening (109 KLD) Excess treated sewage (610 KLD) shall be disposed to sewer line.			
<b>Solid Waste(Biodegradable &amp; Non-biodegradable):</b>	<b>Building</b>	<b>Solid Waste Generation (Kg/day)</b>		
		<b>Non- Biodegradable</b>	<b>Biodegradable</b>	<b>Total</b>
	<b>Building 1</b>	1829	1220	3049
	<b>Building 2</b>	1385	923	2308
	<b>Total</b>	<b>3214</b>	<b>2143</b>	<b>5357</b>
<i>Considerations for solid waste generation: National Building Code (NBC) - 2016</i>				
For Residential: 40% bio degradable garbage and 60% Non-biodegradable garbage out of total 0.450 Kg/person /day				
<b>Hazardous waste Management (Hazardous waste generated at household level) &amp; its Disposal</b>	<p><b>Suggestions for waste management:</b></p> <ul style="list-style-type: none"> <li>• Hazardous Waste generated at household level is always labeled as toxic, poisonous, corrosive, flammable, combustible or irritant. Hence while purchasing one can take care to buy non-toxic/less hazardous products and only what are really needed</li> <li>• These materials should be kept out of reach of children and pets</li> <li>• Hazardous waste generated at household level should not be thrown into household garbage, toilets or sinks or never to be dumped on the ground or poured down into the storm drains as HHW can cause contamination of surface and ground water and hence posing health hazards</li> <li>• There will be common storage space on site for temporary storage of Hazardous wastes and its disposal shall be done to authorized CHWTSDF sites as per regulations</li> </ul>			
<b>Solid Waste segregation, storages and Treatment Facilities</b>	<ul style="list-style-type: none"> <li>• Segregation and storages facilities for all solid waste streams</li> <li>• Biodegradable garbage shall be treated by composting in Organic waste converter (OWC)</li> <li>• Non-Biodegradable garbage shall be handed over to recyclers.</li> </ul>			
<b>Facilities for workers (Household servants, drivers, sweepers,</b>	<ul style="list-style-type: none"> <li>• Provision of drinking water facility &amp; toilets</li> <li>• Security Cabins for watchmen</li> <li>• Maintenance room</li> </ul>			

Component	Details
gardeners, watchmen, etc.)	• Provision of utility/service area

### 2.6.1 Water Requirement for the Project :

Total water requirement for the project and sources are given in Table 2.10:

**Table 2.10: Total water requirement for the project and source during operation phase**

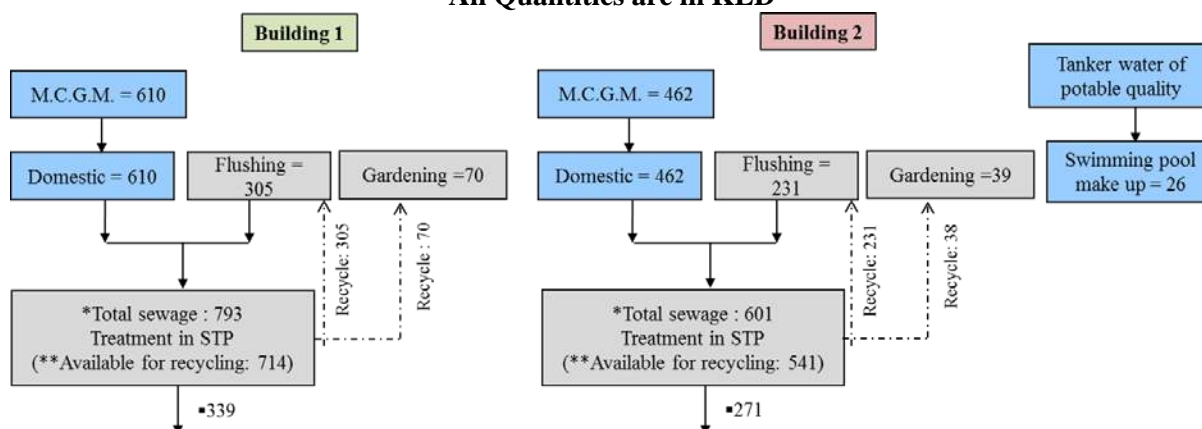
No.	Description	Quantity of water required in KLD	Source of water supply
1	Domestic	1072	M.C.G.M./ Partly by Rain Water Harvesting (RWH) during monsoon season
2	Flushing	536	Treated sewage from STP
3	Gardening	109	Treated sewage from STP
4	Swimming Pool make up	26	Tanker water of potable quality

**Considerations for water requirement:** National Building Code (NBC) - 2016 – Part 9, Page 11, Water Requirement

**Residential:** 90 Liter/Person/day for domestic and 45 Liter/Person/day for flushing

### WATER BALANCE PER DAY BASIS DURING NON-MONSOON

All Quantities are in KLD



**Fig. 2.5: Water balance per day basis during non-monsoon**

**Please Note:**

\*Considered 80% sewage of total of domestic and 100 % of flushing requirement hence total sewage generation is 1394 KLD

\*\*Considered 10% less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation hence sewage available for recycling is 1255 KLD

- Excess treated sewage: 610 KLD shall be disposed to the sewer line

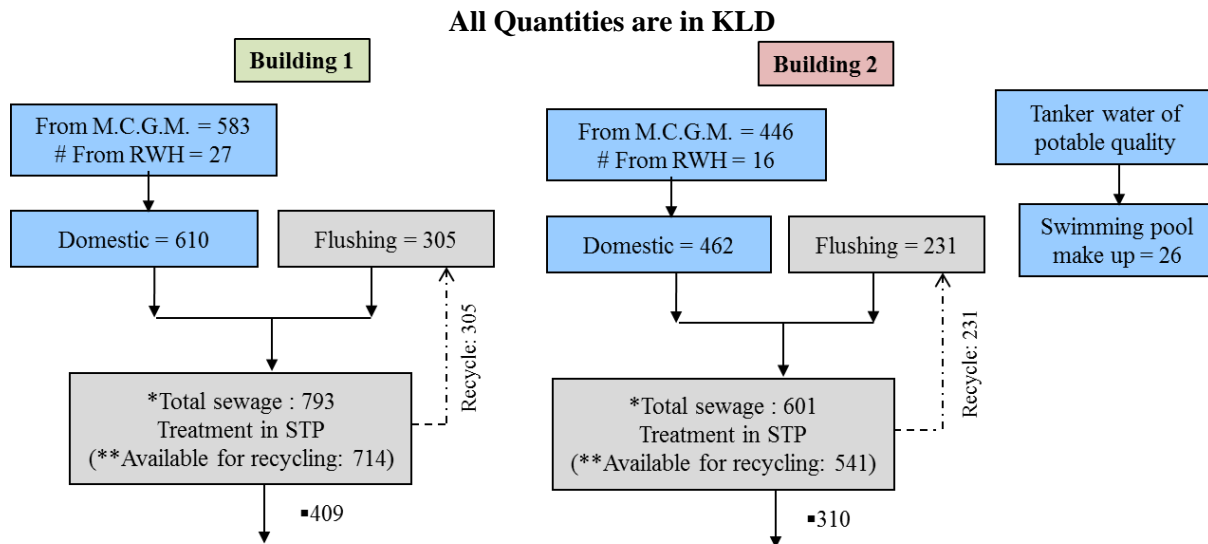
**Total water requirement = 1743 KLD**

**Recycling of treated Sewage (645 KLD)** shall be done for flushing (536 KLD) and gardening (109 KLD)

**Hence Net water requirement: 1743 – 645 = 1098 KLD** [i.e. for Domestic purpose = 1072 KLD (Source: M.C.G.M.), 26 KLD of tanker water of potable quality for swimming pool make-up]

**Reduction in Net water demand = 37%**

### WATER BALANCE PER DAY BASIS DURING MONSOON



**Fig. 2.6: Water balance per day basis during monsoon**

**Please Note:**

- \*Considered 80% sewage of total of domestic and 100 % of flushing requirement hence total sewage generation is 1394 KLD
- \*\*Considered 10% less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation hence sewage available for recycling is 1255 KLD
- Excess treated sewage: 719 shall be disposed to the sewer line
- # Daily rain water availability is calculated as per Av. 20 mm rainfall/day considering only 50 rainy days (half of season)

**Total water requirement = 1634 KLD**  
**Recycling of treated Sewage (536 KLD)** shall be done for flushing  
**From RWH Tanks = 43 KLD** (only for domestic purpose)  
**Hence Net water requirement:** 1634 – 536 – 43 = 1055 KLD [i.e. for Domestic purpose = 1029 KLD (Source: M.C.G.M.), 26 KLD of tanker water of potable quality for swimming pool make-up]  
**Reduction in Net water demand = 35%**

**2.7 COMPLIANCE TO EARLIER EC CONDITIONS:**

Conditions stipulated in earlier EC shall be complied during construction and operation phases and as committed all Environmental facilities are also planned in the current proposal.

Attribute	Measures planned in the project
<b>Water Saving</b>	▪ Reduction in demand 37% by using treated sewage for secondary

Attribute	Measures planned in the project
	requirement like flushing and gardening <ul style="list-style-type: none"> <li>▪ Reuse of harvested rain water (43 KLD) for domestic purpose after treatment in monsoon which helps in further reduction by 35% using RWH in monsoon</li> <li>▪ Water supply by M.C.G.M.</li> </ul>
<b>Rain water harvesting &amp; Storm Water Drainage</b>	Collection of rainwater from terrace by 2 RWH tanks of total capacity 160 KL Provision of internal storm water drains of total capacity 4.24 m <sup>3</sup> /s for collection of storm water
<b>Sewage Treatment</b>	Reduction by using treated sewage for secondary requirement like flushing (536 KLD) and gardening (109 KLD)
<b>Energy Saving</b>	Energy Saving as per Conventional Base case = 22% Energy saving through renewable energy = 4.52%
<b>Green Belt Development</b>	Recreational Ground Area: 15507.63 Sq. mt. Plantation of new trees of various varieties on ground. After development, there shall be 1273 trees on the site (including retained and newly planted).
<b>Solid Waste Management</b>	Segregation of all types of waste on site. <ul style="list-style-type: none"> <li>▪ Biodegradable : Composting in OWC</li> <li>▪ Non- biodegradable: To recyclers</li> </ul>
<b>Statutory approvals</b>	a. Received Previous Environmental Clearance dt. 21.09.2016 and Amendment and Expansion in Environmental Clearance dt. 14 <sup>th</sup> February 2019 b. Received IOD and CC from M.C.G.M. c. Submission of six monthly monitoring report to MoEF, Bhopal

## 2.8 SHADOW, WIND, DAYLIGHT ANALYSIS

Detailed Shadow, wind, daylight analysis report is attached as **Enclosure**.

## *Chapter 3*

# *Description of the Environment*

## CHAPTER: 3

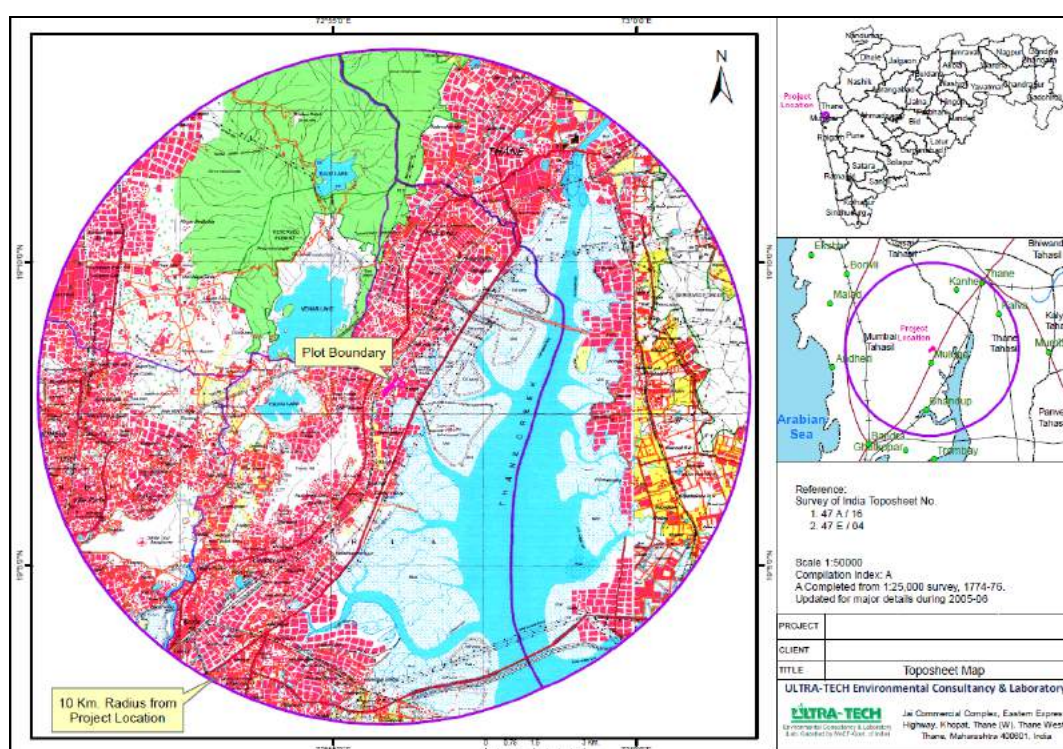
### DESCRIPTION OF THE ENVIRONMENT

#### 3.0 INTRODUCTION

This chapter provides information on existing environmental status with respect to environmental components *viz*: existing land use of study area, water and air environment, biological environment and socio-economic conditions.

- **STUDY AREA**

As per the Terms of Reference (TOR) received from Ministry of Environment and Forests & Climate Change (MOEF & CC) on dt. 14.08.2017, study area considered for this report is 10 km radius around the project site. The study area marked on Toposheet is given in **Figure 3.1**.



**Fig.3.1: Toposheet map of 10 km radius area around project site**

**Environmental sensitive places within study area are as follows:**

**Table 3.1: Environmental Sensitive Places within 10 Km**

Environmental Sensitive Places	Locations	Aerial distance (in km) from Plot boundary
National Park / Wildlife Sanctuary	Sanjay Gandhi National Park	2.00
	Thane Creek Flamingo Sanctuary	3.00
Nature Parks /Mangroves vegetation	Mangroves near Thane	1.00
Water bodies	Mithi River	6.00
	Thane Creek	3.00
	Yoor Lake	10.00
	Tulsi Lake	6.00
	Powai Lake	2.00
	Vihar Lake	2.00
	Upvan Lake	10.00

Environmental Sensitive Places	Locations	Aerial distance (in km) from Plot boundary
	Chandivali Lake	4.00
	Ambe Ghosle Lake	9.00
	Jail Lake	9.00
	Brahmala Lake	9.00
	Makhmali Talao	8.00
	Siddheshwar Lake	8.00
	Masunda Lake	8.00
	Kachrali Lake	8.00
	Hariyali Lake	7.00
	Raila Devi Lake	7.00
	Digha Lake	8.00
	Mogliche Lake	9.00
	Juhu Village lake	9.00
	DAKC lake	8.00
	Ghansoli Lake	7.00
	Gothivali Khadan Lake	7.00
Archaeological sites	Kondivate (Mahakali) Caves	7.00
	Kanheri Caves	9.00

- **Methodology for classification of the Study Area:**

Classification of the study area and generation of the baseline data is as per Guidance Manual for Building, Construction projects approved by MoEF & CC for preparation of EIA report and as per the Standard Terms of Reference (ToR) of Ministry of Environment and Forests & Climate Change (MOEF & CC) dt. 10.04.2015. This is tabulated as follows:

**Table 3.2: Methodology for classification of the Study Area**

No.	Study Area	Type of Baseline data collection	Attributes
1.	Project Site	Primary	Ambient air quality, Ground water, Surface water, Noise levels, Flora, Fauna, Socio economic aspects, Traffic studies.
2.	Area with angular distance of 500 meters surrounding the project site	Primary	Ambient air quality, Surface water, Flora ,Fauna, Noise levels (100 m radius from site), Traffic study
3.	Area with angular distance of 500 meters upto 10 km surrounding the project site	Secondary data from various reliable sources.	Meteorological data, Surface water bodies, Flora, Fauna, Socio economic aspects, Land environment.  Whenever the secondary data is not available primary data collection to be done for the respective attribute.

- **Generation of Baseline Data:**

Baseline information with respect to air quality, noise level, water and soil quality, biological environment in the study area were collected by conducting primary sampling / field studies during 15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018 (Post-monsoon season) for obtaining previous Environmental Clearance. Baseline status of Land and Socio-economic environment were also studied simultaneously and subsequently. Traffic survey was conducted and detailed Traffic study was carried out. Detailed report is enclosed.

This sampling period is incorporated in this EIA report as this data is valid for 3 years as stated in the O.M. (dt. 29.08.2017) by MoEF & CC regarding validity of TOR and baseline data.

The environmental attributes studied are detailed out in **Table 3.3** as follows:

**Table 3.3: Environmental Attributes**

No.	Attribute	Details of Baseline Data	Remarks								
<b>1</b>	<b>Air Environment</b>										
i	Ambient air quality	<b>Type of data :</b> Primary data <b>Sampling Locations:</b> total 5 locations including project site <b>Period:</b> 15 <sup>th</sup> October 2017 to 15 <sup>th</sup> January 2018	Locations were selected within 500 m radius.								
ii	Noise Level	<b>Type of data :</b> Primary data <b>Sampling Locations:</b> Total 5 locations including project site within 100 m radius of the project site <b>Frequency:</b> 15 <sup>th</sup> October 2017 to 15 <sup>th</sup> January 2018	Locations are selected within 100 m radius as per suggestions given by Functional Area Expert for Noise and Vibrations.								
iii	Meteorological Data	<b>Type of data :</b> Secondary <b>Source:</b> Indian Meteorological Department (IMD), Mumbai 2018	--								
<b>2</b>	<b>Water Environment</b>										
i	Surface water	Surface water bodies <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Location</th> <th>Nos.</th> </tr> </thead> <tbody> <tr> <td>Project site</td> <td>Nil</td> </tr> <tr> <td>500 m radius from the project site</td> <td>Nil</td> </tr> <tr> <td>500 m to 10 km radius from the project site</td> <td>4</td> </tr> </tbody> </table> <b>Type of data :</b> Primary <b>Frequency:</b> Once during the study period	Location	Nos.	Project site	Nil	500 m radius from the project site	Nil	500 m to 10 km radius from the project site	4	As stated in <b>Table 3.2</b> and as per the Guidance Manual for Building, Construction projects approved by MoEF & CC, it is permissible to report the secondary data for the water bodies from 500 m to 10 km from site. However as secondary data is not available for all these water bodies we have collected the primary data.
Location	Nos.										
Project site	Nil										
500 m radius from the project site	Nil										
500 m to 10 km radius from the project site	4										
ii	Ground water	<b>Type of data :</b> Primary <b>Sampling location:</b> Project site (1 no) <b>Frequency:</b> Once during the study period	--								
<b>3</b>	<b>Land Environment</b>										
i	Land use & land cover	<b>Type of data :</b> Secondary <b>Source:</b> GIS Study for Landuse / Landcover details of 10 km radius Date of Pass: 3 <sup>rd</sup> March 2017	Land use/ land cover classification was made based on the satellite data collected from LANDSAT_8, OLI_TIRS software								
ii	Soil analysis	<b>Type of data :</b> Primary <b>Sampling Location:</b> Project site (3 nos.)	--								
<b>4</b>	<b>Socio – Economic Environment</b>	<b>1. Primary data:</b> Project site (September 2019) <b>2. Secondary data :</b> <b>Source :</b> i. 'Census of India' 2011 ii. For Demographic details of S	--								

No.	Attribute	Details of Baseline Data	Remarks
		Ward of MCGM, Mumbai : Official website of MCGM (as per 'Census of India' -2011)	
5	<b>Biological Environment</b>	1. <b>Primary data:</b> Project site and selected locations in the 500 m radius from the project site (Period: September 2019) 2. <b>Secondary data :</b> From 500 m upto 10 km radius from the project site	--
6	<b>Traffic study</b>	Traffic survey was carried out for Traffic volume by M/s. Transportation and Traffic Engineering Consultants (TTEC)	

(Ref.: Guidance Manual for Building, Construction projects approved by MoEF & CC for preparation of EIA report)

### 3.1 Land Environment

The status of land environment has been assessed through reconnaissance in the project area, characterization of soil through field studies, land use/ land cover and cropping pattern corresponding to the project area.

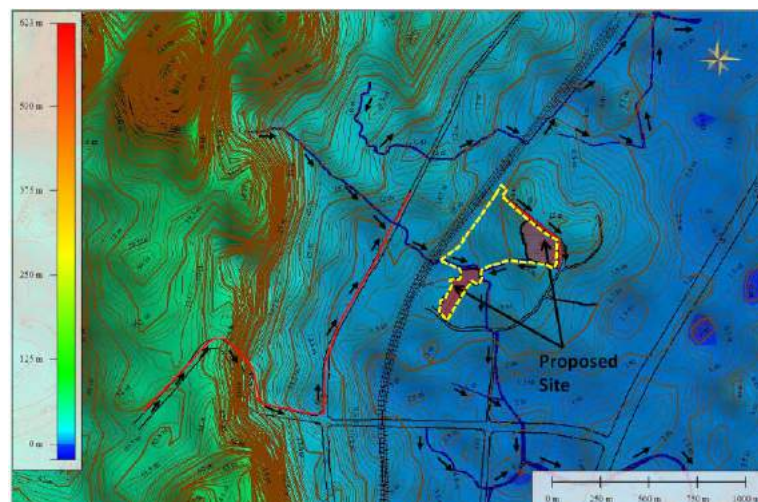
#### 3.1.1 Reconnaissance

The 10 km area around project site covers barren land, built up land, vegetation / forest, Mangroves vegetation, open land, water bodies. The topography of the project site is flat.

The climate of the study area is humid due to vicinity of the coastal, characterized by monsoon, hot summer and mild winter. The annual average rainfall is 2000-2500 mm. The bulk of precipitation received from the south-west monsoon from June to September. The mean annual temperature of the area is 27-28°C. The mean summer and winter soil temperatures are 38°C and 18°C respectively with marginal difference of 2°C confirming coastal region of soil taxonomy. The summer commences in March with increase in day temperature.

#### a. Drainage and Hydrogeological Studies :

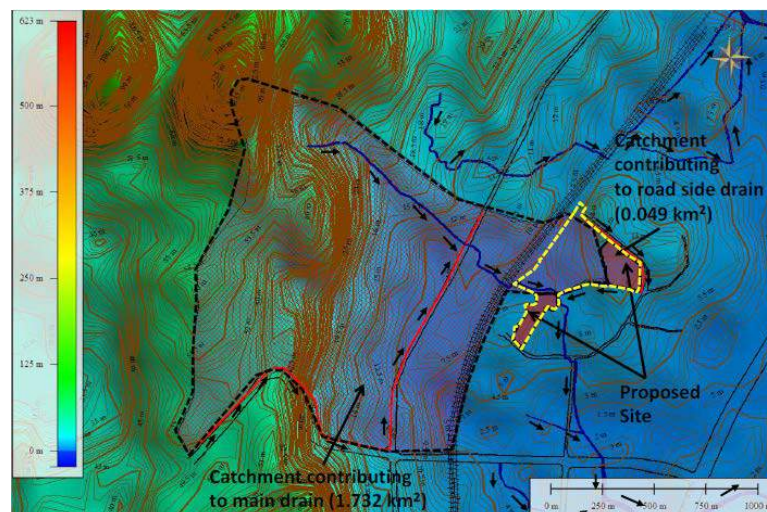
Catchment based approach has been considered in designing rather than isolated individual plot/area based approach. The storm water drain disposal system of proposed site and adjoining area has been identified and catchment contributing to the drain has been shown in figure 3.2.



**Fig 3.2: Location of proposed plot on contour map**

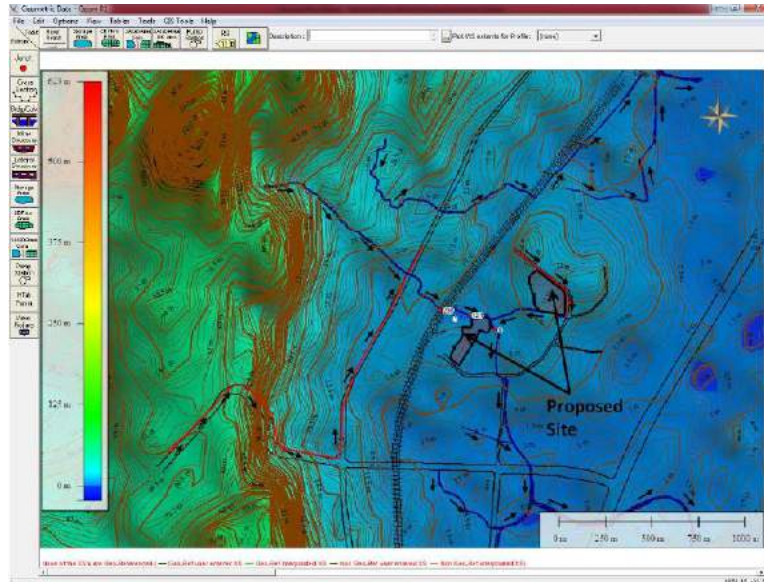
- **Assessment of drain carrying capacity:**

- The storm water from the plot is proposed to be disposed in to an existing 5.0 m wide drain passing through the plot.
- 1.0 coefficient of runoff has been considered for computation of runoff by rational method for impervious and pervious areas. Internal plot storm water drain sizes have been worked considering the rainfall intensity of 100 mm/h.
- The catchment contributing to the road side drain and main passing through the plot have been demarcated and shown in Figure 3. Catchment contributing to the road side drain and main passing through the plot has been estimated as 0.049 sq.km. and 1.732 sq.km. respectively.
- Drain carrying capacity has been computed considering contributing catchment area. Runoff contributing the drain has been computed considering rainfall intensity as 100 mm/h. Coefficient of runoff for road side drain has been considered as 1.0 for pervious and impervious areas. Whereas, Coefficient of runoff for main drain has been considered as 0.90 and 0.50 for impervious and pervious areas respectively. Runoff contributing to road side drain has been computed as 1.36 m<sup>3</sup>/s (Plot = 0.92 m<sup>3</sup>/s and road side = 0.44 m<sup>3</sup>/s). Runoff contributing to main drain has been computed as 39.80 m<sup>3</sup>/s (Plot = 0.92 m<sup>3</sup>/s and adjoining areas = 38.88 m<sup>3</sup>/s).



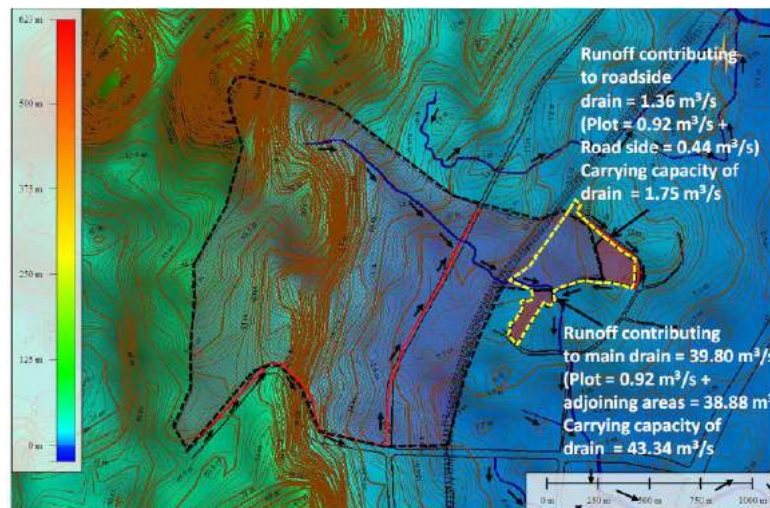
**Fig 3.3: Proposed layout on contour and catchment contributing to drain.**

- Hydraulic analysis of drains has been carried out using US Army Corps of Engineer's HEC-RAS (Hydrologic Engineering Center's & River Analysis System) software. The drain schematic in HEC-RAS has been shown figure 3.4.



**Fig 3.4: Drain network in HEC-RAS**

- o Carrying capacity of road side drain has been computed as  $1.75 \text{ m}^3/\text{s}$ , whereas, contributing runoff is  $1.36 \text{ m}^3/\text{s}$  as shown in below figure. Carrying capacity of main drain has been computed as  $43.34 \text{ m}^3/\text{s}$ , and whereas, contributing runoff is  $39.80 \text{ m}^3/\text{s}$ .



**Fig 3.5: Runoff contributing to drains and its carrying capacity**

**Table 3.4: Summary of contributing runoff**

Details	Runoff ( $\text{m}^3/\text{sec}$ )
Run off after development from plot	1.84
Peak runoff from catchment area outside plot contributing to plot drain	0
Total runoff from plot	1.84
Runoff contributing to the existing road side drain (Plot = $0.92 \text{ m}^3/\text{s}$ + outside plot = $0.44 \text{ m}^3/\text{s}$ )	1.36
Runoff contributing to the existing main drain (Plot = $0.92 \text{ m}^3/\text{s}$ + outside plot = $38.88 \text{ m}^3/\text{s}$ )	39.80

Carrying capacity of drains	Capacity (m <sup>3</sup> /sec)
Carrying capacity of internal drain	4.24
Carrying capacity of road side drain	1.75
Carrying capacity of main drain	43.34

**b. Geology**

The area is occupied by archean quartzites deccan trap and alluvium. The major part of the study area is covered by thick soil cover.

The Deccan traps or basal are the basic igneous rocks which come out through long narrow fissures as lava and spread as nearly horizontal sheets on continental scale. The Deccan trap occurring in the watershed is part of this vast basaltic province. The bulk of the rock is composed of piagiociase feldspar and provixeness. The Archean quartzites are silicious rocks containing minor feldspars and other oxides.

**Soil profile/layers as per the Geotechnical Investigation Report:**

**On site subsurface layers:**

- Layer I – Fill consisting mostly of Clay with boulders
- Layer II: Residual Soil consisting of Yellowish/ Reddish brown Clay
- Layer III: Completely Weathered rock
- Layer IV: Hard Basalt Bedrock

Extract of Geotechnical Investigation Report is attached as **Enclosure**.

**3.1.2 Physico-Chemical characteristics of soil**

**a. Soil Characteristics**

Soil samples (from depth of 0-15cm) were collected from project site and characterized for physicochemical parameters to know the pristine quality of the soil under study. Standard methods were followed for the analysis of soil sample, methodology is attached as Enclosure.



**Fig. 3.6: Map showing Locations of Soil sampling**

**b. Physical Properties of Soil**

The physical properties of soil determine the aeration of the soil and the ability of water to infiltrate and to be held in the soil. Color, Bulk density and Water Holding Capacity were analysed as shown below:

**Table 3.5 (A): Physical Properties of Soil**

No.	Parameter	Result of analysis			Unit
		S1	S2	S3	
1.	Color	Brown	Brown	Brown	--
2.	Bulk Density	1156	1133	1110	kg/m <sup>3</sup>
3.	Water Holding Capacity	57.0	53.0	55.6	%
4.	Moisture content	4.0	11.2	11.9	%

**c. Chemical Properties of Soil**

The collected soil samples were analysed for various chemical parameters. The parameters selected were pH, electrical conductivity, soluble anions and cations, nutrients and organic carbon content.

The analysis results that the soil represents the low productivity with no salinity problem and as the pH is slightly alkaline, this soil can be used for landscaping area. The detailed analysis report is as follows:

**Table 3.5 (B): Chemical Properties of Soil**

No.	Parameter	Result of analysis			Unit
		S1	S2	S3	
1.	pH	7.8	8.5	8.8	--
2.	Electrical Conductivity	0.121	0.176	0.132	mS/cm
3.	Calcium as Ca <sup>2+</sup>	48	49	16	mg/kg
4.	Magnesium as Mg <sup>2+</sup>	38	59	50	mg/kg
5.	Sodium as Na <sup>+</sup>	69	43	52	mg/kg
6.	Potassium as K <sup>+</sup>	4	7	8	mg/kg
7.	Chloride as Cl <sup>-</sup>	58	86	152	mg/kg
8.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	51	95	81	mg/kg
9.	Cation Exchange Capacity (NH <sub>4</sub> OAc Extract)	15.2	17.3	16.3	meq/100g

**Table 3.5 (C): Relationship of CEC with Productivity**

CEC	Range in meq/100g	Productivity	Observed Values
Very low	<10	Very Low	S1: 15.2 meq/100g: This soil represents <b>Low</b> Productivity S2: 17.3 meq/100g: This soil represents <b>Low</b> Productivity S3: 16.3 meq/100g: This soil represents <b>Low</b> Productivity
Low	10-20	Low	
Moderate	21-50	Moderate	
High	>50	High	

**Table 3.5 (D): Relationship of CEC with Absorptivity**

CEC	Range in meq/100g	Absorptivity	Observed Values
Very low	<10	Low or Limited absorption	S1: 15.2 meq/100g: This soil represents <b>Moderate</b> Absorptivity S2: 17.3 meq/100g: This soil represents <b>Moderate</b> Absorptivity S3: 16.3 meq/100g: This soil represents <b>Moderate</b> Absorptivity
Low	10-20	Moderate absorption	
Moderate	21-30	High absorption	
High	>30	Very High absorption	

**d. Exchangeable Cations and Fertility Status of Soil**

The concentration levels of available cations in the soil with respect to Calcium, Magnesium, Sodium, and Potassium and fertility status in the form of NPK values, organic matter and Organic Carbon are presented in Table 3.5 (E).

**Table 3.5 (E): Nutrient Status of Soil**

No.	Parameter	Result of analysis			Unit
		S1	S2	S3	
1	Exchangeable Calcium as Ca <sup>2+</sup>	6.9	7.1	8.1	meq/100g
2	Exchangeable Magnesium as Mg <sup>2+</sup>	5.9	4.1	5.1	meq/100g
3	Exchangeable Sodium as Na <sup>+</sup>	0.6	0.7	0.9	meq/100g
4	Exchangeable Potassium as K <sup>+</sup>	0.2	0.5	0.6	meq/100g
5	Organic Matter	0.8	0.4	0.6	%
6	Organic Carbon	0.4	0.2	0.3	%
7	Available Nitrogen	129	99	113	kg/ha
8	Available P <sub>2</sub> O <sub>5</sub>	79	41	56	kg/ha
9	Available K <sub>2</sub> O	283	255	357	kg/ha

**Table 3.5 (F): Fertility Status Classification**

Fertility Status	Organic Carbon (%)	Nitrogen (kg/ha)	P <sub>2</sub> O <sub>5</sub> (kg/ha)	K <sub>2</sub> O (kg/ha)
Poor Soil	<0.5	<280	<23	<133
Medium Fertile Soil	0.5-0.75	280-560	23-57	133-337
Fertile Soil	>0.75	>560	>57	>337

**Table 3.5 (G): Fertility Status Classification for Soil at Project Site****For Soil Sample 1**

Fertility Status	Organic Carbon (%)	Nitrogen (kg/ha)	P <sub>2</sub> O <sub>5</sub> (kg/ha)	K <sub>2</sub> O (kg/ha)
Poor soil	0.4	129	79	283

**For Soil Sample 2**

Fertility Status	Organic Carbon (%)	Nitrogen (kg/ha)	P <sub>2</sub> O <sub>5</sub> (kg/ha)	K <sub>2</sub> O (kg/ha)
Poor soil	0.2	99	41	255

**For Soil Sample 3**

Fertility Status	Organic Carbon (%)	Nitrogen (kg/ha)	P <sub>2</sub> O <sub>5</sub> (kg/ha)	K <sub>2</sub> O (kg/ha)
Poor soil	0.3	113	56	357

On comparison with the classification made as shown in Tables 3.5 (F) and 3.5 (G), it was observed that the fertility status of soil is Poor.

**e. Heavy Metal Content in the Soil**

Soil samples were also analyzed for total metals. At present, to check the soil contamination there are no specific standards available in India. The only set of standards available for heavy metals is in the Hazardous and Other Wastes (Management and Tran boundary Movement) Rules, 2016. Schedule II of the said rule defines concentration of certain constituents to be labeled as hazardous wastes.

Concentrations of heavy metal present in the soil sample along with comparison of results with Schedule II of Hazardous Wastes are given below.

**Table 3.5 (H): Heavy Metals in Soil (TCLP Method)**

No.	Parameter	Result of analysis			Standards	Unit
		S1	S2	S3		
1.	Iron as Fe	BDL	BDL	BDL	NS	mg/L
2.	Copper as Cu	BDL	BDL	BDL	25.0	mg/L
3.	Manganese as Mn	BDL	BDL	BDL	10.0	mg/L
4.	Chromium as Cr	BDL	BDL	BDL	5.0	mg/L
5.	Cobalt as Co	BDL	BDL	BDL	80.0	mg/L
6.	Cadmium as Cd	BDL	BDL	BDL	1.0	mg/L
7.	Zinc as Zn	BDL	BDL	BDL	250	mg/L

8.	Lead as Pb	BDL	BDL	BDL	5.0	mg/L
9.	Nickel as Ni	BDL	BDL	BDL	20.0	mg/L

NS: Not Specified

BDL: Below Detection Limit

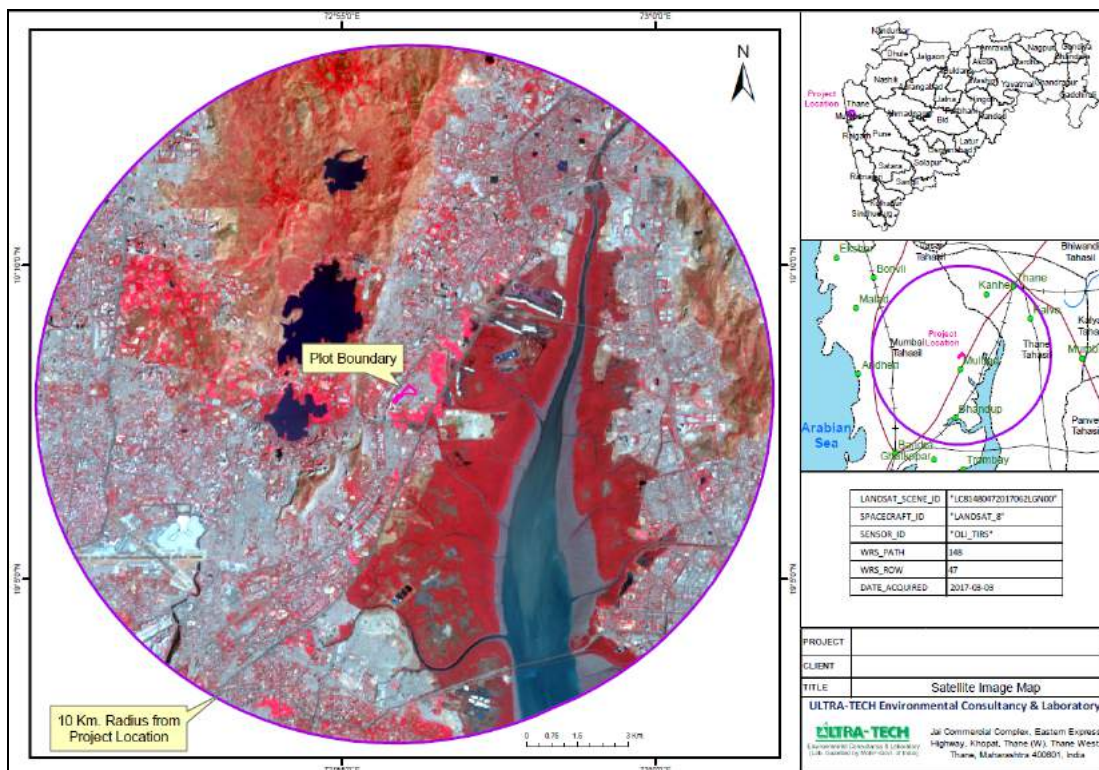
Comparing the reported TCLP values with available guidelines [HWM Rules, 2016] indicating that leachable concentrations are below detection limits and eliminating the chances of soil contamination due to past activities at project site. After detailed assessment of on-site soil for heavy metal contamination, it was concluded that soil is not contaminated with any eco toxic heavy metals as per rule Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016.

### 3.2 EXISTING LAND USE OF STUDY AREA

#### 3.2.1 Site Topography and Geographical Location of site:

The project site is flat. The Contour map of the project site and surrounding area is attached as **Enclosure** to this report. The satellite imagery alongwith latitude and longitude is presented in **Figure 3.7**.

Latitude : 19°2'37.219"N to 19°13'25.003"N  
Longitude : 72°50'24.068"E to 73°1'49.839"E  
Tehsil : Mumbai Suburb  
District : Mumbai Suburb  
State : Maharashtra



**Fig. 3.7: Satellite image of 10 km radius around project site.**

#### 3.2.2 Land use/ Land cover Classes Details:

The land use/ land cover classes were identified in total area of 10 km radius around project site through the satellite imagery as shown in **figure 3.2** and classified in different features as presented in **figure 3.3**. The details regarding satellite data procured is as follows:

## Software and Hardware

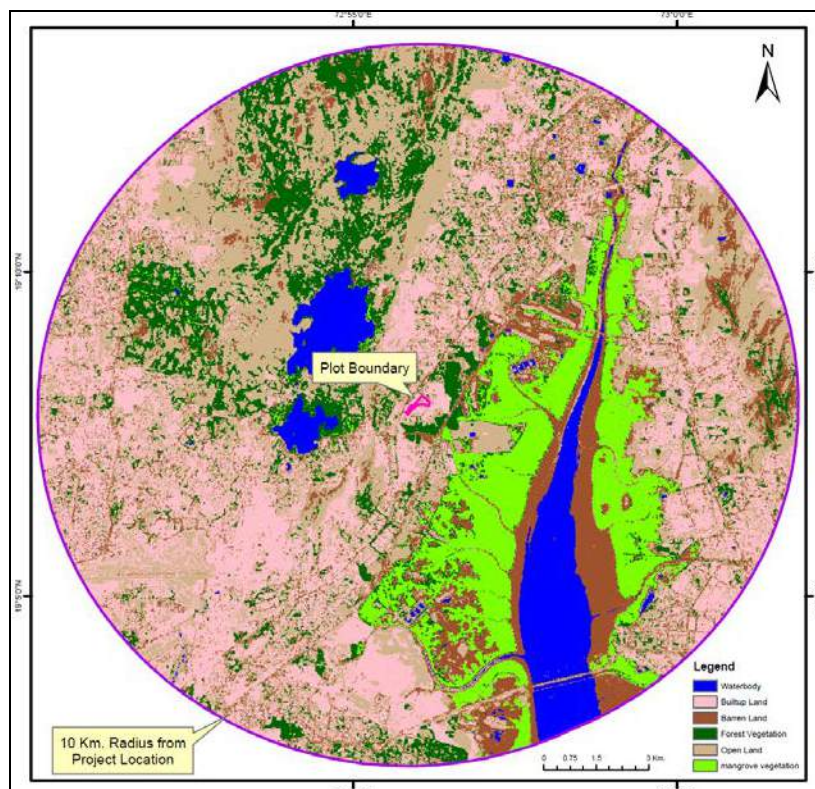
Satellite Data: Landsat\_8  
Path and Row – Path 148, Row 47

Satellite Sensor: OLI TIRS  
Date of Pass: 3<sup>rd</sup> March 2017

The area under each land use/land cover class has been calculated and presented in table below:

**Table 3.6: Land use/Land Cover Features of the Study Area  
(Within 10 km radius from the project site)**

No.	Land use	Area (in sq.km)	Area (%)
1	Barren Land	40.22	12.1
2	Built up Land	79.58	24.0
3	Forest Vegetation	42.28	12.8
4	Mangrove Vegetation	30.57	9.2
5	Open Land	119.48	36.1
6	Water Body	19.23	5.8
	<b>Total Area</b>	<b>331.36</b>	<b>100</b>



**Fig. 3.8: Land use/land cover of 10 km radius area around project site**

### 3.2.3 Seismicity

Mumbai falls under seismically active zone owing to the presence of 23 fault lines in the vicinity. The area is classified as a Seismic Zone III region as per seismic zone classification carried out for India.

### 3.3 WATER ENVIRONMENT

This section documents the baseline scenario of the water environment in the study area.

#### 3.2.1 Surface water:

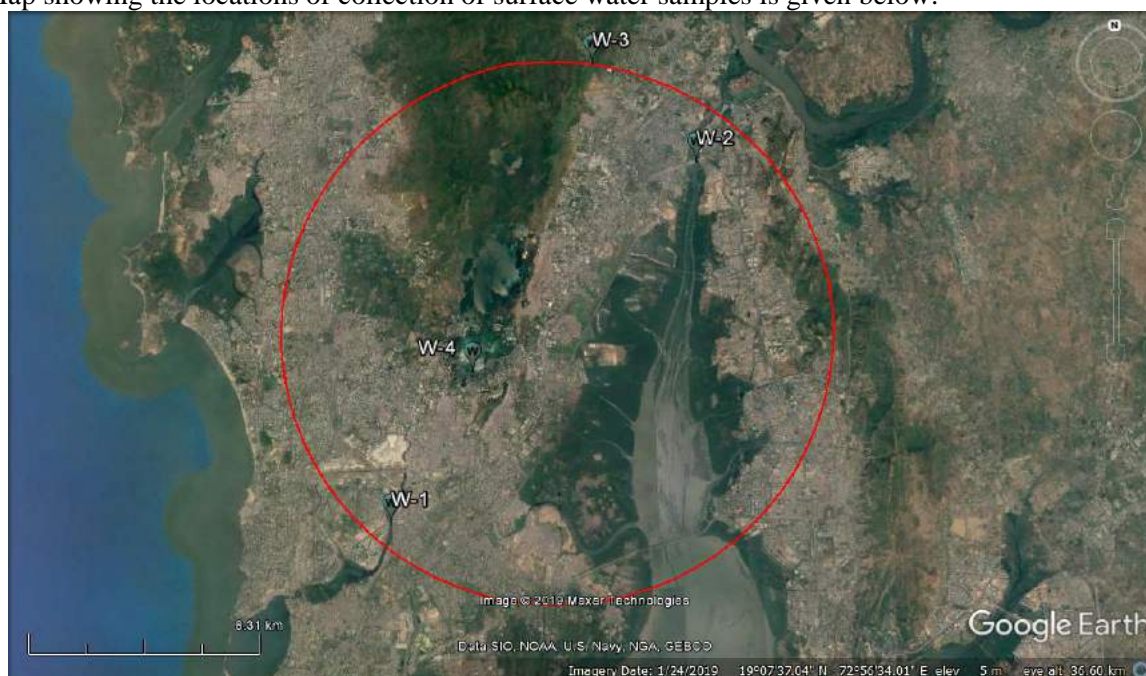
No surface water bodies were observed on site and within 500 m radius from project site. Water samples were collected from water bodies within the study area to establish the existing status of water quality for physico-chemical and microbiological parameters. The surface water bodies found within study area are tabulated in **Table 3.7**

**Table 3.7: Sampling Locations of Surface Water bodies in the study area**

Code	Sampling Locations of the Surface Water bodies	Aerial Distance in km from Plot Boundary	Classes of Water	Table No.
W1	Mithi River behind MTNL office, BKC	9.8 Km	E	3.11 A
W2	Thane Creek near Kalwa railway bridge	7.90 Km	SW II	3.11 B
W3	Yeoor Lake, Thane	10.00 Km	C	3.11 C
W4	Powai Lake	2.00 Km	E	3.11 A

*Sampling Frequency: Once at each location*

Map showing the locations of collection of surface water samples is given below:



**Fig. 3.9: Surface water sampling site map of 10 km radius area around project site**

In addition to these surface water bodies some lakes are also observed within study area. Details of them are given as follows:

**Table 3.8: Lakes in the study area\***

No.	Surface Water body	Aerial Distance in km from Plot Boundary
1.	Upvan Lake	10.00 km
2.	Chandivali Lake	4.00 Km
3.	Ambe Ghosle Lake	9.00 Km
4.	Jail Lake	9.00 Km

No.	Surface Water body	Aerial Distance in km from Plot Boundary
5.	Brahmala Lake	9.00 Km
6.	Makhmali Talao	8.00 Km
7.	Siddheshwar Lake	8.00 Km
8.	Masunda Lake	8.00 Km
9.	Kachrali Lake	8.00 Km
10.	Hariyali Lake	7.00 Km
11.	Raila Devi Lake	7.00 Km
12.	Digha Lake	8.00 Km
13.	Mogliche Lake	9.00 Km
14.	Juhu Village lake	9.00 Km
15.	DAKC lake	8.00 Km
16.	Ghansoli Lake	7.00 Km
17.	Gothivali Khadan Lake	7.00 Km
18.	Tulsi Lake	6.00 Km
19.	Vihar Lake	2.00 Km

\*All the above mentioned lakes though are in the study area they are located in the area beyond 500 m periphery from the project boundary. All of these lakes except Tulsi & Vihar Lake are mainly for recreational purpose and are maintained by Thane Municipal Corporation. Hence primary data for these lakes have not been collected. The lakes like Tulsi & Vihar falls under the boundary of Sanjay Gandhi National Park, so sampling is not allowed.

• **Classification of Surface Water Bodies:**

The Classes of the water bodies found in study area are to be defined as per the CPCB guidelines for Designated Best Use Classification of Surface Waters.

Designated best use	Quality Class	Primary Water Quality Criteria
Drinking water source without conventional treatment but with chlorination	A	<ul style="list-style-type: none"> <li>○ Total coliform organisms (MPN*/100 ml) shall be 50 or less</li> <li>○ pH between 6.5 and 8.5</li> <li>○ Dissolved Oxygen 6 mg/l or more</li> <li>○ Biochemical Oxygen Demand 2 mg/l or less</li> </ul>
Outdoor bathing (organized)	B	<ul style="list-style-type: none"> <li>○ Total coliform organisms(MPN/100 ml) shall be 500 or less</li> <li>○ pH between 6.5 and 8.5</li> <li>○ Dissolved Oxygen 5 mg/l or more</li> <li>○ Biochemical Oxygen Demand 3 mg/l or less</li> </ul>
Drinking water source with conventional treatment	C	<ul style="list-style-type: none"> <li>○ Total coliform organisms(MPN/100 ml) shall be 5000 or less</li> <li>○ pH between 6 and 9</li> <li>○ Dissolved Oxygen 4 mg/l or more</li> <li>○ Biochemical Oxygen Demand 3 mg/l or less</li> </ul>
Propagation of wildlife and fisheries	D	<ul style="list-style-type: none"> <li>○ pH between 6.5 and 8.5</li> <li>○ Dissolved Oxygen 4 mg/l or more</li> <li>○ Free ammonia (as N) 1.2 mg/l or less</li> </ul>
Irrigation, industrial cooling, and controlled disposal	E	<ul style="list-style-type: none"> <li>○ pH between 6.0 and 8.5</li> <li>○ Electrical conductivity less than 2250micromhos/cm</li> <li>○ Sodium Absorption Ratio less than 26</li> <li>○ Boron less than 2 mg/l</li> </ul>

The results of baseline monitoring of surface water are compared with the standards of Environment (Protection) Rules, 1986, and as per IS 2296, 1982.

As per Environment (Protection) Rules, 1986 in a coastal segment, marine water is subjected to several types of uses. Depending on the types of uses and activities, water quality criteria have been specified to determine its suitability for particular purpose. Among the various types of uses there is one use that demands highest level of water quality/purity and that is termed as “designated best use” in that stretch of the coastal segment.

- **Classification of Creeks /Sea:**

As per the GR of Environment Department, Maharashtra and surface monitoring programme in Maharashtra by MPCB; all creeks are classified under SW II class. (Designated Best Use Standards for Coastal Waters). Hence parameters of Thane creek near Kalva railway bridge (W2) were analyzed as per CPCB guidelines for water quality monitoring and results have been compared with SW II class based on classification adopted by water quality standards for coastal waters marine outfalls (Designated Best Use Standards for Coastal Waters).

- **Classification of River:**

The river parameters were analyzed, as per CPCB guidelines for water quality monitoring dated 27<sup>th</sup> December, 2007. After primary survey and analysis of parameters of surface water i.e. Mithi River (W1) following the classification adopted by IS: 2296 and CPCB, it was found that stretch of Mithi River behind MTNL office, BKC (W1) can be classified as Class-E for which best use is for Irrigation, Industrial cooling and controlled waste disposal. This classification is also in accordance to CPCB guidelines for Designated Best Use Classification of Surface Waters.

- **Classification of Lake:**

As per IS: 2296, 1982 the tolerance limits of parameters are specified as per classified use of water depending on various uses of water in India. After analysis of parameters of surface water of Yeoor Lake (W3) & Powai Lake (W4) as per classification adopted by IS: 2296 and CPCB, it was found that Yeoor Lake (W3) can be classified as Class-C which is suitable for outdoor bathing & Powai Lake (W4) can be classified as Class-E which best use is for Irrigation, Industrial cooling and controlled waste disposal. This classification is also in accordance to CPCB guidelines for Designated Best Use Classification of Surface Waters.

Standard methods were followed for the analysis, methodology is attached as Enclosure. Analysis results for environmental parameters of the surface water bodies are given below:

**Table: 3.9 (A). Analysis Results of Water Quality of Mithi River behind MTNL office, BKC (W1) & Powai Lake (W4)**

No.	Parameter	W1	W4	Standards IS:2296, Class-E	Unit
<b>A. General</b>					
1.	Colour	5	<5	No noticeable color	Hazen
2.	Odour	Agreeable	Agreeable	No offensive odor	-
3.	Temperature	27.1	27.2	NS	<sup>0</sup> C
4.	pH	7.5	7.1	6.0-8.5	-
5.	Electrical Conductivity	14000	450	2250	μS/cm
6.	Dissolved Oxygen	4.8	4.8	NS	mg/L
7.	Turbidity	15.9	4.3	NS	NTU
8.	Total Dissolved Solids (TDS)	9170	298	2100	mg/L
<b>B. Nutrients</b>					
9.	Ammonical Nitrogen as NH <sub>3</sub> -N	4.9	<0.1	NS	mg/L
10.	Nitrite Nitrogen as	<0.001	0.24	NS	mg/L

No.	Parameter	W1	W4	Standards IS:2296, Class-E	Unit
	NO <sub>2</sub> -N				
11.	Nitrate Nitrogen as NO <sub>3</sub> -N	2.8	0.8	NS	mg/L
12.	Total Phosphate as PO <sub>4</sub> <sup>-3</sup>	15.6	0.4	NS	mg/L
<b>C. Organic Matter</b>					
13.	Biochemical Oxygen Demand @ 27 <sup>0</sup> C, 3 days	190	9	NS	mg/L
14.	Chemical Oxygen Demand	572	60	NS	mg/L
<b>D. Major Ions</b>					
15.	Potassium as K	155	3.2	NS	mg/L
16.	Sodium as Na	2642	26.4	NS	mg/L
17.	Calcium as Ca	176	44	NS	mg/L
18.	Magnesium as Mg	241	23	NS	mg/L
19.	Carbonates as CO <sub>3</sub> <sup>-2</sup>	<1	<1	NS	mg/L
20.	Bicarbonates as HCO <sub>3</sub> <sup>-</sup>	236	194	NS	mg/L
21.	Chlorides as Cl <sup>-</sup>	4354	44	600	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>-2</sup>	1450	35	1000	mg/L
<b>E. Other Inorganics</b>					
23.	Fluoride as F <sup>-</sup>	1.0	<0.2	NS	mg/L
24.	Boron as B	0.9	<0.1	2	mg/L
<b>F. Microbiological</b>					
25.	Total <i>coliform</i>	1600	600	NS	MPN./100ml
26.	<i>Fecal coliform</i>	90	34	NS	MPN/100ml
# : The detection limit for Carbonates is applicable when pH > 8.3; for pH<8.3 the carbonates are zero					

**Presentation of Surface Water Quality analysis of Mithi River (W1) and Powai Lake (W4):**

- pH is within standards
- TDS, Electrical Conductivity, Chloride and Sulphate are exceeding the standards in Mithi River but found within standards in Powai Lake
- Higher BOD and COD values shows that water bodies are polluted due to discharge of untreated sewage
- Presence of *Fecal Coliform* shows pollution of water bodies due to disposal of sewage
- The values of other parameters analyzed are in compliance with Class E (for which best use is for Irrigation, Industrial cooling and controlled waste disposal)

**Table: 3.9 (B). Analysis Results of Water Quality of Thane creek near Kalwa railway bridge (W2)**

No.	Parameter	W2	Standards SW II (Water Quality Standards for Coastal Water Marine Outfalls)	Unit
<b>A. General</b>				
1.	Colour	<5	No noticeable color	Hazen
2.	Odour	Agreeable	No offensive odor	-
3.	Temperature	27.5	NS	<sup>0</sup> C
4.	pH	7.3	6.5-8.5	-

5.	Electrical Conductivity	39500	NS	µS/cm
6.	Dissolved Oxygen	5.1	4.0 mg/l or 50 percent saturation value, whichever is higher.	mg/L
7.	Turbidity	16.2	30	NTU
8.	Total Dissolved Solids	25680	NS	mg/L
<b>B. Nutrients</b>				
9.	Ammonical Nitrogen as NH <sub>3</sub> -N	<0.1	NS	mg/L
10.	Nitrite Nitrogen as NO <sub>2</sub> -N	<0.001	NS	mg/L
11.	Nitrate Nitrogen as NO <sub>3</sub> -N	0.8	NS	mg/L
12.	Total Phosphate as PO <sub>4</sub> <sup>-3</sup>	12.6	NS	mg/L
<b>C. Organic Matter</b>				
13.	Biochemical Oxygen Demand @ 27 °C, 3 days	20	3	mg/L
14.	Chemical Oxygen Demand	120	NS	mg/L
<b>D. Major Ions</b>				
15.	Potassium as K	115	NS	mg/L
16.	Sodium as Na	8952	NS	mg/L
17.	Calcium as Ca	180	NS	mg/L
18.	Magnesium as Mg	309	NS	mg/L
19.	Carbonates as CO <sub>3</sub> <sup>-2</sup>	<1	NS	mg/L
20.	Bicarbonates as HCO <sub>3</sub> <sup>-</sup>	522	NS	mg/L
21.	Chlorides as Cl <sup>-</sup>	14921	NS	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>-2</sup>	880	NS	mg/L
<b>D. Other Inorganics</b>				
23.	Fluoride as F <sup>-</sup>	1.0	NS	mg/L
24.	Boron as B	0.9	2	mg/L
<b>E. Microbiological</b>				
25.	Total <i>coliform</i>	1600	NS	MPN/100ml
26.	<i>Fecal coliform</i>	40	100/100 ml (MPN)	MPN/100ml
NS-Not Specified BDL-Below Detectable Limit, MPN-Most Probable Number # : The detection limit for Carbonates is applicable when pH > 8.3; for pH<8.3 the carbonates are zero				

- **Presentation of Surface Water Quality analysis of Thane Creek (W2):**
  - pH is within standards.
  - BOD level is exceeding the standards.
  - Presence of Fecal Coliform in Thane Creek shows that there is pollution due to disposal of sewage.
  - The values of parameters analyzed as per SW II class (Designated Best Use Standards for Coastal Waters)

**Table: 3.9 (C). Analysis Results of Water Quality of Yeoor Lake (W3)**

No.	Parameter	W3	Standards IS:2296, Class-C	Unit
<b>A. General</b>				
1.	Colour	<5	No noticeable color	Hazen
2.	Odour	Agreeable	No offensive odor	-
3.	Temperature	26.9	NS	°C
4.	pH	7.3	6.0-8.5	-
5.	Electrical Conductivity	375	2250	µS/cm
6.	Dissolved Oxygen	6.1	NS	mg/L
7.	Turbidity	3.2	NS	NTU

No.	Parameter	W3	Standards IS:2296, Class-C	Unit
8.	Total Dissolved Solids	240	2100	mg/L
<b>B. Nutrients</b>				
9.	Ammonical Nitrogen as NH <sub>3</sub> -N	<0.1	NS	mg/L
10.	Nitrite Nitrogen as NO <sub>2</sub> -N	0.71	NS	mg/L
11.	Nitrate Nitrogen as NO <sub>3</sub> -N	3.3	NS	mg/L
12.	Total Phosphate as PO <sub>4</sub> <sup>-3</sup>	0.4	NS	mg/L
<b>C. Organic Matter</b>				
13.	Biochemical Oxygen Demand @ 27 °C, 3 days	<2	NS	mg/L
14.	Chemical Oxygen Demand	12	NS	mg/L
<b>D. Major Ions</b>				
15.	Potassium as K	1.1	NS	mg/L
16.	Sodium as Na	20.1	NS	mg/L
17.	Calcium as Ca	36	NS	mg/L
18.	Magnesium as Mg	14	NS	mg/L
19.	Carbonates as CO <sub>3</sub> <sup>-2</sup>	<1	NS	mg/L
20.	Bicarbonates as HCO <sub>3</sub> <sup>-</sup>	150	NS	mg/L
21.	Chlorides as Cl <sup>-</sup>	40	600	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>-2</sup>	19	1000	mg/L
<b>E. Other Inorganics</b>				
23.	Fluoride as F <sup>-</sup>	0.7	NS	mg/L
24.	Boron as B	0.1	2	mg/L
<b>F. Microbiological</b>				
25.	Total <i>coliform</i>	900	NS	MPN/100ml
26.	<i>Fecal coliform</i>	21	NS	MPN/100ml
# : The detection limit for Carbonates is applicable when pH > 8.3; for pH < 8.3 the carbonates are zero				

• **Presentation of Surface Water Quality analysis of Yeoor Lake (W3):**

- pH is within standards.
- BOD level is exceeding the standards.
- Presence of Fecal Coliform in shows that there is pollution due to disposal of sewage.
- The values of parameters analyzed are in compliance with Class-C (Drinking water source with conventional treatment) of IS: 2296 and CPCB guidelines for Designated Best Use Classification of Surface Waters.

**3.2.2 Ground Water:**

Ground water sample has been collected from project site. The parameters selected for analysis of ground water are based on the guidelines given by Central pollution Control Board (CPCB) for ground water bodies (Ref: Guidelines for Water Quality Monitoring by CPCB, Refer to Table 1, Pg- 14) The results are compared with the standard IS 10500, 2012.



**Fig. 3.10: Ground water sampling site map of project site**

Standard methods were followed for the analysis, methodology is attached as Enclosure. Analysis results for environmental parameters of the ground water bodies are given below

**Table 3.10: Results of Ground Water analysis**

No.	Parameters	GW	Standard (IS:10500 -2012)		Unit
			Acceptable	Permissible	
<b>A. General</b>					
1	Colour	<5	NS	NS	Hazen
2	Odour	Agreeable	Agreeable	Agreeable	--
3	Temperature	26.0	NS	NS	<sup>0</sup> C
4	pH	7.5	6.5-8.5	No relaxation	-
5	Electrical Conductivity	520	NS	NS	mS/cm
6	Total Dissolved Solids	334	500	2000	mg/L
<b>B. Nutrients</b>					
7	Nitrite Nitrogen as NO <sub>2</sub> -N	0.03	NS	NS	mg/L
8	Nitrate Nitrogen as NO <sub>3</sub> -N	0.2	45	No relaxation	mg/L
9	Total Phosphate as PO <sub>4</sub> <sup>-3</sup>	0.3	NS	NS	mg/L
<b>C. Organic Matter</b>					
10	Chemical Oxygen Demand	8	NS	NS	mg/L
<b>D. Major Ions</b>					
11	Potassium as K	1	NS	NS	mg/L
12	Sodium as Na	30	NS	NS	mg/L
13	Calcium as Ca	48.7	75	200	mg/L
14	Magnesium as Mg	19	30	100	mg/L
15	Carbonates as CO <sub>3</sub> <sup>-2</sup>	0	NS	NS	mg/L
16	Bicarbonates as HCO <sub>3</sub> <sup>-</sup>	230	NS	NS	mg/L
17	Chlorides as Cl <sup>-</sup>	47.5	250	1000	mg/L
18	Sulphates as SO <sub>4</sub> <sup>-2</sup>	15	200	400	mg/L
<b>E. Other Inorganics</b>					
19	Fluoride as F <sup>-</sup>	0.1	1.0	1.5	mg/L
20	Boron as B	0.4	NS	NS	mg/L
# : The detection limit for Carbonates is applicable when pH > 8.3; for pH < 8.3 the carbonates are zero					

NS-Not Specified BDL: Below Detectable Limit

- **Presentation of Ground Water Quality Status:**
  - pH of water samples were within the range
  - Total Dissolved Solids (TDS) found within the acceptable limit
  - Major ions like Ca, Mg, Cl<sup>-</sup> and SO<sub>4</sub><sup>-2</sup> within standards

### 3.4 AIR ENVIRONMENT :

#### 3.4.1 Climate

The climate of Mumbai is characterized by an oppressive summer, dampness in the atmosphere nearly throughout the year, and heavy South-West monsoon rainfall. The cold season from December to February is followed by the summer season from March to June. The period from June to about the end of September constitutes the South-West monsoon season, and October and November form the post-monsoon season.

#### 3.4.2 Rainfall

The records of Mumbai for the average annual rainfall are 2000 -2500 mm. About 94 per cent of the annual rainfall in Mumbai is received during the south-west monsoon months of June to September. July is the rainiest month when about one-third of the annual rainfall is received. Some rainfall mostly as thundershowers is also received during the month of May and the post-monsoon months.

#### 3.4.3 Cloud Cover

During the South-West monsoon months the skies are generally heavily clouded or overcast. Cloudiness decreases after the withdrawal of the South-West monsoon towards the end of September. During the period December to March clear or lightly clouded skies prevail generally. Later cloudiness increases with the progress of the season.

Source: [http://cultural.maharashtra.gov.in/english/gazetteer/greater\\_bombay/general.html#3](http://cultural.maharashtra.gov.in/english/gazetteer/greater_bombay/general.html#3)

#### 3.4.4 Meteorology

Meteorological data for the year 2018 has been collected from the nearest base station i.e. Indian Meteorological Department (IMD), Santacruz Mumbai. The parameters for which data have been collected are:

- Wind speed
- Wind direction
- Temperature
- Relative humidity

**Table 3.11: Meteorological data for the year 2018**

Study period	Temp (0C)		Predominant wind direction	Wind speed (Km/hr)		Relative Humidity (%)	
	Max.	Min.		Max.	Min.	Max.	Min.
January	35.6	15.6	NW	22	0	92	15
February	36.8	17	NW	18	0	93	0
March	38.4	20.6	NW	22	0	91	11
April	35.8	23.2	NW	22	0	95	0
May	35	25.6	W	22	0	89	52
June	35.2	23	SW	22	0	97	58
July	32.6	23.4	SW	25	0	98	63
August	31.4	24.8	SWW	24	0	96	68
September	35	24.2	W	14	0	95	48
October	38	21.6	NEE	14	0	93	18
November	36.6	20.8	NW	14	0	91	24
December	34.2	14.4	NNE	18	0	90	17

Source: Meteorological data for the year 2018 has been collected from Indian Meteorological Department (IMD), Mumbai.

The prevailing wind direction at site is shown through following wind roses prepared for each month throughout the year 2018 is as follows:

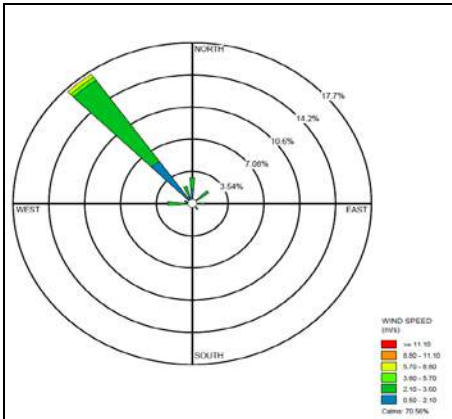


Fig. 3.11 (A): Windrose diagram for January 2018

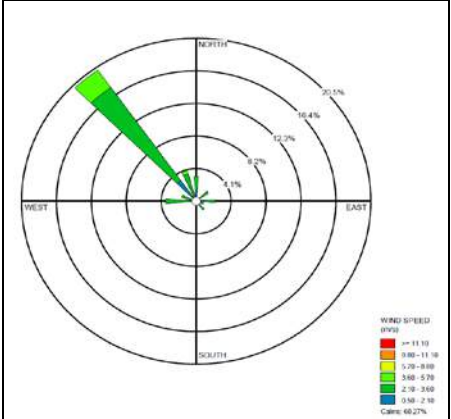


Fig. 3.11 (B): Windrose diagram for February 2018

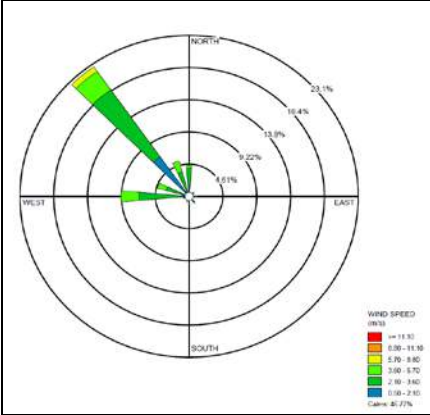


Fig. 3.11(C): Windrose diagram for March 2018

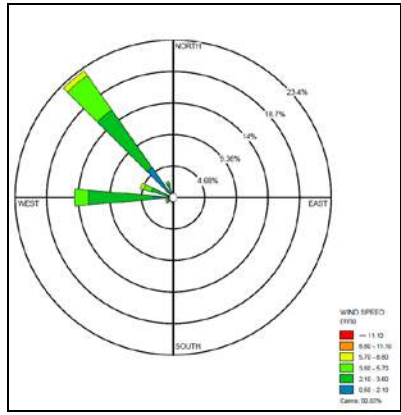


Fig. 3.11 (D): Windrose diagram for April 2018

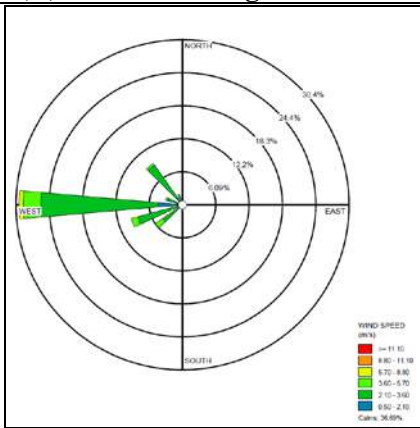


Fig. 3.11 (E): Windrose diagram for May 2018

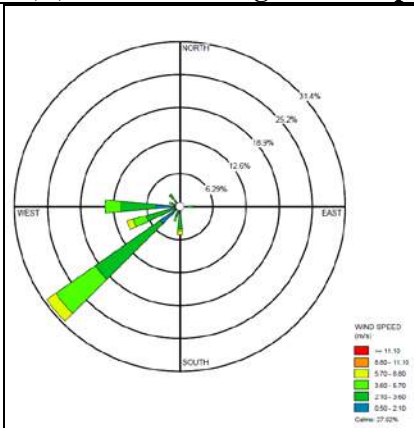


Fig. 3.11 (F): Windrose diagram for June 2018

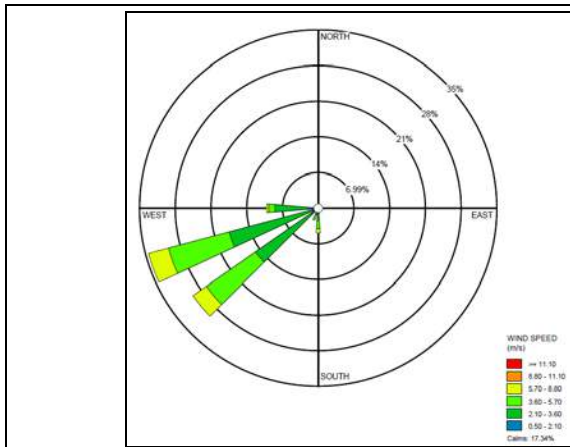


Fig. 3.11 (G): Windrose diagram for July 2018

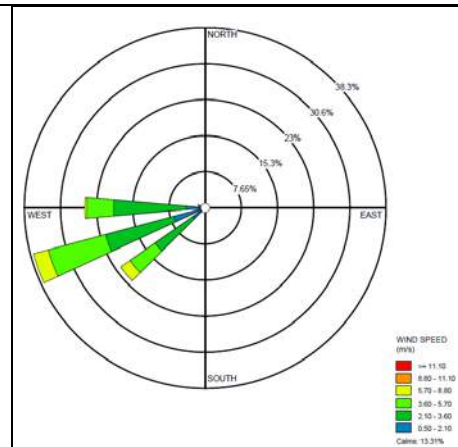


Fig. 3.11 (H): Windrose diagram for August 2018

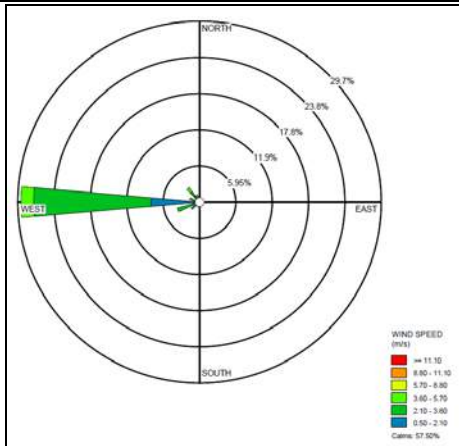


Fig. 3.11 (I): Windrose diagram for September 2018

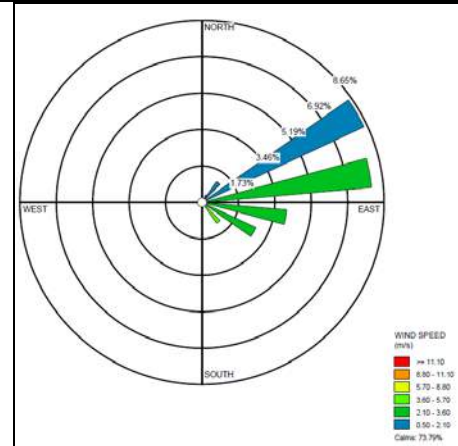


Fig. 3.11 (J): Windrose diagram for October 2018

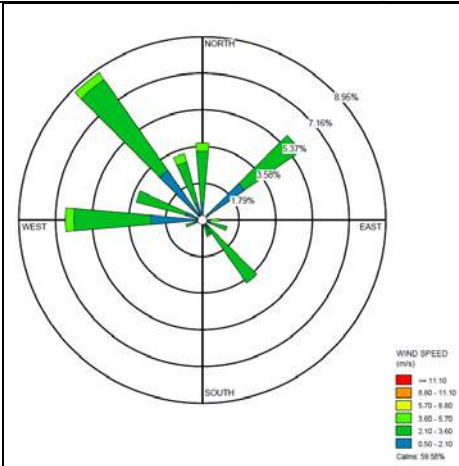


Fig. 3.11 (K): Windrose diagram for November 2018

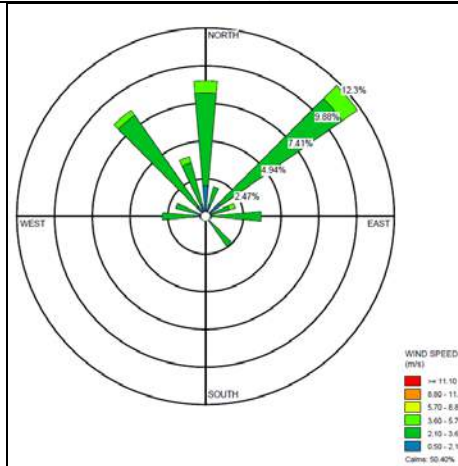


Fig. 3.11 (L): Windrose diagram for December 2018

### 3.4.5 Ambient Air Quality:

An assessment of baseline air quality was undertaken to establish the status of exposure of the major sensitive receptors and to assess the background air quality at the project location.

- **Season and Period of Monitoring**

The ambient air monitoring was carried out in **15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018**.

- **Selected Sampling Locations**

The locations for Ambient Air Quality Monitoring were decided based on the guidelines given in the Guidance Manual for Building, Construction projects approved by MoEF & CC and as explained in

**Table 3.12.** For this EIA, the purpose is to ascertain the baseline pollutant concentrations in ambient air at project site and nearby areas.

Locations selected for ambient air quality monitoring are presented in **Table 3.12**

**Table 3.12: Ambient air quality monitoring location details**

Station Code	Description	Distance from project site
AAQM1	Project site	--
AAQM2	Near Datar Colony, Bhandup (E)	375 m.
AAQM3	Near Yashwantrao Chavan Udyan, Kanjurmarg	372 m.
AAQM4	Near Klick to Buy Ventures (p) Ltd. Kanjurmarg	430 m.
AAQM5	At Ambedkar Nagar Nr. Gundecha Heights, Kanjurmarg	335 m.

Map showing the locations of ambient air quality monitoring is given below.



**Fig. 3.12: Air monitoring site map of 500 m radius area around project site**

- **Sampling Frequency**

The frequency of monitoring was 24 hrs twice a week at each station spread over the season except for CO which was 1 hr twice a month.

- **Parameters Monitored and Methods Used**

The parameters monitored were Respirable Suspended Particulate Matter (RSPM), Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Oxides (NO<sub>x</sub>) and CO. The detailed monitoring methodology for air is attached as Enclosure.

- **Results of Ambient Air Monitoring**

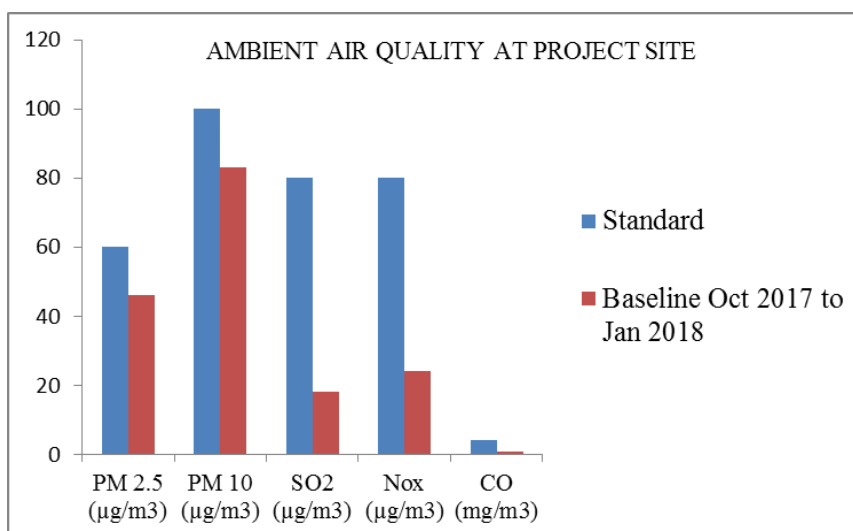
Results of Ambient Air monitoring are given in **Table 3.13**

**Table 3.13: Ambient Air Quality around the Project Site**  
**Period: 15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018**

Station Code	Location of AAQM Station	PM <sub>2.5</sub> (24 hr) ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	NO <sub>x</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	CO (1 hr) ( $\text{mg}/\text{m}^3$ )
		Average	Average	Average	Average	Average
AAQM1	Project Site	46	83	18	24	0.9
AAQM2	Near Datar Colony, Bhandup (E)	54	86	29	37	1.5
AAQM3	Near Yashwantrao Chavan Udyan, Kanjurmarg	45	77	20	27	1.1
AAQM4	Near Klick To Buy Ventures (P) Ltd., Kanjurmarg	56	84	27	37	2.2
AAQM5	At Ambedkar Nagar Nr. Gundecha Heights, Kanjurmarg	50	79	26	36	1.1

**Table 3.14: Permissible Ambient Air Quality Standards as per National Ambient Air Quality Standard (NAAQS) issued by Central Pollution Control Board (CPCB) B-29016/20/90/PCI-I**

Pollutants	PM <sub>2.5</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	NO <sub>x</sub> (24hr) ( $\mu\text{g}/\text{m}^3$ )	CO(1 hr) ( $\text{mg}/\text{m}^3$ )
<b>Residential, Industrial, rural area &amp; other area</b>	60	100	80	80	04
<b>Sensitive</b>	60	100	80	80	04



**Fig.3.13: Graphical representation of Air quality data at project site and comparison with NAAQ Standards by CPCB**

• **Presentation of Ambient Air Quality analysis results:**

All Ambient Air Quality Monitoring (AAQM) stations have been considered as residential zones. After tabular representation of Ambient Air quality it can be observed that:

- The average values of PM<sub>2.5</sub> ranged in between 45  $\mu\text{g}/\text{m}^3$  to 56  $\mu\text{g}/\text{m}^3$  and PM<sub>10</sub> ranged in between 77  $\mu\text{g}/\text{m}^3$  to 86  $\mu\text{g}/\text{m}^3$
- The average values of SO<sub>2</sub> was in between 18  $\mu\text{g}/\text{m}^3$  to 29  $\mu\text{g}/\text{m}^3$ , NO<sub>x</sub> was in between 24  $\mu\text{g}/\text{m}^3$  to 37  $\mu\text{g}/\text{m}^3$  and CO ranged in between 0.9  $\text{mg}/\text{m}^3$  and 2.2  $\text{mg}/\text{m}^3$
- All the parameters were found to be within the desired limits specified by CPCB

- **Calibration of RSPM (PM<sub>2.5</sub>, PM<sub>10</sub>)**
  - All PM<sub>2.5</sub>, PM<sub>10</sub> samplers used for sampling purpose have been calibrated by Poll-tech Instrument" Mumbai & Eco-tech Instrument- Noida

### 3.4.6 Noise Environment:

Noise can affect human health and behavior. Construction equipment and road traffic are the major sources of noise. Baseline noise data of the project area and the neighborhood habitat areas was ascertained to establish existing conditions of ambient noise in the project site. Methodology for monitoring of noise levels is attached as Enclosure.

- **Noise Level Results**

Noise readings were taken at different locations 100 mt. around the project site. Locations are selected within 100 mt. radius as per suggestions given by Functional Area Expert for Noise and Vibrations. The readings are presented vide **Table 3.19**

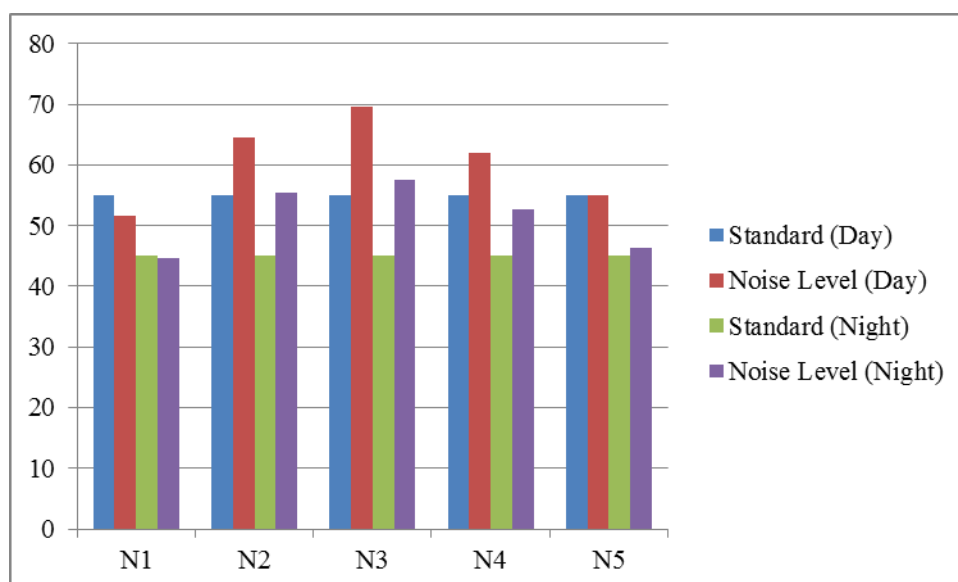
**Table 3.15: Noise level monitoring locations and readings 100 m around the project site**

Station Code	Location of Noise Monitoring Station	Zone	Aerial Distance from Project Site	Equivalent Noise levels in Leq	
				Day	Night
ANQM1	Project Site	Residential	--	56	47
ANQM2	Damle colony, Kanjur village	Residential	73 m.	69	56
ANQM3	Junction of Kanjur village road and Shah colony road	Residential	68 m	71	58
ANQM4	Backside of Crompton Greaves Ltd.	Residential	70 m	68	53
ANQM5	Near IES School, Kanjur	Residential	94 m	58	48

Map showing the locations of noise level monitoring 100 m around project site is given in **Fig 3.14**.



**Fig. 3.14: Noise monitoring site map of 100 m around the project site**



**Fig. 3.15: Graphical representation of noise quality data 100 m around project site and comparison to Ambient Noise Levels Standards Specified by CPCB for Residential zone**

The Principal Rules of Noise Pollution were published in the Gazette of India, vide S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.

**Table 3.16: Ambient Noise Levels Standards Specified By CPCB**

Category of Area	Limits in dB (A) Leq	
	Day Time(6 am – 9 pm)	Night Time (9 pm – 6 am)
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

- Presentation of Ambient Noise Quality results:**

Comparison of the ambient noise levels with the standards specified by CPCB reveals that the day time and night time noise readings at all the locations are exceeding CPCB standards owing to vehicular movement in nearby roads.

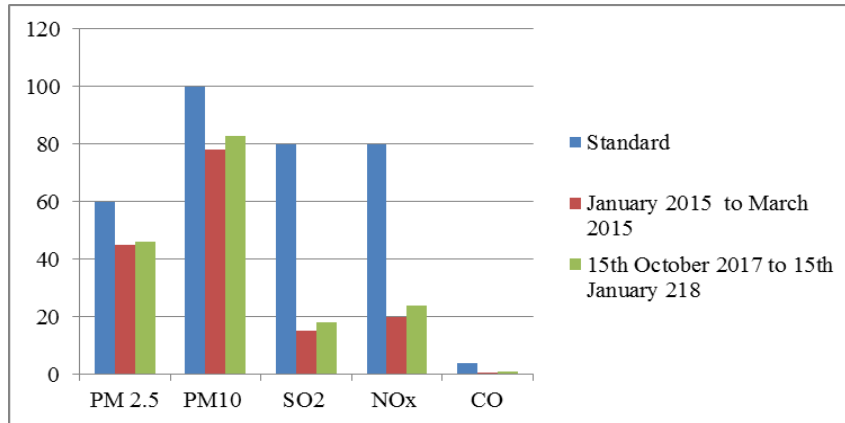
- Comparison of Baseline data:**

For this project earlier baseline data were collected by conducting primary sampling / field studies during January 2015 to March 2015 (Pre-monsoon season) while obtaining EC dt. 21.09.2016. Also fresh baseline study were carried out from 15<sup>th</sup> October 2017 to 15<sup>th</sup> January 2018 at that time of obtaining EC dt. 14.02.2019. Comparison of baseline data collected each time for the project site is tabulated and presented as under;

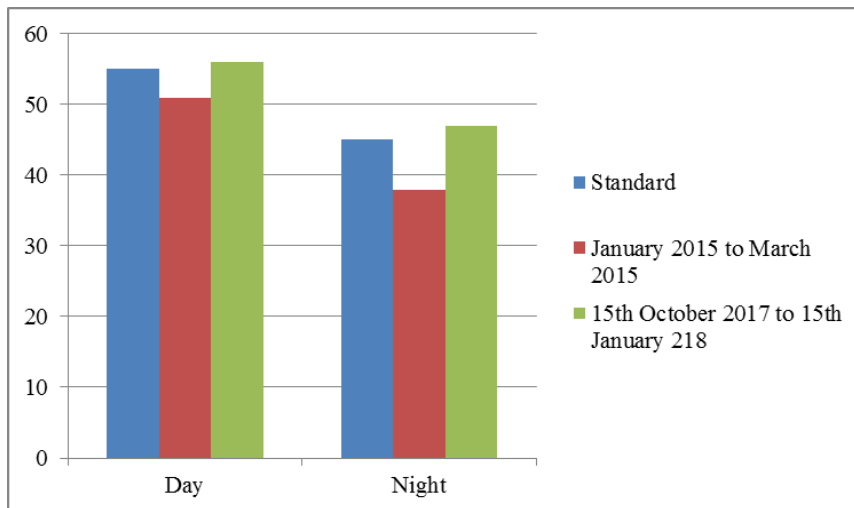
Component	Baseline data- (January 2015 to March 2015)	Baseline data (15 <sup>th</sup> October 2017 to 15 <sup>th</sup> January 2018.)
<b>Ambient Air quality</b>		
PM <sub>2.5</sub> (ug/m <sup>3</sup> )	45	46
PM <sub>10</sub> (ug/m <sup>3</sup> )	78	83
SO <sub>2</sub> (ug/m <sup>3</sup> )	15	18
NO <sub>x</sub> (ug/m <sup>3</sup> )	20	24
CO (mg/m <sup>3</sup> )	0.7	0.9
<b>Ambient Noise levels</b>		
Noise levels	Day: 51 Leq	Day: 56 Leq

Component	Baseline data- (January 2015 to March 2015)	Baseline data (15 <sup>th</sup> October 2017 to 15 <sup>th</sup> January 2018.)
	Night: 38 Leq	Night: 47 Leq

Graphical representation of Comparison of Baseline for Ambient Air Quality status of the project site is as below:



Graphical representation of Comparison of Baseline for Noise Quality status of the project site is as below:



Tabular representation of Comparison of Baseline for Ambient Air Quality status of the project site is as below:

- The concentrations of parameters like PM<sub>2.5</sub>, PM<sub>10</sub> and NO<sub>x</sub> show rise compared to the concentration measured during previous baseline studies. This rise may be due to construction activities on site & surrounding areas. But the concentrations are still within the limits prescribed by CPCB.
- Ambient noise levels at the project site reveals increase in noise levels compared to noise levels measured during previous baseline studies.

### 3.5 BIOLOGICAL ENVIRONMENT:

#### 3.5.1 Objectives of Ecological Studies:

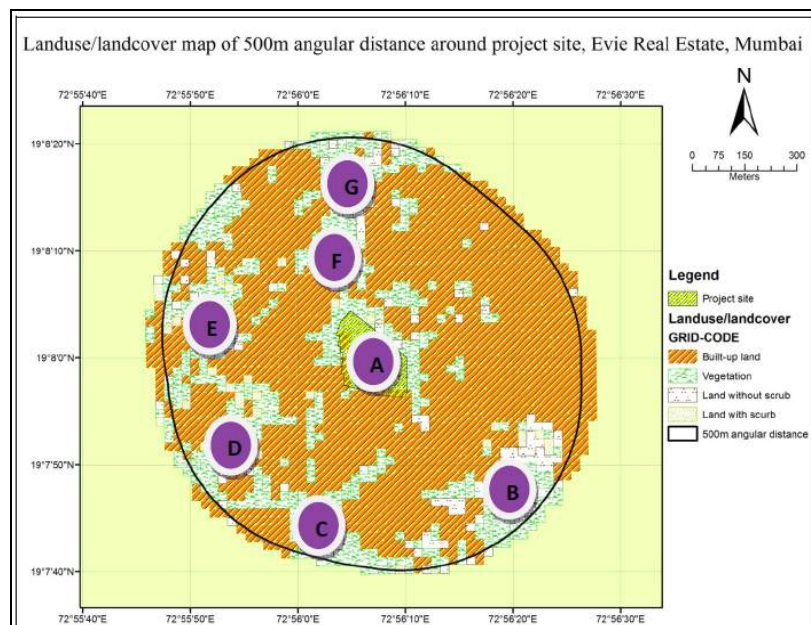
The present study was undertaken with the following objectives:

- To assess the nature and distribution of vegetation in and around the project site

- To evaluate the distribution of animal life spectra, including avifauna and butterflies, available in this area
- To ascertain whether the proposed project will have any adverse impact on the ecology in and around project areas, and suggest mitigation measures, if needed.

### 3.5.2 Study Area:

As per guidelines of MoEF & CC for Environmental Impact Assessment, pertaining to Construction projects, total study area is restricted up to 10 km radius from the project site, of which primary data need to be collected from the area up to 500 m periphery, while remaining 9.5 km will be represented by secondary data. The data up to 500 m periphery were generated with reference to topography, land use, habitats, flora and fauna etc. All observations were undertaken at select sampling locations (Fig. 3.16). Terrestrial vegetation primarily consists of trees and shrubs.



**Fig.3.16: Locations of field survey within 500 m periphery of project site: Flora and Fauna (A-G)**

### 3.5.3 Biodiversity

#### I. Project site

**A. Terrestrial Ecology:** Based on field survey and land use map, single locations (A) were selected within the project site for field survey (Fig.3.22)

#### a) Flora:

#### Special Features:

There is an old Indian National tree *Ficus benghalensis* (Banyan tree) at project site. On 30<sup>th</sup> November 2010 this tree aged 147 years, as per information displayed at site.



147 years old *Ficus benghalensis* (Banyan tree)

The floristic survey reveals that at the project site there are different varieties of flora, such as:

- **Trees:** *Albizia lebbbeck*, *Azadirachta indica*, *Alstonia scholaris*, *Artocarpus heterophyllus*, *Annona reticulatea*, *Araucaria columnaris*, *Anacardium occidentale*, *Acacia auriculiformis*, *Borassus flabellifer*, *Cassia fistula*, *Cocos nucifera*, *Caryota sp.*, *Cordia dichotoma*, *Couroupita guianensis*, *Delonix regia*, *Garcinia indica*, *Eucalyptus globules*, *Ficus religiosa*, *Ficus benghalensis*, *Ficus benjamina*, *Emblica officinalis*, *Mangifera indica*, *Moringa oleifera*, *Manilkara hexandra*, *Musa paradisiaca*, *Peltophorum pterocarpum*, *Phoenix dactylifera*, *Plumeria sp.*, *Polyalthia longifolia*, *Saraca indica*, *Samanea saman*, *Spathodea campanulata*.
- **Shrubs:** *Catharanthus roseus* and *Hibiscus rosa-sinensis*
- **Palms:** *Borassus flabellifer*, *Cocos nucifera*, *Phoenix dactylifera*, *Areca catechu* etc.
- **Grass:** *Cynodon dactylon*
- **Climber:** *Pipremnum aureum*

Amongst these plants *Alstonia scholaris*, *Cocos nucifera*, *Saraca indica* and *Polyalthia longifolia* were most dominant. (Table 3.21).

#### b) Fauna:

The fauna observed in project site are as follows

- **Mammals:** *Felis silvestris catus* and *Funambulus palmarum*
- **Avifauna:** *Milvus migrans*, *Columba livia*, *Corvus splendens*, *Cuculus micropterus*, *Acridotheres tristis*, *Saxicoloides fulvicata*, *Pycnonotus jocosus* and *Merops orientalis*
- **Butterflies:** *Papilio polymnestor*, *Eurema hecabe*, *Euploea core*, *Prosotas nora*, *Papilio polytes*, *Junonia lemonias*, *Papilio demoleus*, *Danaus chrysippus* and *Ionolyce helicon*
- **Dragonflies:** *Trithemis aurora* and *Diplacodes trivialis*
- **Damselfly:** *Ischnura senegalensis* (Table 3.21)

**B. Wetland Ecology:** There is no water body found within the site.

## II. Area between project site and 500 m surroundings

### A. Terrestrial Ecology:

#### a) Flora:

Based on field survey and land use map, 7 locations viz, project site (A), near Pariwar Society Building area (B), near Mansukh Dyeing Company Bus Stop area (C), near Royal Park Co-Op Housing Society area (D), near Ambedkar Nagar area (E) and near NCH Colony area (F & G) (Fig.3.23) were selected for vegetation studies. Primary data were generated by preparing a general checklist of the plants encountered in these areas. The area showed overall 59 plant species from 55 genera and 31 families, dominated by *Albizia lebbbeck*, *Azadirachta indica*, *Ficus religiosa*, *Peltophorum pterocarpum*, *Acacia auriculiformis*, *Polyalthia longifolia* and *Mangifera indica*. (Table 3.21).



**A**



**B**



**C**



**D**



**E**



**F & G**

**Plate 3.1: Presence of vegetation within 500m periphery from the project site (A-G)**

**Table 3.17: List of vegetation in sampling locations**

No.	Botanical name	Common name	Family	Status	Status as per International Union for Conservation of Nature (IUCN)
<b>Trees</b>					
1.	* <i>Albizia lebbek</i>	Sirish	Fabaceae	Common Indigenous	Not assessed
2.	* <i>Azadirachta indica</i>	Neem tree	Meliaceae	Common Native	Not assessed
3.	* <i>Alstonia scholaris</i>	Saptaparni	Apocynaceae	Common (Native)	Least concern
4.	* <i>Artocarpus heterophyllus</i>	Fanas	Moraceae	Frequent	Not assessed
5.	* <i>Anacardium occidentale</i>	Kaju	Anacardiaceae	Frequent	Not assessed
6.	* <i>Acacia auriculiformis</i>	Earleaf acacia	Fabaceae	Common	Least concern
7.	* <i>Annona reticulata</i>	Ramphal	Annonaceae	Frequent	Least Concern
8.	* <i>Alstonia scholaris</i>	Satvin	Apocynaceae	Common	Least concern

No.	Botanical name	Common name	Family	Status	Status as per International Union for Conservation of Nature (IUCN)
9.	<i>Araucaria columnaris</i>	Christmas tree	Araucariaceae	Frequent	Least Concern
10.	<i>Carica papaya</i>	Papaya	Caricaceae	Frequent	Not assessed
11.	* <i>Couroupita guianensis</i> ,	Kailaspati	Lecythidaceae	Frequent	Not assessed
12.	* <i>Caryota sp.</i>	Fhishtel plam	Arecaceae	Frequent	Not assessed
13.	* <i>Cassia fistula</i>	Bahava	Caesalpiniaceae	Frequent	Not assessed
14.	* <i>Cordia dichotoma</i>	Bhoker	Boraginaceae		
15.	* <i>Delonix regia</i>	Gulmohar	Fabaceae	Common	Least concern
16.	* <i>Eucalyptus globulus</i>	Nilgiri	Myrtaceae	Frequent	Not assessed
17.	* <i>Embllica officinalis</i>	Amla	Phyllanthaceae	Frequent	Not assessed
18.	* <i>Ficus religiosa</i>	Pimpal	Moraceae	Common (Native)	Not assessed
19.	* <i>Ficus benghalensis</i>	Vad, Banyan	Moraceae	Frequent	Not assessed
20.	* <i>Ficus benjamina</i>	Weeping fig	Moraceae	Frequent	Not assessed
21.	<i>Ficus racemosa</i>	Umber	Moraceae	Frequent	Not assessed
22.	* <i>Garcinia indica</i>	Kokam tree	Clusiaceae	Common	Not assessed
23.	* <i>Hyophorbe lagenicaulis</i>	Bottle plam	Arecaceae	Common	Not assessed
24.	<i>Lagerstroemia speciosa</i>	Tamhan	Lythraceae	Frequent	Not assessed
25.	* <i>Leucaena leucocephala</i>	Subabul	Fabaceae	Common	Not assessed
26.	* <i>Mangifera indica</i>	Mango	Anacardiaceae	Common	Not assessed
27.	* <i>Manilkara hexandra</i>	Khirani	Sapotaceae	Frequent	Not assessed
28.	* <i>Moringa oleifera</i>	Drumstick tree	Moringaceae	Frequent	Not assessed
29.	* <i>Musa paradisiaca</i>	Banana	Musaceae	Frequent	Not assessed
30.	<i>Plumeria alba</i>	White frangipani	Apocynaceae	Frequent	Not assessed
31.	* <i>Peltophorum pterocarpum</i>	Copperpod	Caesalpiniaceae	Common	Not assessed
32.	* <i>Polyalthia longifolia</i>	False ashok	Annonaceae	Common	Not assessed
33.	* <i>Syzygium cumini</i>	Jamun	Myrtaceae	Frequent	Not assessed
34.	* <i>Spathodea campanulata</i>	Spethodia	Bignoniaceae	Frequent	Not assessed
35.	* <i>Samanea saman</i>	Rain tree	Fabaceae	Frequent	Not assessed
36.	* <i>Terminalia catappa</i>	Badam	Combretaceae	Common (Native)	Not assessed
37.	* <i>Tabebuia sp.</i>	Tabebuia	Bignoniaceae	Frequent	Not assessed
38.	* <i>Tamarindus indica</i>	Chinch	Caesalpiniaceae	Frequent	Not assessed
<b>Shrubs</b>					
1.	* <i>Catharanthus roseus</i>	Cape periwinkle	Apocynaceae	Frequent	Not assessed
2.	* <i>Hibiscus rosa-sinensis</i>	China rose	Malvaceae	Frequent	Not assessed
3.	<i>Ixora coccinea</i>	Jungle geranium	Rubiaceae	Frequent	Not assessed

No.	Botanical name	Common name	Family	Status	Status as per International Union for Conservation of Nature (IUCN)
4.	<i>*Tabernaemontana divaricata</i>	Tagar	Apocynaceae	Frequent	Not assessed
5.	<i>Thevetia peruviana</i>	Yellow oleander	Apocynaceae	Frequent	Not assessed
6.	<i>Lantana camara</i>	Wild sage	Verbenaceae	Common	Not assessed
7.	<i>Plumbago zeylanica</i>	Chitrak	Plumbaginaceae	Common	Not assessed
8.	<i>Senna auriculata</i>	Tarwad	Fabaceae	Common	Not assessed
9.	<i>Stachytarpheta indica</i>	Indian snakeweed	Verbenaceae	Frequent	Not assessed
<b>Palms</b>					
1.	<i>*Areca catechu</i>	Beetle nut	Arecaceae	Frequent	Not assessed
2.	<i>*Borassus flabellifer</i>	Taad	Arecaceae	Frequent	Not assessed
3.	<i>*Cocos nucifera</i>	Coconut	Arecaceae	Dominant (Native)	Not assessed
4.	<i>*Caryota sp.</i>	Fishtail palm	Arecaceae	Frequent	Not assessed
5.	<i>*Hyophorbe lagenicaulis</i>	Bottle plam	Arecaceae	Common	Critically endangered
6.	<i>Pritchardia pacifica</i>	Fan palm	Arecaceae	Frequent	Not assessed
7.	<i>*Phoenix dactylifera</i>	Date palm	Arecaceae	Frequent	Not assessed
8.	<i>*Roystonea regia</i>	Royal palm	Arecaceae	Common	Not assessed
<b>Grass</b>					
1.	<i>*Cynodon dactylon</i>	Durva	Poaceae	Common	Not assessed
2.	<i>Dendrocalamus calostachyus</i>	Indian bamboo	Poaceae	Frequent	Not assessed
<b>Climber</b>					
1.	<i>Bougainvillea glabra</i>	Paperflower	Nyctaginaceae	Frequent	Not assessed
2.	<i>*Epipremnum aureum</i>	Money plant	Araceae	Frequent Native	Not assessed
3.	<i>Ipomoea indica</i>	Blue dawn flower	Convolvulaceae	Frequent	Not assessed

**Source: Primary data generation by ULTRA TECH team**

**\* Also Observed on Project site A**

## b) Fauna

### *Methodology*

Field observations of fauna were carried out. The commonly available mammals, amphibians, reptiles, butterflies, dragonflies and damselflies within 500m surroundings were enumerated. The method followed for avifauna survey has been outlined in respective section.

### **Observation**

#### **i. Vertebrates**

- **Mammals:** The domestic animals in the study area mostly comprise of squirrel and dog. The survey revealed that 3 species of mammals were recorded in and around study area. During the survey, no wild mammal was observed within 500m periphery of the project site. Availability of fauna in the vicinity of the sites is referred in **Table 3.18**. None of these animals are endangered (Schedule I) as per Wildlife (Protection) Act 1972.

- **Avifauna:** Birds were studied by direct observation with the help of ‘‘Olympus 10 x 50 DPS I’’ binocular and were identified by adopting available literature (Grimmett *et al.* 1998). A total of 20 bird species dominated by *Columba livia*, *Acridotheres tristis*, *Corvus splendens*, *Dicrurus adsimilis*, *Cuculus micropterus*, *Turdoides caudata* etc. (**Table 3.18**) were recorded. None of these birds are endangered (Sch I) as per Wildlife (Protection) Act 1972.

## ii. Invertebrates

- **Butterflies:** Study area comprises of 15 species of butterflies, dominated by *Euploea core*, *Eurema hecabe*, *Danaus chrysippus* etc. None of these is endangered (Schedule I) as per Wildlife (Protection) Act 1972.
- **Dragonflies and Damselflies:** Two species each of dragonflies and damselflies were recorded. Species like *Diplacodes trivialis* and *Trithemis aurora* are commonly seen throughout the project area while damselfly *Ischnura senegalensis* was common in the periphery of the project site.

**Table 3.18: Fauna recorded in the study area up to 500m periphery**

No.	Common Name	Scientific Name	Conservation status as per Wildlife (Protection) Act 1972
<b>Mammals</b>			
1.	Common dog	<i>Canis lupus familiaris</i>	Not enlisted
2.	*Squirrel	<i>Funambulus palmarum</i>	Sch-IV
3.	*Common cat	<i>Felis silvestris catus</i>	Not enlisted
<b>Avifauna</b>			
1.	*Black kite	<i>Milvus migrans</i>	Not enlisted
2.	*Blue rock pigeon	<i>Columba livia</i>	Sch – IV
3.	*House crow	<i>Corvus splendens</i>	Sch – V
4.	*Indian cuckoo	<i>Cuculus micropterus</i>	Sch – IV
5.	*Indian myna	<i>Acridotheres tristis</i>	Sch – IV
6.	*Indian robin	<i>Saxicoloides fulicata</i>	Sch – IV
7.	Jungle crow	<i>Corvus macrorhynchus</i>	Sch – V
8.	Redvented bulbul	<i>Pycnonotus cafer</i>	Sch – IV
9.	Redwattled lapwing	<i>Vanellus indicus</i>	Sch – IV
10.	*Redwhiskered bulbul	<i>Pycnonotus jocosus</i>	Sch – IV
11.	*Small green bee eater	<i>Merops orientalis</i>	Sch – IV
12.	Cattle egret	<i>Bubulcus ibis</i>	Sch – IV
13.	Common swallow	<i>Hirunds rustica</i>	Sch – IV
14.	Crow pheasant	<i>Centropus sinensis</i>	Sch – IV
15.	Indian black drongo	<i>Dicrurus adsimilis</i>	Sch – IV
16.	Indian pond heron	<i>Ardeola grayii</i>	Sch – IV
17.	Red avadavat	<i>Amandava amandava</i>	Sch – IV
18.	Roseringed parakeet	<i>Psittacula krameri</i>	Sch – IV
19.	Common babbler	<i>Turdoides caudata</i>	Sch – IV
20.	Small blue kingfisher	<i>Alcedo atthis</i>	Sch – IV
<b>Amphibians</b>			
1.	Common Indian toad	<i>Bufo melanostictus</i>	Not enlisted
2.	Cricketer frog	<i>Fejervarya limnocharis</i>	Not enlisted
3.	*Indian bullfrog	<i>Rana tigrina</i>	Not enlisted
<b>Reptiles</b>			
1.	*Common garden lizard	<i>Calotes versicolor</i>	Not enlisted
2.	House gecko	<i>Hemidactylus brookii</i>	Not enlisted
<b>Butterflies</b>			
1.	*Common emigrant	<i>Catopsilia pomona</i>	Not enlisted

No.	Common Name	Scientific Name	Conservation status as per Wildlife (Protection) Act 1972
2.	*Common evening brown	<i>Melanitis leda</i>	Not enlisted
3.	*Common grass yellow	<i>Eurema hecabe</i>	Not enlisted
4.	*Common Indian crow	<i>Euploea core</i>	Sch – IV
5.	*Common line blue	<i>Prosotas nora</i>	Not enlisted
6.	*Common mormon	<i>Papilio polytes</i>	Not enlisted
7.	*Lemon pansy	<i>Junonia lemonias</i>	Not enlisted
8.	*Lime butterfly	<i>Papilio demoleus</i>	Not enlisted
9.	*Plain tiger	<i>Danaus chrysippus</i>	Not enlisted
10.	*Pointed line blue	<i>Ionolyce helicon</i>	Not enlisted
11.	Blue mormon	<i>Papilio polymnestor</i>	Not enlisted
12.	Common castor	<i>Ariadne merione</i>	Not enlisted
13.	Common leopard	<i>Phalanta phalantha</i>	Not enlisted
14.	Common pierrot	<i>Castalius rosimon</i>	Not enlisted
15.	Gray pansy	<i>Junonia atlites</i>	Not enlisted
<b>Dragonflies</b>			
1.	*Crimson marsh glider	<i>Trithemis aurora</i>	Not enlisted
2.	*Ground skimmer	<i>Diplacodes trivialis</i>	Not enlisted
<b>Damselflies</b>			
1.	Golden dartlet	<i>Ischnura aurora</i>	Not enlisted
2.	*Senegal golden dartlet	<i>Ischnura senegalensis</i>	Not enlisted

Source: Primary data generation by ULTRA TECH team

\* Also Observed on Project site A

### III. Area between 500 m and 10 km

**Methodology:** The data pertaining to flora and fauna have been collected based on discussions with concerned forest department officials, local people, published literature, NGOs etc. and supported by physical verifications, wherever feasible. The collated data have been delineated hereunder.

Sanjay Gandhi National Park is located within 10 Km periphery of the study area. Further, a sizable portion is covered by Environmental Sensitive water bodies such as Thane creek, Tulsi Lake, Powai lake, Vihar lake, Yeoor lake and Mithi river. Also observed some recreational lakes mentioned in table 3.1

#### A. Terrestrial Ecology:

##### a) Sanjay Gandhi National Park (SGNP):

SGNP, also known as Borivali National Park, is within the study area and is nestled in the hill ranges at a distance of approximate 2 km from the project site.

##### i. Flora

- **Vegetation types:** According to the revised classification of Indian forest types by Champion & Seth, the forests of Sanjay Gandhi National Park division represent the following forest types (Table 3.19).

- **Threatened Species:** Threatened species are those found only in small numbers or very near to extinction in the country. India has a list of threatened species at the all India level, as published by the Botanical Survey of India, entitled 'Red Data Book' and Wildlife (Protection) Act 1972, from & CC, Govt. of India. The threatened vegetations available in SGNP are outlined hereunder. **Sita ashok:** It is rare and endemic species of the national park. Nearly 75 ha patch of *Saraca ashoka*; popularly known as 'Ashok Van' is seen near Kanheri caves. Flowers that are visible from March to May are delicious food of monkeys, langurs and other herbivores (Plate 3.2 & Table 3.19).

**Kokam:** Kokam (*Garcinia indica*) is an evergreen species seen mostly at the highest point area. Fruits, having medicinal value for use as antidote of stomach upset, are also preferred by monkeys, langurs and some birds.

**White Orchids:** Two species of white orchids (*Platanthera* sp. and *Habenaria* sp) are found at the highest peak in the month of September.

**Table 3.19: Forest types recorded in SGNP**

Forest Type	Scientific Name	Local Name
3B/C1 Southern moist teak bearing forest	<i>Adina cordifolia</i>	Hedu
	<i>Bombax malabaricum</i>	Kate-Saveri
	<i>Garuga pinnata</i>	Kakad
	<i>Lannea grandis</i>	Shemat
	<i>Mangifera indica</i>	Amba
	<i>Mimusops hexandra</i>	Ranjana
	<i>Pterocarpus marsupium</i>	Indian Kino tree
	<i>Schleichera oleosa</i>	Kosumb
	<i>Syzygium cumini</i>	Jambul
	<i>Tectona grandis</i>	Sag
	<i>Bambusa arundinacea</i>	Kalaka Bamboo
<i>Dendrocalamus strictus</i>	Velu Bamboo	
3B/C2 Southern moist mixed deciduous forest	<i>Ixora parviflora</i>	Techi
	<i>Mallotus phillippensis</i>	Shendri
	<i>Saraca indica</i>	Ashok
4B/TS1 Mangrove scrubs	<i>Avicennia marina</i>	Grey mangrove
	<i>Pongamia pinnata</i>	Karanj
	<i>Garcinia indica</i>	Kokum
8A/C2 Western sub-tropical hill forest	<i>Syzygium cuminii</i>	Jambul
	<i>Murraya paniculata</i>	Kunti
	<i>Ixora parviflora</i>	Techi
	<i>Calophyllum inophyllum</i>	Surangi

## ii. Fauna:

- **Mammals:** Mammals like *Suncus murinus*, *Rousettus leschenaultia*, *Taphozous saccolaimus*, *Rhinolophus rouxii*, *Viverricula indica*, *Lepus nigricollis*, *Funambulus palmarum* have been recorded in the national park. Some rare and endangered species were found in SGNP that has been dealt separately (**Table 3.20**).
- **Avifauna:** The avifauna of this area is an attractive wildlife feature. Well over 250 bird species, both resident & migrant, belonging to 18 different orders and 47 families have been recorded here. The period between December and February is ideal for bird watching. Migratory ducks, such as, common teal (*Anas crecca*) and the red crested pochard (*Rhodonessa rufina*) are seen in small numbers in Vihar and Tulsi lakes. Mangrove swamps attract a variety of plovers, sandpipers, gulls and terns. The rose-ringed parakeet (*Psittacula krameri*) and the blossom headed parakeet (*Psittacula roseata*) etc.
- **Reptiles:** The reptiles of the park are covered under three orders and fourteen families. There are 38 species of reptiles, of which 3 species of tortoise and 11 species of lizards occur in this area.
- **Amphibia:** The tree frogs, the bullfrog and common toad, the Jerdon's Narrow-mouthed frog (*Ramanella montana*) have been recorded in the area.
- **Fishes:** During the monsoons, when deep-sea fishing is suspended, many sea fishes migrate to the shore. Within the park, 25 species of marine fishes like *Hilsa ilisha*, *Therapon jarbua*, *Mugil cephalus*, *Harpodon nehereus*, *Scatophagus argus*, *Eleutheronema tetradactylum* etc.
- **Annelids:** Among the marine annelids, two species of Earthworms (*Lumbricidae*) are commonly found.

- **Molluscs:** The Molluscs are represented from the orders gastropoda, bivalvia and pulmonata. The common species are *Telescopium telescopium*, *Nerita crepidularia*, *Potamides cingulatus* etc.
- **Crustaceans:** Mangroves, present in the Park, help in breeding of crustaceans, comprising of barnacles *Balanus* sp., crabs, lobsters, prawns and shrimps, of which crabs are most dominant. Five species of crabs, viz. swimming crabs (*Scylla serrata*, *Varuna litterata*), fiddler crab (*Uca rosea*, *U. vocans*) and *Sesarma* sp. are most common.

➤ **Threatened animals in SGNP:**

Certain fauna in SGNP are enlisted under various Schedules of Wildlife (Protection) Act 1972. While species like Indian peafowl (*Pavo cristatus*), osprey or fish-eating eagle (*Pandion haliaetus*), white-bellied sea eagle (*Haliaeetus leucogaster*), hawks, large falcons and *Haliaeetus leucogaster* are included in Schedule I, *Halcyon pileata*, *Anas crecca* and *Psittacula roseata* are included in Schedule IV of Wildlife (Protection) Act 1972.

**Table 3.20: Endangered and rare faunal species found in SGNP**

Class	Scientific Name	Common Name	Status
<b>Mammalia</b>	<i>Canis aureus</i>	Jackal	Endangered
	<i>Viverricula indica</i>	Small Indian Civet	Endangered
	<i>Paradoxurus hermaphroditus</i>	Toddy Cat or Common Palm Civet	Endangered
	<i>Felis chaus</i>	Jungle Cat	Endangered
	<i>Panthera pardus fusca</i>	Indian Leopard	Endangered
	<i>Felis rubiginosa</i>	Rusty Spotted Cat	Rare
	<i>Tragulus meminna</i>	Mouse Deer or Indian Spotted Chevrotain	Endangered
	<i>Tetracerus quadricornis</i>	Four-horned Antelope or Chausinga	Endangered
<b>Reptilia</b>	<i>Crocodilus palustris</i>	Indian Marsh Crocodile or Mugger	Endangered
	<i>Varanus monitor</i>	Common Monitor	Endangered
	<i>Python molurus</i>	Indian Python	Endangered
	<i>Ptyas mucosus</i>	Dharman or Common Rat Snake	Endangered
	<i>Xenochrophis piscator</i>	Checkered Keelback	Endangered
	<i>Naja naja</i>	Indian Cobra	Endangered
	<i>Viper russelli</i>	Russell's Viper	Endangered
<b>Aves</b>	<i>Haliaeetus leucogaster</i>	White Bellied Sea Eagle	Endangered
	<i>Pandion haliaetus</i>	Osprey	Endangered
	<i>Pavo cristatus</i>	Common Peafowl	Endangered

**B. Wetland Ecology:**

Within 10 km, a sizable portion is covered by Environmental Sensitive water bodies such as Thane Creek Flamingo Sanctuary, Tulsi lake, Powai lake, Vihar lake, Yeoor lake and Mithi river described below.

Also observed some recreational lakes in study area such as Upvan Lake, Chandivali Lake, Ambe Ghosle Lake, Jail Lake, Brahmala Lake, Makhamali Talao, Siddheshwar Lake, Masunda Lake, Kachrali Lake, Hariyali Lake, Raila Devi Lake, Digha Lake, Mogliche Lake, Juhu Village Lake, DAKC Lake, Ghansoli Lake and Gothivali Khadan Lake. Secondary data of which is not available.

**1. Thane Creek and Thane Creek Flamingo Sanctuary:**

Thane Creek is an inlet in the shoreline of the [Arabian Sea](#) that isolates the city of [Mumbai](#) from the Indian mainland. It comprises the area between Mumbra Retibunder and the [Mankhurd-Vashi Bridge](#). As per records, Thane creek possesses 19 types of mud burrowing type sea anemones, 8 varieties of polychaetes, 7 kinds of bivalves, the gastropods of 14 types etc. A good variety of birds have been observed and there has been increasing number of Flamingoes. There are 11 true mangrove types,

dominated by *Avicennia marina*, 12 varieties of mangroves associates and 5 species of non mangrove halophytes along the creek (<http://www.vpmthane.org/sci/FAVEO/ko5.pdf>)

The region of the Thane Creek has been recognized as an **Important Bird Area** by the **Bombay Natural History Society** (BNHS), as it is home to various avian species. In particular, it harbors populations of flamingos and several other migratory and wading birds. The Maharashtra Government has declared the area along the western bank of the Thane Creek as the "Thane Creek Flamingo Sanctuary". The sanctuary was notified in Govt. Gazette on 6th August 2015.

The flamingo sanctuary is spread on the western side of Thane creek across Mulund (143 ha), Bhandup (95 ha), Kanjurmarg (265 ha), Vikhroli (257 ha) and Mandale (31 ha). It will be under the Mumbai Mangrove Conservation Unit. It was proposed as one of the mitigation measures for the Mumbai Trans Harbour Link. The sanctuary hosts nearly 40,000 flamingos for almost six months every year, including the Greater and Lesser flamingos. Besides flamingos, the creek is the wintering refuge for many species of migratory birds, including large number of Pied Avocets, Black-tailed Godwits, Common Redshanks, stints and sand plovers.

Thana Flamingo Sanctuary is located on the western bank of the Thane Creek between the Vashi and Airoli bridges that connect Mumbai with Navi Mumbai. It is spread over an area of 1,690 hectares which include 794 hectares of adjacent water body and 896 hectares of mangroves. Shital P Achpande and Dr. Madhuri Pejaware recorded 95 species of bird in Thane Creek.

**Source:**

[https://www.researchgate.net/publication/303537546\\_A\\_preliminary\\_study\\_on\\_the\\_birds\\_of\\_Thane\\_Creek\\_Maharashtra\\_India](https://www.researchgate.net/publication/303537546_A_preliminary_study_on_the_birds_of_Thane_Creek_Maharashtra_India)

## **2. Mithi River:**

Mangroves existed in the banks of Mithi river. The river is about 6 km from the project site covers reclaimed sites, fodder crop field, barren land & salt pans. The predominant species of mangrove is *Avicennia marina*, commonly known as grey or white mangrove.

## **3. Tulsi Lake & Vihar Lake:**

The data pertaining to flora have been collected based on discussions with concerned forest department officials, local people, web references, published literature, NGOs etc. and supported by physical verifications, wherever feasible. The collated data have been delineated hereunder. Both Tulsi and Vihar lake are present inside the thickly forested area of Sanjay Gandhi National Park.

### **i. Flora**

Flora nearby to Tulsi and Vihar lake is same as thickly forested area of Sanjay Gandhi National Park:

- **Trees:** *Pongamia pinnata* (Karanj), *Erythrina indica* (Indian coral tree), *Terminalia arjuna* (Arjun), *Tectona grandis* (Teak), *Mimusops hexandra* (Ranjana), *Mangifera indica* (Amba), etc.
- **Shrubs:** *Carissa carandas* (Karvand), *Helicteres isora* (Muradsheng), *Adhatoda vasica* (Adulsa), and *Thespesia lampas* (Raanhendi), *Lantana camara* (Wild sage), *Calotropis gigantean* (crown flower) etc.
- **Bamboo:** *Dendrocalamus strictus* (Velu) and *Bambusa arundinacea* (Kalaka)
- **Grass:** *Cynodon dactylon* (Dhurva), *Dichanthium annulatum* (Daroya), *Coix gigantea* (Garmotika) and *Panicum repens* (bullet grass)

(<http://journeymart.com/de/india/maharashtra/mumbai/tulsi-lake.aspx>)

### **ii. Fauna**

Birds: *Halcyon smyrnensis* (White-throated kingfisher), *Anas poecilorhyncha* (Spot-billed duck), *Porphyrio porphyrio* (Purple swamphens), *Hydrophasianus chirurgus* (Pheasant-tailed jacanas), *Prinia socialis* (Ashy prinias), *Haliastur Indus* (Brahminy kite), (*Microcarbo niger*) Little cormorants and other minor varieties.

Also thick lush green vegetation of mixed range of moist deciduous trees surrounds the lake and a crocodile park has been set up by the park authorities in the lake as the lake has a sustainable number of crocodiles.

(<http://www.mumbai.org.uk/lakes/tulsi-lake.html>)

#### 4. Powai Lake:

##### i. Flora

- **Trees:**Asoka, Gulmohr, Mango, Jack fruit, Tamarind, Drumstick, Coconut etc.
- **Shrubs:**Ghaneri, Kanher, Anar, Ixora, Bougainvillea,Royal palm etc.
- **Herbs:**Kurdu, Ekdandi etc.
- **Grasses:**Indian Bamboo

##### ii. Fauna

Common birds like little cormorant, small green bee eater, cattle egret, red wattled lapwing, pond heron, blue rock pigeon etc. were found in and around the lake. There is excessive growth of *Ipomea* and water hyacinth in the lake.

There are varieties of ecologically important attributes, viz. Lake, river, mangroves etc. within 10km of project site. There is possibility that the project may have adverse effect on ecology of such environments. Accordingly, the past, present and probable future status of nearby Thane creek, Mithi river and Powai lake are summarized hereunder (**Table 3.21**). Based on critical assessment, it appears that the project is unlikely to have adverse impact on the ecology in future.

**Table 3.21: Environmental features during Past, Present and Future scenarios**

Surface waters	Past	Present	Future	Remarks
<b>Thane Creek within (3 km )</b>	Mangrove forests are very vital ecosystems as they provide support to a complex community assemblage, reduce coastal erosion and serve as sinks for macronutrients, micronutrients and heavy metals. The mangrove plants take nutrients from the tidal seawater and river water and in turn provide natural food to mangrove dwelling fauna (Odum et al., 1982). The forest detritus comprising of fallen leaves and branches from the mangroves, provides nutrients to the marine environment and supports immense variety of sea life in intricate food webs associated directly through detritus and indirectly through planktonic and epiphytic algal food chain (Martinez et al., 1982).Sewage and effluent load and growing construction activity in the urbanized area. The effluents and sewage have also increased the nutrient levels . <b>Source:</b> <b>Biodiversity of Thane Creek</b> . <a href="http://www.vpmthane.org/sci/FAVEO/ko5.pdf">http://www.vpmthane.org/sci/FAVEO/ko5.pdf</a>	Data not available  Thane creek is classified under SW II class. (Designated Best Use Standards for Coastal Waters).	Quality may deteriorate	Presently cutting of mangroves for fuel and other purposes is a major damaging factor.  There are certain Nallas carrying sewage to Thane creek
<b>Powai Lake within (2 km)</b>	Problem plaguing the lake that of excessive growth of weeds like Ipomea and water hyacinth.These have choked a good portion of lake, especially on the I.IT side.Algal and cynobacterial cell are almost always multiply rapidly when the physical and chemical condition are right. Powai lake was said to be populated by 37 sp.of fishes ( Kulkarni 1947)main factor which is responsible for decline of fisheries in powai lake is growth of aquatic weeds,aquatic pollution and high lead concentration. <b>Source:</b> Environmental status of powai lake <b>Sengupta,Mand Dalwani , (Editors) - 2008</b>	Medium productive water quality  Powai Lake is classified under Class E (for which best use is for Irrigation, Industrial cooling and controlled waste	Quality may deteriorate	There are many refinery industries near to the powai lake Construction debris, plastic, Garbage etc. directly dumped in to the lake

		disposal)		
<b>Mithi river (6km)</b>	<p>Mangrove alongside the river has been destructed which normally serve as a buffer between land and water. Without them, the river banks are unable to withstand pressure from increased water flow. It is estimated that Mumbai lost about 40% of its mangroves between 1995 and 2005. Some have been destroyed by the dumping of sewage and garbage, but many of them were reclaimed for building land.</p> <p>The stretch of Mithi River passes through the the slums and unauthorized small and cottage industrial units. The waste water is directly discharged in the Mithi river and finally reaches in Arabian Sea via the Mahim creek. The resultant of polluted water of Mithi River (an open drain) is responsible for the deterioration of marine water</p> <p><b>Source:</b> Pollution Status of Mithi River; International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163 Volume 1 (6) ( 2014)  <a href="http://ijirae.com/images/downloads/vol1issue6/JYEN10080.02.pdf">http://ijirae.com/images/downloads/vol1issue6/JYEN10080.02.pdf</a></p>	<p>Data not available</p> <p>Mithi River is classified under Class E (for which best use is for Irrigation, Industrial cooling and controlled waste disposal)</p>	<p>Deterioration of water quality</p>	<p>There are also certain Nallas carrying sewage water to Mithi river</p> <p>Disposed solid wastes were observed along the bank of Mithi river</p>

**Conclusion:**

- The project site is fairly good in biodiversity with reference to flora and fauna.
- Considering different environmental components and detailed ecological aspects, it is concluded that apparently project activities will not have any adverse impact on flora and fauna Existences of the endangered plants / animals in Sanjay Ghandhi national national park is beyond 500 m from the project site.
- Although there are no surface water bodies within 500 m of project site, still important water bodies, viz. vihar lake, Powai lake, Thane creek, Mithi river are located beyond 500 m. These water bodies are already in stress due to various reasons.
- Since waste water from proposed project will not be discharged in outside water bodies, any deterioration of above referred wetlands in future cannot be concerned of the proposed project.

**3.6 SOCIO ECONOMIC ENVIRONMENT:**

This section discusses the baseline scenario of the socio-economic environment in the study area and anticipated impacts of the proposed project on the socio-economic environment. The issues under focus in this topic are demographic pattern, economic activity, education and literacy profile, etc. The assessment attempts to predict and evaluate the future impacts of project upon people, their physical and psychological health and well being, their economic status, cultural heritage, lifestyle and other value system.

**3.5.1 Growth of Mumbai and Settlement Pattern**

Mumbai is one of the largest mega cities in the world in terms of population and is currently ranked 4<sup>th</sup> after Tokyo, Mexico City and New York. The city is the financial capital of India with a large commercial and trading base. It plays host to a number of industries, multinational companies and important financial institutions. With a per capita income thrice that of the national average, Mumbai makes huge contribution to the total tax revenues of the country. The city is also an important international sea port and strategic from defence perspective.

The population of Mumbai is marked by its social heterogeneity cutting across racial, religious, regional and linguistic lines. Each community initially had its niche in the occupational structure. The various religious and caste communities remained largely encapsulated and, in spite of being juxtaposed in Mumbai’s cosmopolitan setting, continued to maintain lifestyles, which differed relatively little from those practiced in their respective regions of origin.

The population of Greater Mumbai has increased more than twelve times in the last century. Until 1950, most of the growth remained within the Island City but this significantly reduced after 1971 due to congestion. After independence, with the influx of refugees, both the eastern and western suburbs started growing rapidly. Since 1981, the suburban district of Mumbai has become the largest district in the State of Maharashtra in terms of population.

### 3.5.2 Objectives

The objectives of the study are described in below section.

- To identify all potential significant adverse social impacts of the Project and recommend measures for mitigation
- To verify compliance with the environmental regulations and industry's standards
- To recommend cost effective measures to be implemented to mitigate the expected impact.
- Prepare socio economic report to contribute in EIA report

### 3.5.3 Methodology

Approach and methodology mainly consists of quantitative and qualitative tools and techniques. The available secondary literature and project related documents were reviewed and consultations were held with the project officials. Socio-economic survey was carried out using pre-tested structured questionnaire. Discussions were conducted by study team with the help of Project proponents with the labourers at project site.

### 3.5.4 Details of study area

No.	Type of data collection	Study area
1.	Primary data collection	Social survey on project area
2.	Secondary data collection	10 Km from project site. Collecting data and information from available secondary sources like records and reports of Government Department, academic and research institutions, etc.

### 3.7 BASELINE SOCIO-ECONOMIC STATUS OF THE STUDY AREA:

On-site observations were made about the existing conditions with respect to basic infrastructure resource base, connectivity etc. The information relating to social parameters such as demographic details, basic amenities was collected from secondary sources such as MCGM web site, Census of India 2011 etc.

### 3.5.5 Demographic Features and Infrastructure Resource Base in the Proposed Project Area:

- The proposed project site falls under S-ward of Municipal Corporation of Greater Mumbai (MCGM).
- Total area of S ward is 64 sq. km.
- Total population of the S-ward is 743,783 with density of 11622 persons per sq.km which is lower than the population density of Mumbai Suburban District i.e. 20,980 persons per sq.km.
- Sex ratio of S-ward is 920 females per thousand males, which is very high as compared to the sex ratio of Mumbai Suburban District i.e. 860 females per thousand males.
- Municipal water supply through pipeline is the source of potable water in the study area.
- The project site has access to good education and medical facilities in and around area.
- All the houses have regular power supply facility.
- Project site also has access to good communication and transport facility.

### 3.5.6 Social Infrastructure in the study area

- **Educational Facilities:**

Kanjurmarg and nearby area has good educational facilities. Schools and Colleges closer to the proposed site are IES Secondary School, St Xavier's High School and Junior College, St. Xaviers High School, Dnyandeep Vidya Mandir, St. Francis Xavier's High School, Saraswati

Vidyalaya, Dr. Datta Samant Vidyalaya, Ramanand Arya DAV College, Kendriya Vidyalaya Bhandup, G G Singh School, Jijamata Vidhya Mandir, Vikhroli Vidyalaya, Dharmaveer Sambhaji Vidyalaya, I. D. U. B. S. Junior College, Brahman Vidyalaya, Sandesh School and Junior College, Dnyanmandir School, Madhyamik Vidyalaya, Pawar Public School, NES High School, Vikas School and Night College, NES Primary School, NES Sunbeam School, G S Shetty International School, Bright High School, St. Joseph High School, Kumari Kasturi Vidhyalaya, Sri Ram College, Udayachal Primary School, Shivai Vidya Mandir.

- **Health Care Facilities:**

Aniket Hospital, Ankur Hospital, Aarogyam Cancer Hospital, Naval Hospital, NuLife Hospital, Atul Lok Hospital, Dr Babasaheb Ambedkar Hospital, Shrenik Hospital And Maternity House, Padmalaya Maternity & Surgical Home, Chandan Charitable Hospital, Dr.Hegde skin clinic, Nihal Nursing Home, Thakare Hospital & Alcohol Rehabilitation Research Centre, Dr Seema Patil & Bhatia Ruby Hospital, Central Health Home, Mahatma Phule Hospital, S S Hospital, Sai Kripa Hospital, Chandan Hospital, Srushti Authatic Hospital, Dr. Thakur's Ear,Nose and Throat Hospital, Yashwant Hospital, International Oncology Centre, LH Hiranandani Hospital. Besides there are several small clinics catering the population.

- **Transportation:**

Kanjur marg is very well connected by Central Railway line as well as Bus routes serviced by BEST. Kanjurmarg railway station is the main access point for Kanjurmarg as well as Powai. Kanjur Marg is also the starting point for the Jogeshwari Vikhroli Link Road popularly known as JVLR which connects the Eastern and Western Express Highways. It is one of the major arterial routes that have opened up connectivity between western and eastern Mumbai increasing accessibility to areas like Powai which are not served by trains.

- **Project Site Observations:**

- There is labour colony for residential workers at project site
- The basic facilities available at project site, in the labour camp such as proper sanitation, and toilet facility
- Drinking and bathing water facility available in the labour colony for site workers
- Safety and medical awareness posters are displayed in labour camp.
- All necessary personal protective and safety equipment's were provided to labours.
- Adequate first aid facilities were provided in the case of emergency treatment of injured persons.
- There are security cabins for the watchmen's at project site

### **3.8 TRAFFIC PATTERN AND DENSITY:**

It is expected that the residential development will attract and generate an increase of vehicular traffic coming into the area. It is estimated that the proposed development will attract and generate some 1200-1225 PCU's per hour from Building-1 (i.e. Tower A, B, C, D & E) and Building- 2 (i.e. Tower I, J & K). This will include the traffic entering and exiting the proposed development. The traffic generated from the Residential development will be loaded on two different roads (i.e. Veer Savarkar Road and Kanjur Village Road). As per existing condition Veer Savarkar road is 2-lanes, 2-way road. It is proposed as 18.3m wide DP Road. The widening of the road will improve the level of service. The traffic impact will be mitigated with the upcoming of new DP Roads in future. These roads are planned as per the Development Plan (DP) Map of Mumbai. Moreover the proposed Metro Alignment along Lal Bahadur Shastri Road and Jogeshwari Vikhroli Link Road will reduce the traffic on surrounding roads and will further mitigate the traffic impact on surrounding roads.

Detailed report stating impact and proposed mitigation measures is attached as Enclosure.

***Chapter 4***  
***Anticipated Impact and Mitigation  
Measures***

## CHAPTER: 4

### ANTICIPATED IMPACT AND MITIGATION MEASURES

#### 4.0 INTRODUCTION:

This chapter describes the anticipated environmental impacts on the surrounding area / environment due to the implementation of project. The major objectives of describing the anticipated impacts and mitigation measures are:

- To identify pollution sources-characteristics, quantification and prediction during construction and operation phase
- To suggest suitable avoidance / mitigation methods for each of the impacts due to project activity

The impacts have been assessed for the project assuming that the pollution due to the existing activities has already been covered under baseline environmental monitoring and continue to remain the same during the operation phase. The project would create impact on the environment in two distinct phases.

- During the Construction phase which may be regarded as temporary or short term
- During the Operation phase

#### 4.1 PREDICTION OF IMPACTS & MITIGATION MEASURES:

The activities that take place during construction phase and operation phase of the project and the potential impacts on the environment, their prediction, significance and mitigation are as follows.

##### 4.1.1 Land Environment:

###### A. During Construction Phase:

###### a) Anticipated Impacts –

- The waste generated during demolition, excavation and construction activity.
- Improper disposal of the excavated earth and waste generated during construction may cause irreversible negative impacts on land environment
- Storage of construction material/chemicals if not done at designated place can cause nuisance and hazards
- Accidental spillage of chemicals/oil may lead to soil contamination
- Improper segregation and disposal of the solid waste by workers dwelling on site during construction phase may cause negative impacts on land environment

###### b) Mitigation Measures-

- Designated storage of demolition debris and construction material.
- Disposal of demolition debris (6000 cum) to authorized landfill site and steel (450 Ton) to authorized recyclers.
- Use of Construction waste (Brick, blocks, ceramic tiles, marbles etc.) for waterproofing work, paving & landscaping areas
- As on date 91876 cum excavated material has been generated. Reuse of 3900 cum material on site and disposal of remaining excavation material (87976 cum) to authorized landfill site as per permission from M.C.G.M.
- In future total 180594 cum excavation material shall be disposed to authorized landfill site as per permission from M.C.G.M.
- Disposal of C & D waste at authorised sites, as per approval received from local authority

- Segregation of garbage that generates due to the workers dwelling on site into biodegradable (22 Kg /day) and non- biodegradable waste (33 Kg/day). Further disposal of segregated garbage to recyclers.
- Storage of Bituminous materials /any other chemicals on paved surface so that possibilities of its leaching into the soil is avoided
- Disposal of waste oil generated from D.G. sets through authorized recyclers approved by CPCB
- Disposal of Hazardous waste to authorized common hazardous waste disposal site for further treatment and disposal

**B. During Operation Phase:**

**a) Anticipated Impacts -**

- Various types of solid wastes, if disposed improperly, can have a negative impact on land environment
- Accidental spillage of oil from vehicles leads to soil contamination

**b) Mitigation Measures-**

- Waste minimization recovery and reuse
- Segregation at source for all solid waste streams
- Non-biodegradable garbage (3214 kg/day) shall be handed over to Authorized recyclers to reduce the load on dumping grounds
- Composting of biodegradable garbage (2143 Kg/day) by Organic waste converter (OWC) and the treated produce shall be used as manure
- Building wise space is provided for collection of waste
- Total 349 Sq.mt. of space for solid waste management shall be earmarked. This includes the space required for collection, segregation, OWC for treatment, curing and storage of manure
- Use of dried STP sludge from STP shall be done as manure
- All the occupants shall be informed that they should dispose their E- waste or household hazardous waste to the designated common storage so that these will not be mixed with municipal solid waste and can be disposed as per norms

This being a construction project apart from impacts on the site, no adverse impact on the land environment and soil in the surrounding area is anticipated.

**4.1.2 Water Environment (Water Resources and Quality):**

**A. During Construction Phase:**

**a) Anticipated Impacts-**

- Increase in water demand during construction phase for site preparation, water spraying for dust suppression, for construction activities, curing, domestic and other water requirements for labour and staff onsite
- Waste water disposal by construction labour and staff can lead to pollution of nearby water courses
- Sedimentation of outside drains
- Water logging creates unsanitary conditions and mosquito breeding at site

**b) Mitigation Measures –**

- Avoid wastage of water for construction curing
- Use of polymeric dust suppression system wherever possible to save water
- Disposal of sewage generated (72 KLD) from construction workers and staff etc. to existing sewer line
- Site sanitation & good housekeeping

- Sedimentation of outside drains shall be avoided by using screens and silt traps
- Proper management of channelization of water to avoid water logging at site

#### **During Operation Phase:**

##### **a) Anticipated Impacts –**

- Increase in fresh water demand (1072 KLD) from M.C.G.M. and (26 KLD ) from tanker water of potable quality
- Generation of waste water (1394 KLD)
- Disposal of sewage can lead to pollution of nearby water courses if not treated properly
- Sedimentation and pollution of outside storm water drains if proper precautions are not taken

##### **b) Mitigation Measures –**

- Use of water saving practices like dual flush cisterns, low loss plumbing fixtures to reduce water consumption
- Treatment of sewage into three Sewage Treatment Plants of total capacity 1464 KL; and its reuse for secondary requirements like flushing (536 KLD) and gardening (109 KLD) within site & excess treated sewage shall be disposed to the existing sewer line
- To keep a daily watch on pH, BOD, COD and TSS & O & G of the STP outlet to ensure good treatment of waste water with the help of onsite sensors and its reuse
- Rain water collection from terraces into 2 RWH tanks of total capacity 160 KL and its reuse thereby reducing the fresh water demand in monsoon season up to 35%.
- Provision of internal Storm water drainage system of total capacity 4.24 m<sup>3</sup>/s.
- External Storm water drainage of adequate capacity (43.34 m<sup>3</sup>/sec)
- Surface rainwater shall be passed through oil & grease trap & desilting chamber and then transferred to municipal storm water drain
- Proper maintenance of storm water drainage to avoid choking of drains and flooding on site

#### **4.1.3 Air Environment:**

##### **During Construction Phase:**

##### **a) Anticipated Impacts –**

- Increase in level of dust and other air pollutants due to building construction and other related activities
- Emissions from vehicles carrying the construction materials
- Emissions from DG sets
- Open burning of solid wastes can cause air pollution
- Emissions from batching plant on site

##### **b) Mitigation Measures-**

- Water sprinkling on unpaved surfaces and loose soil for dust suppression
- Provision of on-site sensors to monitor PM<sub>10</sub> and PM<sub>2.5</sub>. This will help to keep record daily for the air quality.
- Provision of Barricades of adequate height along the periphery of the site
- Use of Plastic/tarpaulin covering sheets while transporting the material
- Wheel washing of the vehicles
- Sand, murrum, loose soil, cement, or Construction Waste or any construction material stored on site shall be covered adequately
- Provision of Wet jet for grinding and stone cutting
- Use of dust masks and health check for workers
- Roads leading to or at construction sites must be paved and blacktopped
- No excavation of soil shall be carried out without adequate dust mitigation measures

- Provision of Wind-breaker of appropriate height i.e. 1/3<sup>rd</sup> of the building height and maximum up to 10 meters
- Display of dust mitigation measures prominently at the construction site for easy public viewing
- Grinding and cutting of building materials in open area shall be prohibited
- Separate storage space for Construction material and waste and road side storage of construction material and waste shall be prohibited
- No uncovered vehicles carrying construction material and waste shall be permitted
- Cleaning or removal of dust accumulated inside the Batching Plant
- Vehicles having valid pollution under control certificate shall be allowed to ply on site
- Open burning of solid waste shall be prohibited
- Plantation of 1037 nos. of trees of various varieties as per norms.

#### **During Operation Phase:**

##### **a) Anticipated Impacts –**

- Vehicular emissions due to parking
- Emissions from DG sets

##### **b) Mitigation Measures –**

- Adequate parking provision (4W-3095 and 2W-711) and proper traffic management for smooth traffic flow (detailed traffic report is enclosed)
- DG sets with acoustic enclosures to be installed and stacks height to be kept as per Central Pollution Control Board (CPCB) norms to allow effective dispersion of pollutants
- Periodic monitoring of SPM and SO<sub>2</sub> concentration and thereby schedule and implement proper maintenance of DG sets
- Plantation of new trees of various varieties on ground. After development, there shall be 1273 trees on the site (including retained and newly planted).

#### **4.1.3.1 Air Emission and Dispersion Modeling:**

Dispersion modeling has been carried out using area source emissions with meteorology data to predict ground level Fugitive Dust concentration. Existing peripheral road traffic and operational phase traffic pattern and generator use because of the development is estimated in this section.

##### **o Analysis details**

##### **Tools and methods**

The major source of pollutant in the vicinity of the proposed project is vehicular exhaust i.e. line source. The fugitive sources of particulate matter in the vicinity of the proposed project are area polygon source i.e. actual construction activity and volume source i.e. excavation and stockpiling of excavated soil. And re-suspension of road dust because of vehicular movement. There are no other significant sources of fugitive dust pollution in the neighborhood. Source dispersion analysis is assumed based on AERMOD View<sup>TM</sup> model. This model enables analysis with respect to PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub> and CO and gives results in easy to understand graphical format.

The following steps are involved in the analysis:

- Inputs are entered into the software as per the general modeling parameters.
- Information on the roadway network, traffic volume, excavated and stockpiled soil, construction activity, generator set and receptor is added to the software.
- The analysis process is done by the model.

o **Input(s) needed and assumption**

**Table 4.1** illustrates series of input and some of assumptions gone into the model

**Table 4.1: Input and Assumptions**

No	Inputs Required	Availability for this project	
1	Traffic Parameters	Traffic Volume	Yes
		Traffic Composition	Yes
		Type of Fuel used by each category	Yes
		Average Speed of the Vehicles	No
2	Construction Parameters	Heavy construction activity & Construction of haul road	Yes
		Construction vehicle plying	Yes
		Excavation, Soil Stockpiling	Yes
3	Generator Set	Capacity	Yes
		Stack details	Referred – CPCB'86
4	Meteorological Parameters	Wind Speed, Wind Direction, Cloud Cover, Temperature, Humidity, Station Pressure, etc.	IMD Weather data
5	Emission Parameters	Expressed in grams/distance travelled	CPCB 2007
		Expressed in grams/m <sup>2</sup> /second emitted	US-EPA, AP42
		Expressed in grams/second emitted	US-EPA, AP42
6	Road Geometry	Road Width	Google image
		Median Width	Actual
7	Receptor Location	Uniform grid	Uniform grid

o **Methodology**

Vehicle number is the most important parameter to quantify the emissions from mobile sources in addition to the distance travelled by each of the vehicles also known as Vehicle Kilometers Travelled (VKT). Emission factors of different types and origin have been used in the past by researchers. However, the commonest method and more appropriate method based on the data available is to use emission factor in terms of pollutant mass per kilometer run of the vehicle. The emission factors developed for Indian conditions have been taken from a report “Air Quality Monitoring Project-Indian Clean Air Program, 2007” prepared by CPCB (with ARAI).

o **Data assimilation**

Based on the proposal mentioned, information of traffic Survey for finding demand of parking in the area, review the external and internal connectivity aspects so as to appreciate the adequacy of the infrastructure proposed in terms of number of road lanes at the entry etc. The road network under consideration will be studied in detail. Comparative account of traffic volume survey and future projected traffic with proposed development is given in **Table 4.2**.

**Table 4.2: Traffic count survey**

Location	2W	3W	Car	LCV	Bus	Truck
<b>Present Scenario</b>						
JVLR	4,843	6,164	6,290	255	1,116	3
LBS road	13,720	11,986	10,937	2,772	1,280	1
Govindram Jolly road	6,198	9,955	2,589	280	1,339	5
Veer Savarkar road	3,963	4,336	1,724	414	339	2
Kanjur Village road	4,808	6,563	3,017	398	470	2
Eastern express highway	4,808	11,693	71,979	6,044	1,900	182
<b>Future Estimates</b>						

JVLR	11,599	14,763	15,065	611	2,673	7
LBS road	32,860	28,707	26,195	6,639	3,066	2
Govindram Jolly road	14,844	23,843	6,201	671	3,207	12
Veer Savarkar road	9,492	10,385	4,129	992	812	5
Kanjur Village road	11,515	15,719	7,226	953	1,126	5
Eastern express highway	11,515	28,005	1,72,392	14,476	4,551	436

A vehicle counting program specific to the need for developing emissions inventory was planned and executed at specific locations all across the area of influence of the project were considered. Project will accommodate 3,095 four wheelers and 771 two wheelers. Construction phase detailing was collected from client.

○ **Baseline emission estimates**

Based on the primary activity data gathered from emission factors the total estimated emissions of different categories of pollutants are represented in **Table 4.3**

**Table 4.3: Vehicular Emission Estimates**

Location	PM <sub>10</sub> (g/s)	PM <sub>2.5</sub> (g/s)	NO <sub>x</sub> (g/s)	CO (g/s)
JVLR	0.0786	0.0511	0.4776	0.8674
LBS road	0.2306	0.1499	1.2600	2.7416
Govindram Jolly road	0.1004	0.0653	0.5494	0.9971
Veer Savarkar road	0.0584	0.0379	0.3027	0.7138
Kanjur Village road	0.0537	0.0349	0.2797	0.6941
Eastern express highway	0.3763	0.2446	2.5819	6.3217

According to the traffic growth rate, the emissions were calculated for each vehicle type and the total emissions for all the vehicles of each road at present and in the future in g/s. Heavy construction activity, haul road and onsite soil stockpile emissions rate calculated as gm/m<sup>2</sup>/sec and were represented as g/s. Construction vehicle plying on unpaved site road was represented as g/s. Construction vehicle plying on site road was represented as g/s. Construction phase pollutant emissions are given in **Table 4.4**. Operations phase pollutant emissions are given in **Table 4.5**.

**Table 4.4: Emissions for Each Pollutant during Construction Phase**

Location	PM <sub>10</sub> (g/s)	PM <sub>2.5</sub> (g/s)	NO <sub>x</sub> (g/s)	CO (g/s)
JVLR	0.1040	0.0676	0.6292	1.1895
LBS road	0.3119	0.2027	1.6940	3.7847
Govindram Jolly road	0.1333	0.0866	0.7220	1.3665
Veer Savarkar road	0.0788	0.0512	0.4055	0.9853
Kanjur Village road	0.0788	0.0512	0.4055	0.9853
Eastern express highway	0.0280	0.0182	0.1446	0.3701
Construction Activity and demolition activity (in future) at site	0.0368	0.0269	--	--
Material trucks on site	0.0050	0.0036	0.0006	0.0004
Stockpiling at site	0.0006	0.0004	--	--

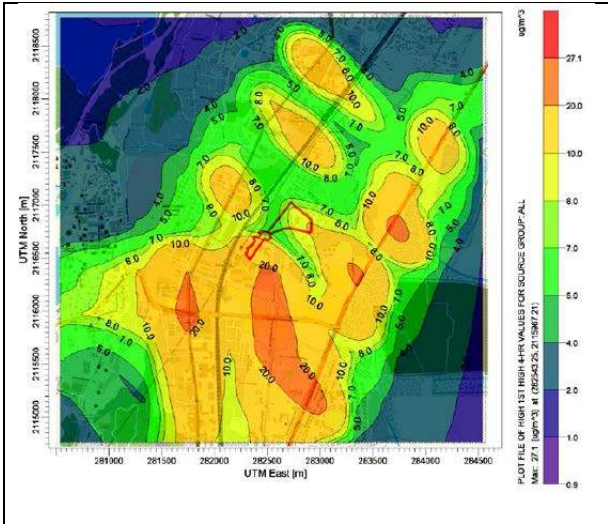
**Table 4.5: Emissions for Each Pollutant in Operation Phase (25yrs)**

Location	PM <sub>10</sub> (g/s)	PM <sub>2.5</sub> (g/s)	NO <sub>x</sub> (g/s)	CO (g/s)
JVLR	0.1883	0.1224	1.1438	2.0774
LBS road	0.5523	0.3590	3.0178	6.5663
Govindram Jolly road	0.2405	0.1563	1.3159	2.3881
Veer Savarkar road	0.1398	0.0908	0.7250	1.7097
Kanjur Village road	0.0497	0.0323	0.2588	0.6422

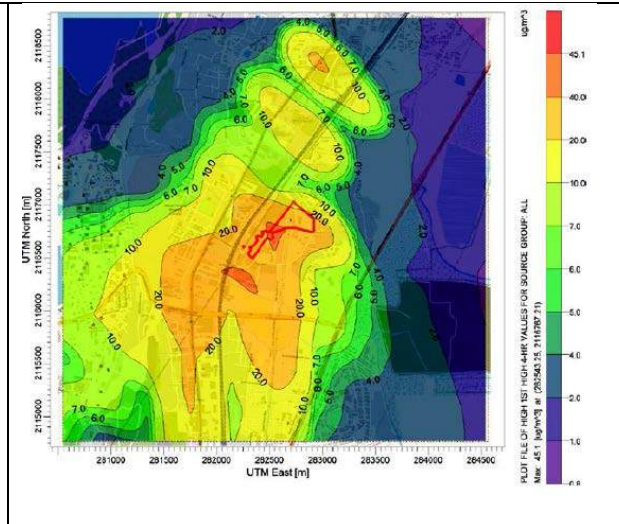
Eastern express highway	0.9014	0.5859	6.1837	15.1407
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○ **SCENARIO ANALYSIS FOR PARTICULATE MATTER (PM10)**

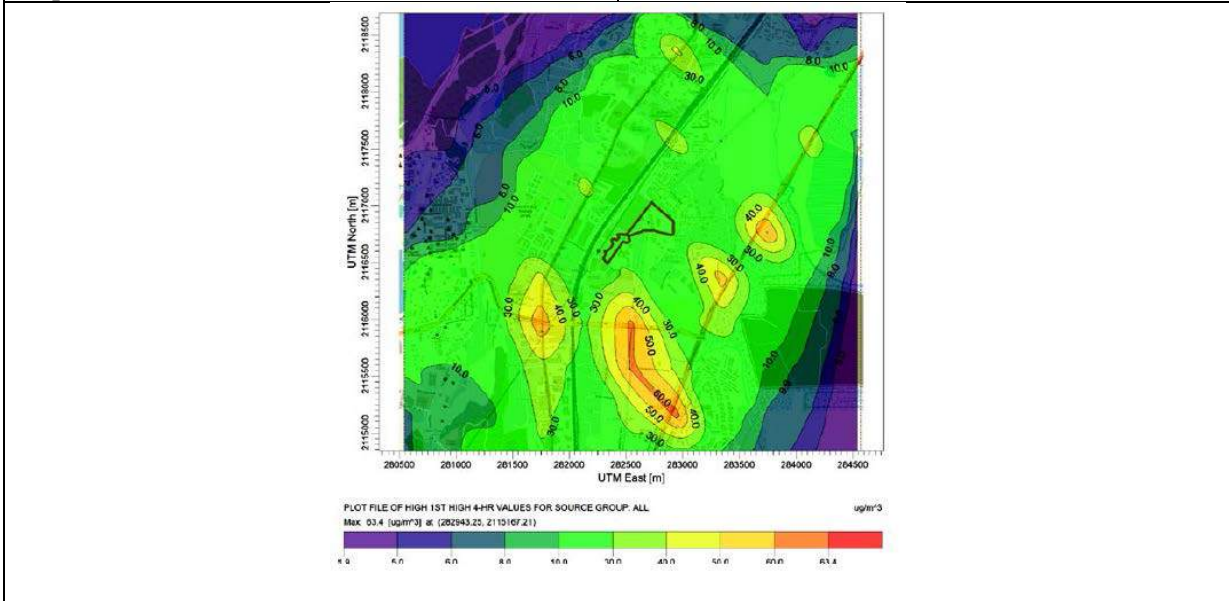
Model simulations considering baseline activity from the proposed project are presented as peak hour in **Figure 4.1 (a, b, c)** and 24hr in **Figure 4.2 (a, b, c)**.



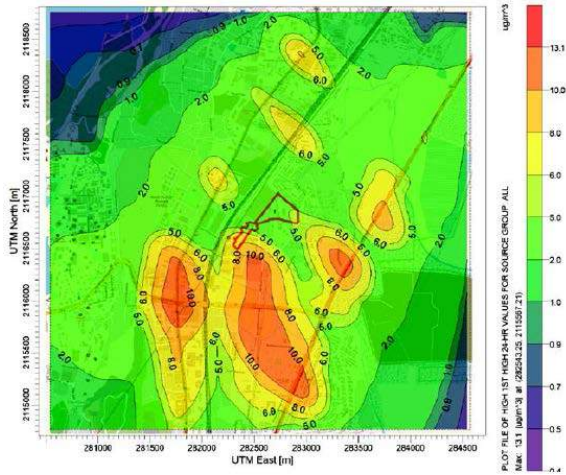
**Fig 4.1(a):** Present PM<sub>10</sub> peak hour emission dispersion contours



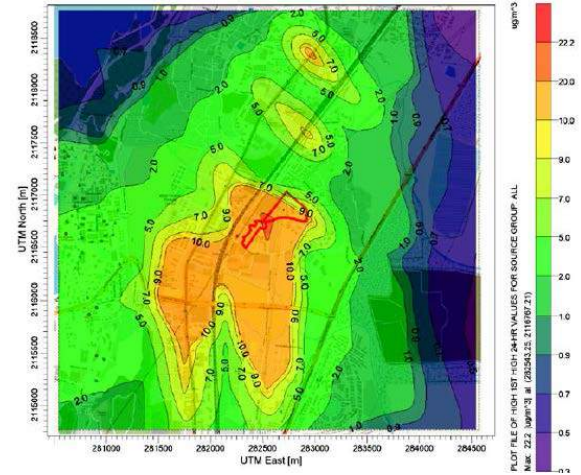
**Figure 4.1 (b):** PM<sub>10</sub> peak hour emission dispersion contours – Construction Phase



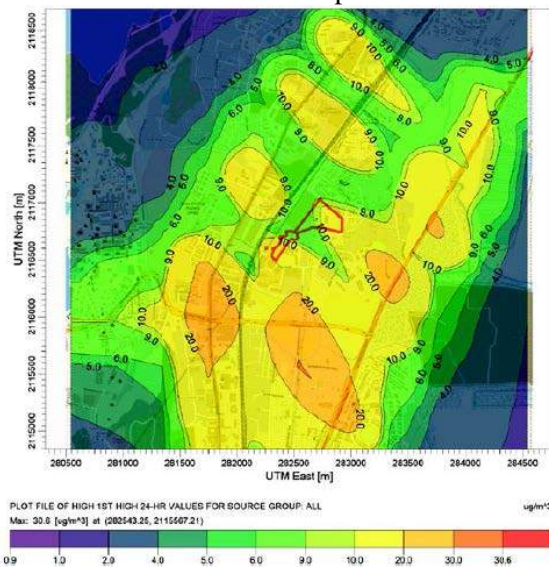
**Figure 4.1 (c):** PM<sub>10</sub> peak hour emission dispersion contours – Operations Phase (25yrs)



**Fig 4.2 (a):** Present PM<sub>10</sub> 24hr average emission dispersion contours



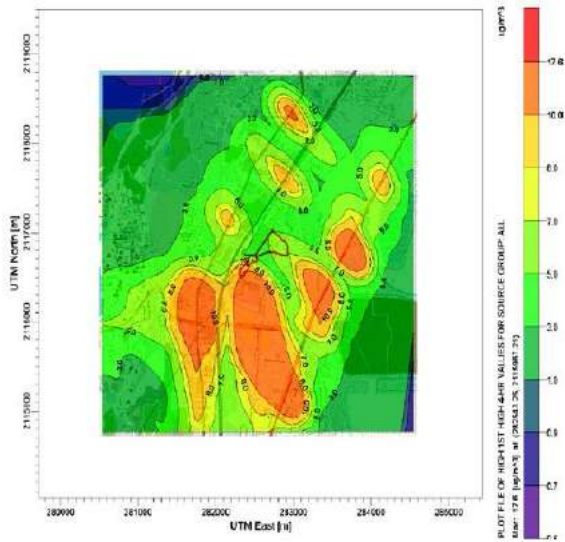
**Fig 4.2 (b):** PM<sub>10</sub> 24hr average emission dispersion contours – Construction Phase



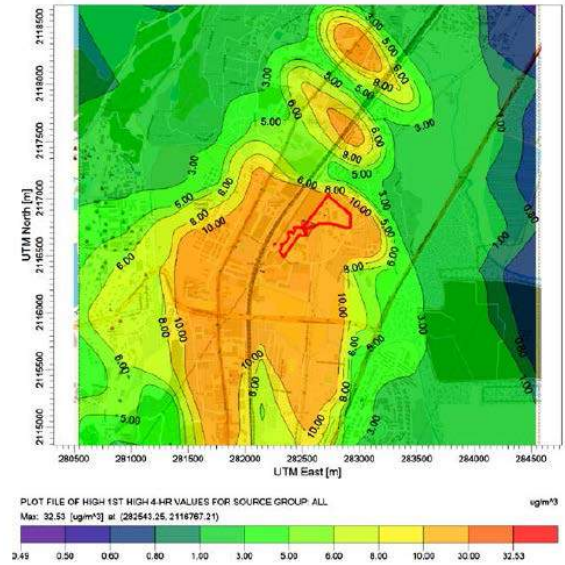
**Fig 4.2 (c):** PM<sub>10</sub> 24hr average emission dispersion contours – Operations Phase (25yrs)

○ **SCENARIO ANALYSIS FOR PARTICULATE MATTER (PM2.5)**

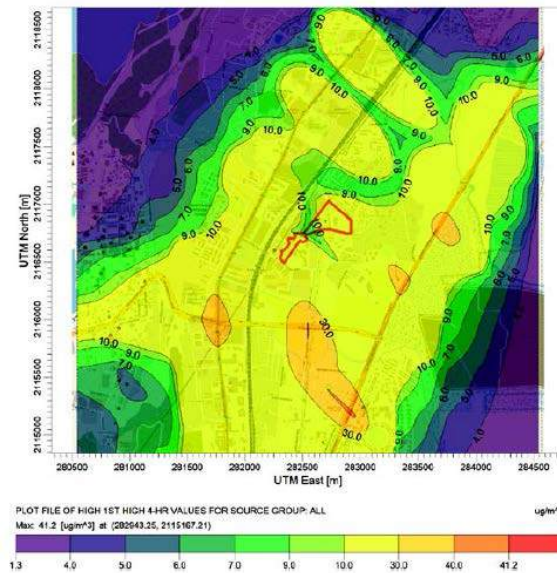
Model simulations considering baseline activity from the proposed project are presented for peak hour in **Figure 4.3 (a, b, c)** and **24hr in Figure 4.4 (a, b, c)**.



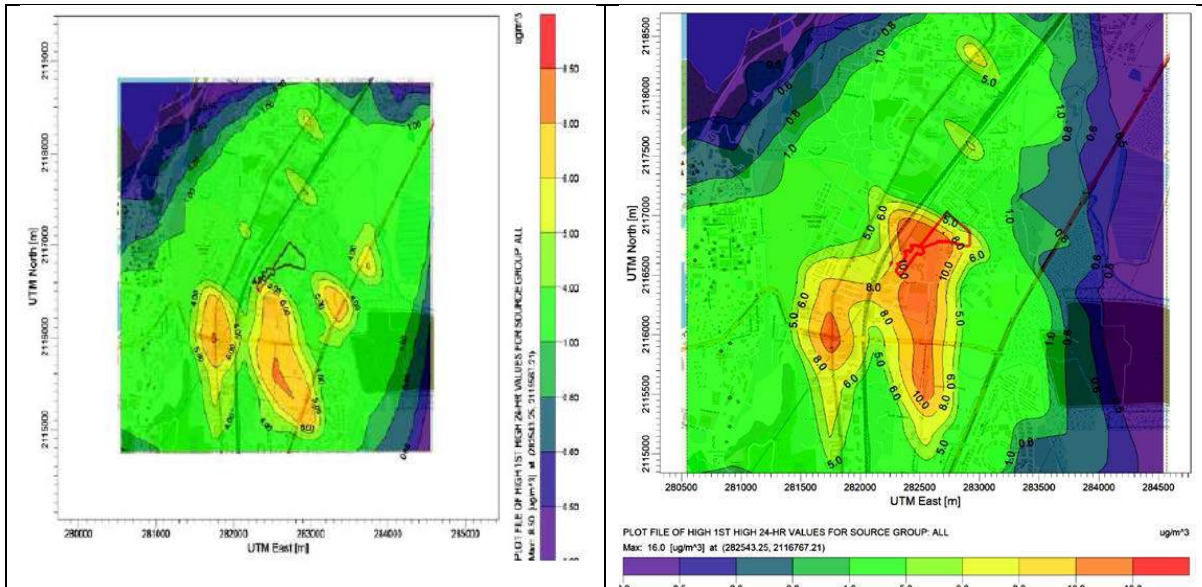
**Fig 4.3 (a):** Present PM<sub>2.5</sub> peak hour emission dispersion contours



**Fig 4.3 (b):** PM<sub>2.5</sub> peak hour emission dispersion contours – Construction Phase

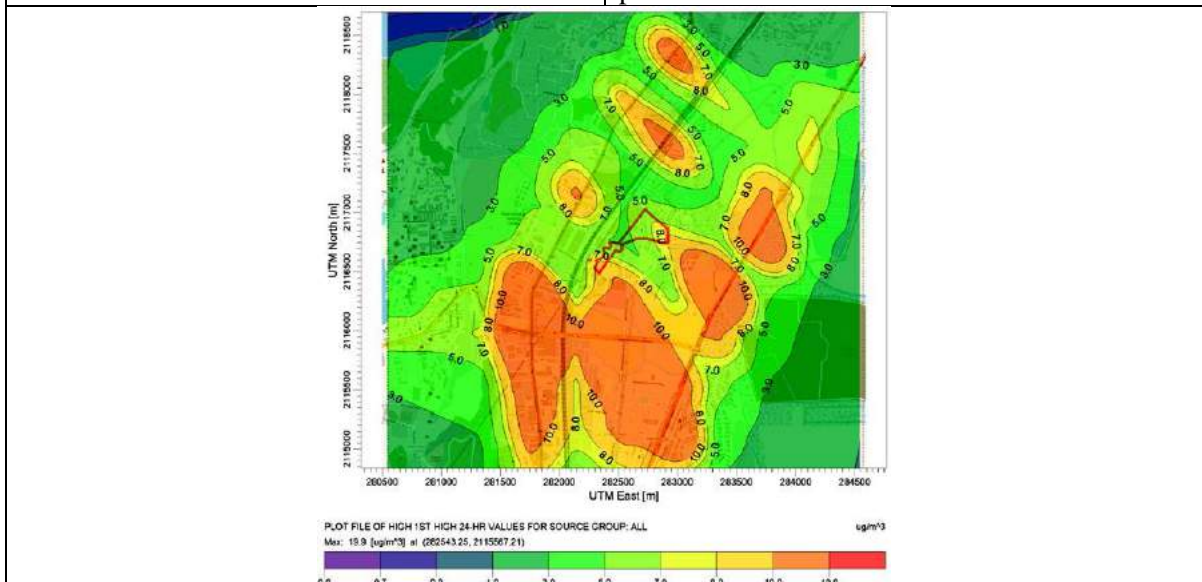


**Fig 4.3 (c):** PM<sub>2.5</sub> peak hour emission dispersion contours – Operations Phase (25yrs)



**Fig 4.4 (a):** Present PM<sub>2.5</sub> 24hr average emission dispersion contours

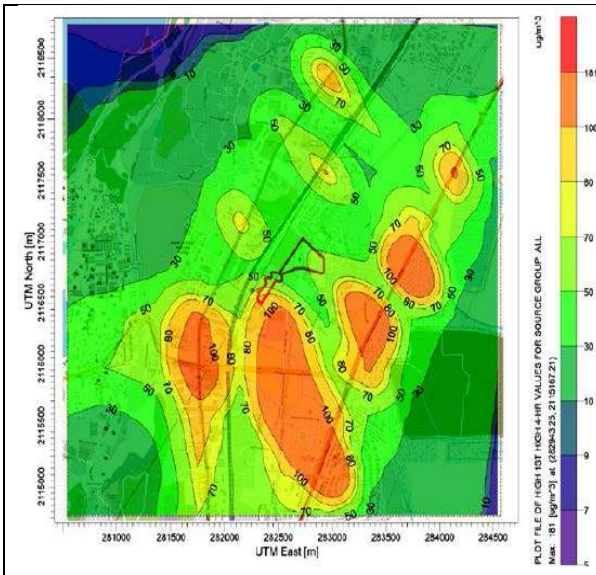
**Fig 4.4 (b):** Present PM<sub>2.5</sub> 24hr average emission dispersion contours – Construction phase



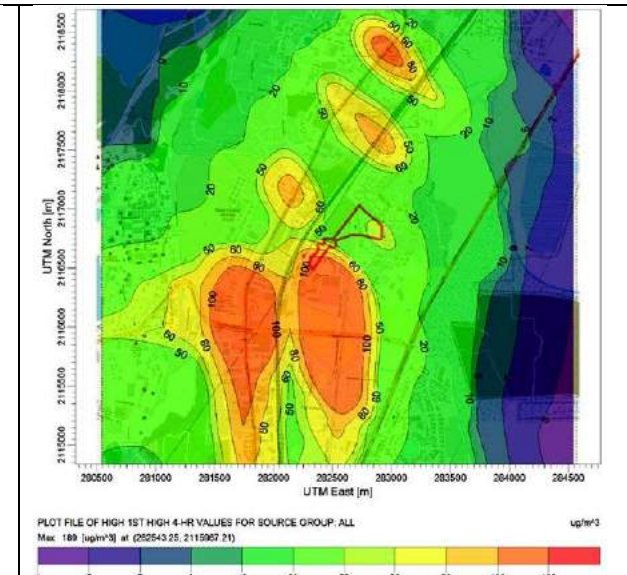
**Fig 4.4 (c):** PM<sub>2.5</sub> 24hr average emission dispersion contours – Operations Phase (25yrs)

○ **SCENARIO ANALYSIS FOR OXIDES OF NITROGEN (NO<sub>x</sub>)**

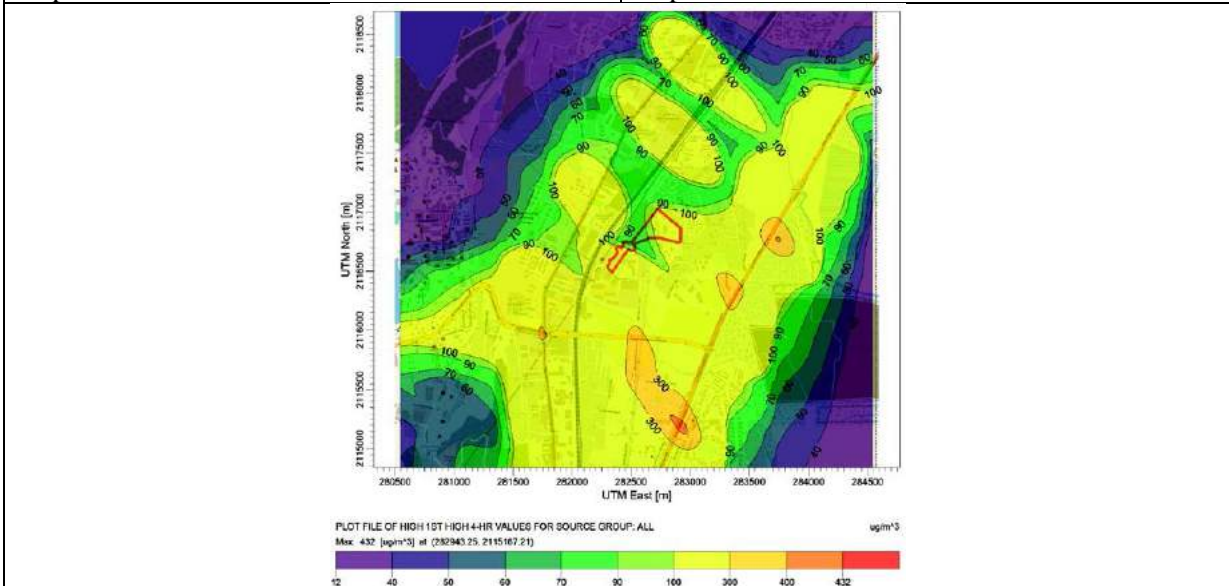
Model simulations considering baseline activity from the proposed project are presented for peak hour in **Figure 4.5 (a, b, c)** and 24hr in **Figure 4.6 (a, b, c)**.



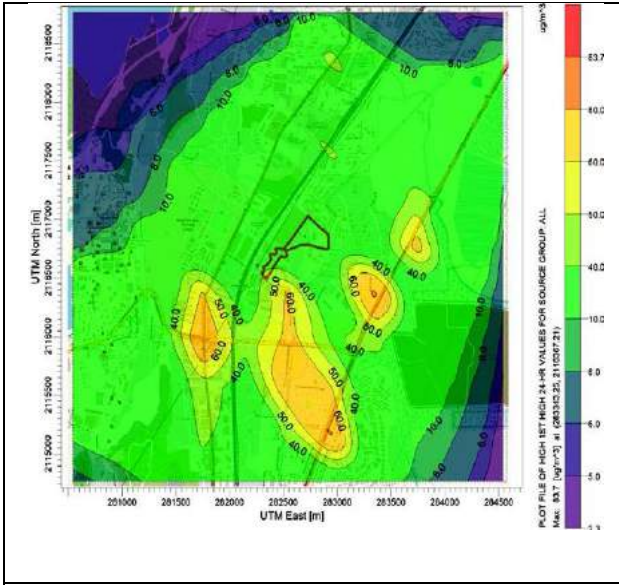
**Fig 4.5 (a):** Present NO<sub>x</sub> peak hour emission dispersion contours



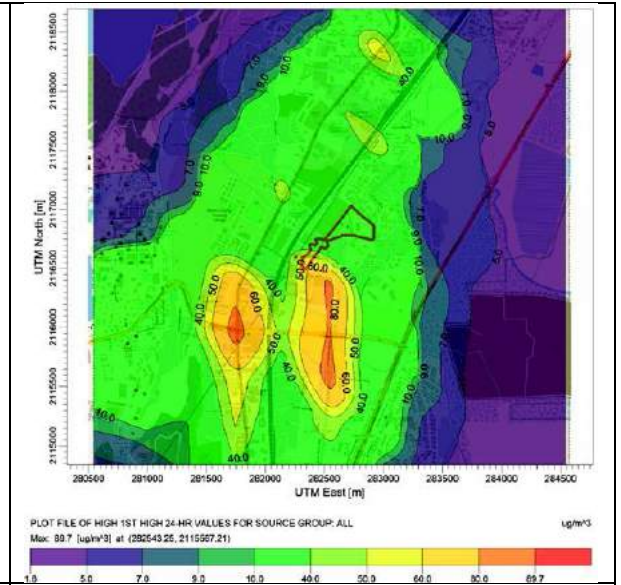
**Fig 4.5 (b):** Present NO<sub>x</sub> peak hour emission dispersion contours – Construction Phase



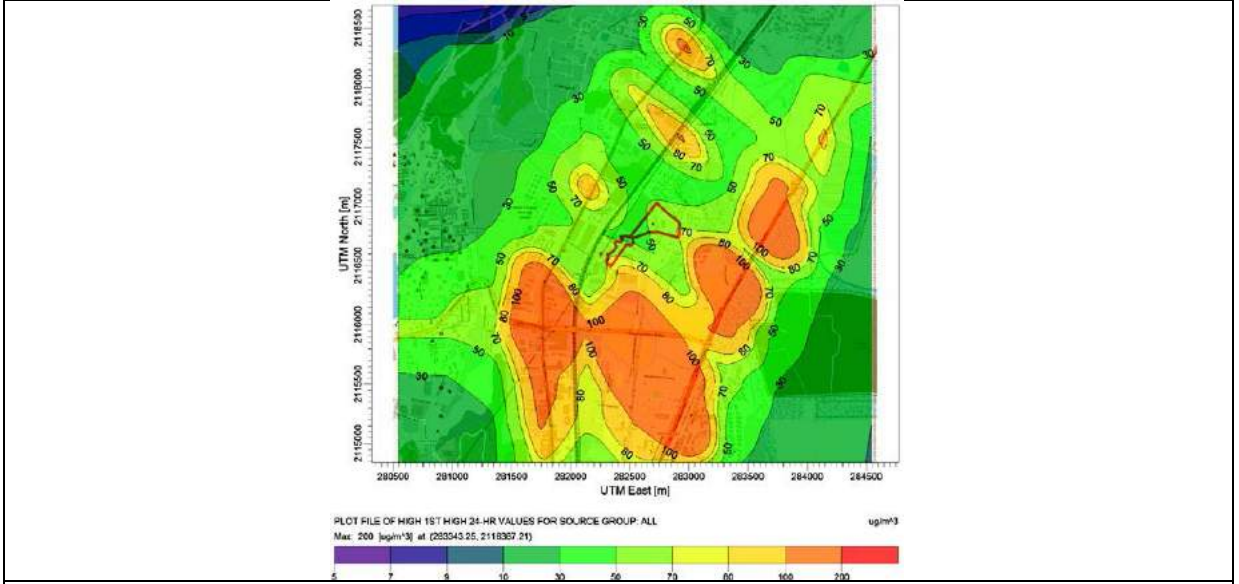
**Fig 4.5 (c):** Present NO<sub>x</sub> peak hour emission dispersion contours – Operation Phase



**Fig 4.6 (a):** Present NO<sub>x</sub> 24hr average emission dispersion contours



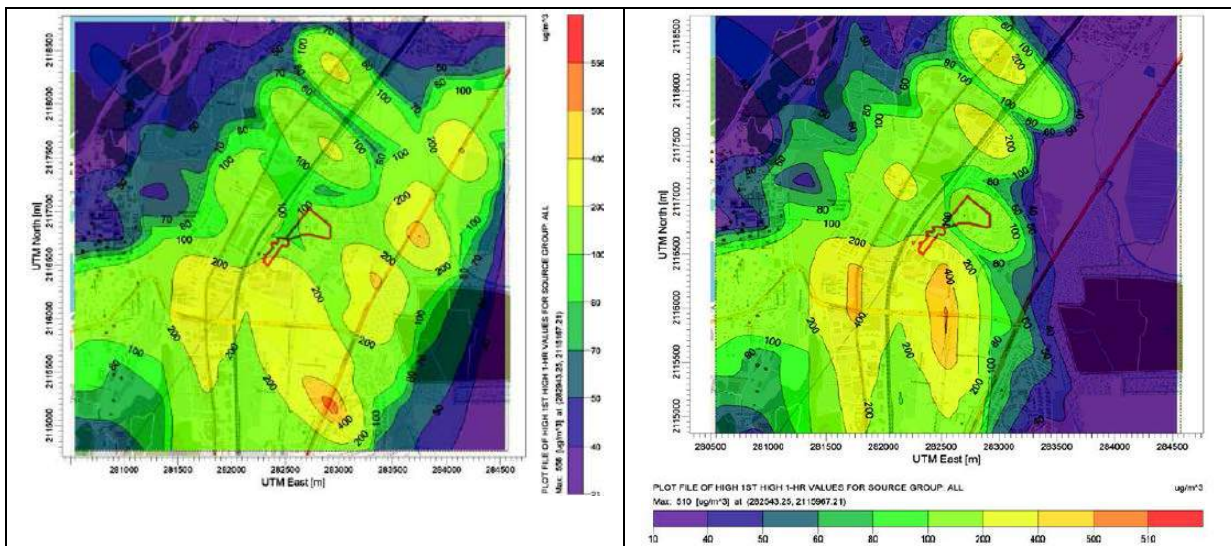
**Fig 4.6 (b):** NO<sub>x</sub> 24hr average emission dispersion contours – Construction Phase



**Fig 4.6 (c):** NO<sub>x</sub> 24hr average emission dispersion contours – Operations Phase (25yrs)

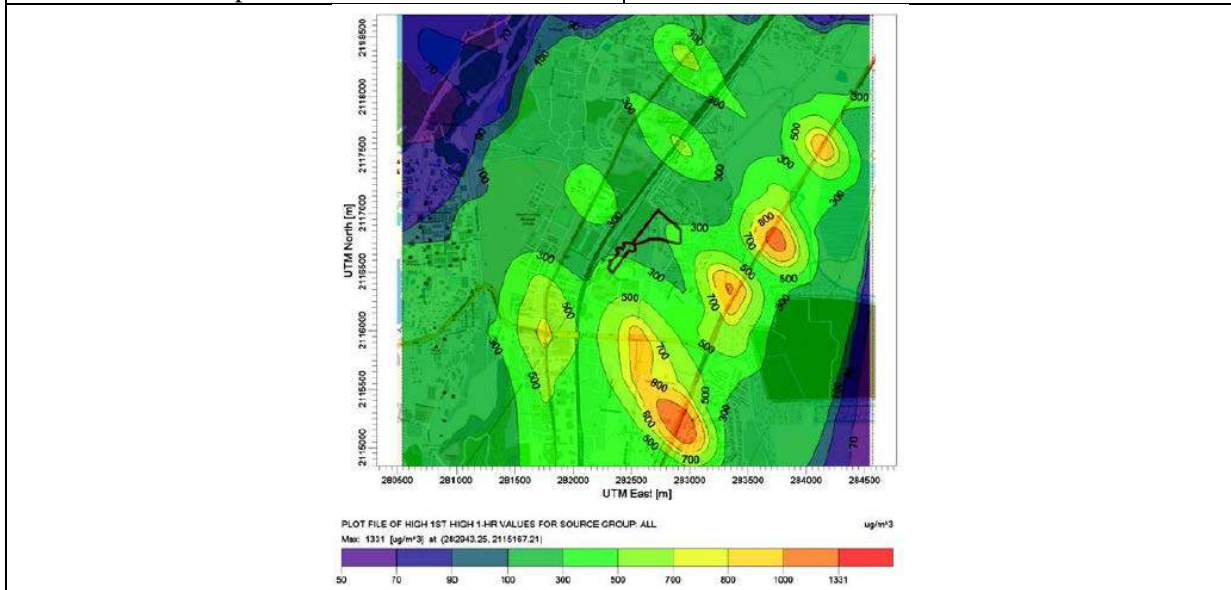
○ **SCENARIO ANALYSIS FOR CARBON MONOXIDE (CO)**

Model simulations considering baseline activity from the proposed project are presented in **Figure 4.7 (a, b, c)**.



**Fig 4.7 (a):** Present CO 1hr average emission dispersion contours

**Fig 4.7 (b):** CO 1hr average emission dispersion contours – Construction Phase



**Fig 4.7 (c):** CO 1hr average emission dispersion contours – Operations Phase (25yrs)

○ **Results**

Modeled pollutant concentrations were tabulated for present, construction and 25yrs down the line in operations phase scenario in **Table 4.6 (a, b)**

**Table 4.6(a): Modeled peak hour concentrations for each scenario ( $\mu\text{g}/\text{m}^3$ )**

Parameters	Present	Construction	Operations
PM <sub>10</sub> (peak hr average)	10	40	10
PM <sub>2.5</sub> (peak hr average)	08	30	10
NO <sub>x</sub> (peak hr average)	80	100	100
CO (peak hr average)	100	200	300

**Table 4.6(b): Modeled 24 hour concentrations for each scenario ( $\mu\text{g}/\text{m}^3$ )**

Parameters	Present	Construction	Operations
PM <sub>10</sub> (24hr average)	06	20	10
PM <sub>2.5</sub> (24hr average)	05	10	07
NO <sub>x</sub> (24hr average)	40	50	50
CO (1hr average)	100	200	300

Comparative account of each pollutant concentration with respective National Ambient Air Quality Standards (NAAQS) is given.

**Table 4.7 (a): Comparative Account Peak hr Emissions of Present and Construction Scenario ( $\mu\text{g}/\text{m}^3$ )**

Parameters	Concentrations			NAAQS
	Baseline	Change	Resultant	
PM <sub>10</sub> (4hr average)	83	30	113	<b>100</b>
PM <sub>2.5</sub> (4hr average)	46	22	68	<b>60</b>
NO <sub>x</sub> (4hr average)	24	20	44	<b>80</b>
CO (1hr average)	900	100	1000	<b>4000</b>

**Table 4.7 (b): Comparative Account Peak hr Emissions of Present and Operation Scenario ( $\mu\text{g}/\text{m}^3$ )**

Parameters	Concentrations			NAAQS ( $\mu\text{g}/\text{m}^3$ )
	Baseline	Change	Resultant	
PM <sub>10</sub> (4hr average)	83	00	83	100
PM <sub>2.5</sub> (4hr average)	46	02	48	60
NO <sub>x</sub> (4hr average)	24	10	34	80
CO (1hr average)	900	200	1100	4000

**Table 4.7 (c): Comparative Account 24hr Emissions of Present and Construction Scenario ( $\mu\text{g}/\text{m}^3$ )**

Parameters	Concentrations			NAAQS
	Baseline	Change	Resultant	
PM <sub>10</sub> (24 hr average)	83	14	97	100
PM <sub>2.5</sub> (24hr average)	46	05	51	60
NO <sub>x</sub> (24hr average)	24	20	44	80
CO (1 hr average)	900	100	1000	4000

**Table 4.7 (d): Comparative Account 24hr Emissions of Present and Operation Scenario ( $\mu\text{g}/\text{m}^3$ )**

Parameters	Concentrations			NAAQS
	Baseline	Change	Resultant	
PM <sub>10</sub> (peak hr average)	83	04	87	100
PM <sub>2.5</sub> (peak hr average)	46	02	48	60
NO <sub>x</sub> (peak hr average)	24	10	34	80
CO (peak hr average)	900	200	1100	4000

- Discussion**

Predicted values of the PM10 and PM2.5 pollutants in the construction scenario are exceeding (during peak hour) the National Ambient Air Quality Standards (NAAQS) issued by Central Pollution Control Board (CPCB) dated November 18, 2009.

This is the temporary impact during construction phase; Mitigation measures for the same are explained in the Chapter 8 in Environment Management Plan (EMP).

All the predicted values of the pollutants in the operation scenario are within the National Ambient Air Quality Standards (NAAQS) issued by Central Pollution Control Board (CPCB) dated November 18, 2009.

#### **4.1.4 Noise Environment:**

##### **During Construction Phase:**

###### **a) Anticipated Impacts –**

- Increase in Noise levels due to:
  - Construction activities
  - Transportation activities
  - DG sets and Batching Plant
  - Carrying out high noise level construction activities at night time
- Nuisance to nearby areas due to increase in noise levels

###### **b) Mitigation Measures –**

- Provision of barricades along the periphery of the site
- Monitoring of noise during construction activities to ascertain the noise levels are within limits
- Precautions for noise abatement during the construction activities
- Contractors to use well maintained & relatively newer equipments to mitigate noise generation in initial stages when excavation & earth removal is carried out
- Provision of ear plugs during high noise construction activity for construction labour and staff
- No noise polluting work in night shifts
- In-built acoustic enclosure for DG sets
- It is recommended that Hydraulic pumps and compressors should be covered with Acoustical Enclosures with 20 dB Transmission Loss Rating in order to reduce the noise

##### **During Operation Phase:**

###### **a) Anticipated Impacts –**

- Impact of noise due to vehicular traffic
- Noise generated due to DG sets

###### **b) Mitigation Measures –**

- Provision of proper parking arrangement, traffic management plan for smooth flow of a vehicle helps to abate noise pollution due to vehicular traffic
- Plantation of new trees of various varieties shall be planted on ground and additionally shrubs shall be planted on podium that shall act as natural noise buffer
- Acoustic enclosure for DG sets

##### **4.1.4.1 Noise Modeling Studies:**

Noise Modeling means predictive analysis of how much would be the noise levels at different distances from the project site, depending upon the predicted maximum noise levels at the project site. (Due to DG Sets, other machineries, etc.)

## A. Construction Phase

**Table 4.8: Noise Modeling Calculations – Construction Phase**

Long Duration Noise Sources							
No.	Noise generating areas	Noise level at source (dBA) At 1 meter distance from particular equipment/location	Anticipated Noise level (dBA) At various distances from project site (m)				
			Nr. Damle Colony (73 m)	Nr. Junction of Kanjur village road & Shah colony road (68 m)	Backside of Crompton Greaves Ltd. (71 m)	Near IES School, Kanjur (94 m)	Distance from project site (150 m)
1	Excavator/Loader/JCB/ Breaker	95	57.7	58.3	58.0	55.5	51.5
2	DG Set	90	52.7	53.3	53.0	50.5	46.5
3	Concrete Batching plant	100	62.7	63.3	63.0	60.5	56.5
Cumulative Noise Levels			64.2	64.9	64.5	62.0	58.0
Attenuation due to Green belt and acoustic enclosure			20.0	20.0	20.0	20.0	20.0
Existing Noise Levels (day-time)			69.2	70.8	63.1	58.0	55.0
<b>Cumulative Noise Levels(Day)</b>			<b>69.2</b>	<b>70.8</b>	<b>63.2</b>	<b>58.1</b>	<b>55.1</b>

### ➤ Impact due to construction activity:

- Most of the machinery are going to be located on the project site temporarily, only during the construction phase. Major sources of noise from the equipment list are listed below with their tentative noise levels.
  - Batching Plant – 100 dB
  - Tower Cranes - < 75 dB
  - Passenger hoists- < 75 dB
  - De-watering Pumps – 85~90 dB
  - DG Sets - 85 dB each / 90 dB Cumulative
  - Transit Mixer – 95 dB
  - Excavator/JCB/Trucks – 95 dB

Impact	Suggested mitigation measures
<p><b>Batching Plant:</b> The batching plant contains several different sources, the collective noise level of which may rise to 100 dB. Following are the several different sources present in a batching plant.</p> <ul style="list-style-type: none"> <li>○ Truck and front end loader engine noise</li> <li>○ Hydraulic pumps</li> <li>○ Conveyor belts</li> <li>○ Air valves</li> <li>○ Filters</li> <li>○ Alarms</li> <li>○ Compressors</li> <li>○ Swinging, scrapping and loading device</li> </ul>	<ul style="list-style-type: none"> <li>○ The contractor should carefully choose the above equipment in order to meet with the CPCB Norms</li> <li>○ Hydraulic pumps and compressors should be covered with Acoustical Enclosures with 20 dB Transmission Loss Rating in order to reduce the noise</li> <li>○ Valves should be covered with Removable Acoustical Blankets</li> <li>○ The contractor should choose controlled operating hours for noisy activities such as delivery, loading unloading etc.</li> </ul>
<p><b>Concrete Pumps:</b> Concrete Pumps, usually Diesel Engine Driven, generate noise levels exceeding 100 dBA during its operation. The operation of Concrete Pumps is usually continuous for duration of 6~8 Hours when operated.</p>	<p>Slabs. Noise levels of this source need to be reduced to at least 70 dBA, for which 30 dBA Transmission Loss Rating Acoustic Enclosures are suggested for this source of noise.</p>

Impact	Suggested mitigation measures
However, concrete pumps would not be operated every day, but only when there would be the construction of Concrete Slabs	
<b>DG Set</b> : All DG sets below 1000 KVA capacity are required to have noise levels less than 75 dBA at 75% Load condition.	DG Sets below 1000 KVA are also pre-installed with Acoustical Canopy where no additional mitigations are required If DG Sets above 1000 KVA are going to be present, Acoustical Enclosures with 30 dB Transmission Loss Rating are recommended to be installed on the DG Sets.
<b>Dewatering Pumps / Water Lifting Pumps / Curing Pumps:</b> All pumps, if submerged type, make negligible noise due to the noise being generated under water. However, pumps installed above the water level generate noise levels in between 80 to 90 dB. Any pumps below 85 dB do not require any mitigation.	Larger pumps with noise levels exceeding 85 or 90 dBA with continuous operation are recommended with Acoustic Enclosures of Transmission Loss Rating of 15 dBA
<b>Construction Activity with other machinery:</b> Construction activity where Jackhammers, breakers, and all the machinery would be used would generate noise levels in between 80~90 dB continuously due to smaller tools such as electric drills, grinders, or electric bar cutter machinery etc.	However, these activities would take place well within the project boundary and due to intermittent operations, are unlikely to make a major impact onto the local Leq Levels outside the project boundary

## B. Operation Phase:

**Table 4.9: Noise Modeling Results - Operation Phase**

Long Duration Noise Sources							
No.	Noise generating areas	Noise level at source (dBA) At 1 meter Distance from project site (m)	Anticipated Noise level (Leq) at various distances from project site (m)				
			Damle colony , Kanjur village (73 mt.)	Junction of Kanjur village road and Shah colony road (68 mt.)	Backside of Crompton Greaves Ltd. (71 mt.)	Near IES School, Kanjur (94 mt.)	Distance from project site 150m
1	STP (Blowers, Pumps)	100	62.7	63.3	63.0	60.5	56.5
2	DG sets (Multiple)	90	52.7	53.3	53.0	50.5	46.5
3	Vehicular movement	80	42.7	43.3	43.0	40.5	36.5
	Cumulative Noise Levels		63.2	63.8	63.4	61.0	56.9
	Attenuation due to Green belt and acoustic enclosure		20.0	20.0	20.0	20.0	20.0
	Existing Noise Levels (Day time)		69.2	70.8	63.1	58.0	55.0
	<b>Cumulative Noise Levels (Day)</b>		69.2	70.8	63.1	58.1	55.1

**Discussion of impact during operational Phase:**

- During operational phase, the only sources going to be present at the project site are the DG Sets, the Sewage treatment plant which would have multiple Blowers, Pumps etc., the combined noise of which is assumed at 100 dB, and the vehicular movement, the noise contribution of which is minimal.
- During the operational phase, increase of approximately 0.1 dB is predicted at the 150 meters from the project boundary, depending on their baseline noise levels. For noise monitoring locations, no increase was predicted during the operational phase of the project.
- However, although the increase appears to be of 0.1 dB at distances of 100 meters or so, at closer distances, such as in the buildings right next to the STP plant, higher noise levels may be observed which may trouble the residents. Therefore, Acoustical Enclosures with 30 dB Transmission Loss Ratings are recommended for the Blowers of the STP.
- Contribution due to vehicular movement is likely to be even less than 80 dB, and it would be significant only during morning and evening peak hours, hence no mitigations are required for this source of noise.

➤ **Conclusion:**

- **During Construction Phase:**
  - Maximum increase in Sound Pressure level would be of approximately 0.1 dB for distances up to 100 meters from the project site
  - 0.1 dB of increase was predicted at 100 meters from the project boundary
- **During Operation phase:**
  - Beyond a distance of 150 meters from the project site, there will not be any increase in the Sound Pressure Levels.
  - During the operational phase, up to 0.1 dB of increase in SPL is predicted at up to 100 meters distance

**4.1.5 Biological Environment:**

**Impact on Ecological Resources in and around project site:**

<b>Environmental Topic and Impact</b>	<b>Mitigation Measures</b>
<p><b>Impact BIO 1</b> The areas like Nehru Nagar Bus stop (Abutting) and Kanjurmarg police station are located 0.50 m from site in south &amp; East side of the sites. Air pollutants may have adverse impacts on public assembled in these locations.</p>	<p>Considering wind directions during most of the seasons, majority of green belt plantations should be undertaken towards SE side of the site. Accordingly impact will be minimized in such areas. Biodiversity will be increased by developing green belt in an area by plantation of different varieties of trees and shrubs, Different varieties of trees would be planted within the project site. This will remarkably enhance biodiversity of flora and fauna.</p>
<p><b>Impact BIO 2</b> Water bodies are situated from 2 to 10 km from the project site. Also, Sanjay Gandhi National park is located beyond 500m from the project site. The project activities could have effects on water bodies around project site due to discharge untreated sewage</p>	<p>No surface water bodies were observed within the project site boundary but present beyond 500 m radius from project site. Excess treated sewage (610 KLD) shall be used for green belt of road side plantation. Characterization of treated sewage should be carried out and maintained as per stipulated norms.</p>
<p><b>Impact BIO 3</b> There is no endangered plant and animal within Project site. However, endangered plants / animals are present in Sanjay Gandhi National Park located at 2.00 Km from the project site. Air pollutants may affect the physiology of existing flora and fauna</p>	<p>All the parameters PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>x</sub>, SO<sub>x</sub> and CO are within the desired limits specified by CPCB In order to further reduce the levels of the pollutants, the measures to be adopted are delineated in concerned Air pollution section</p>

Environmental Topic and Impact	Mitigation Measures
during construction and operation phases.	
<b>Impact BIO 4</b> Excessive light attracts and disorients photophilic animals, those that follow light. Disrupted navigation in moths can easily be observed around bright lamps on summer nights. Insects gather around these lamps at high densities instead of navigating naturally. Some animals, notably insects, such as the honey bee, are sensitive to the polarization of light.	Unless essential, excessive light, particularly UV lights should be strictly avoided during night hours.

**Details for varieties of tree plantation are given in Section 4.2.5 of Chapter 4  
 Layout plan of the project site showing green belt development is enclosed**

#### **4.1.6 SOCIO-ECONOMIC ENVIRONMENT:**

The setting up of any project would have impact on socio-economic life of the people in the project area. Here, an attempt is made to visualize and discuss such impacts likely to be induced by the project. Would be impacts due to project activity are described below:

##### ➤ **Anticipated Positive Impacts**

- Employment opportunities to approximate 550 persons to work as construction workers at the site.
- Besides construction workers, business opportunities to the local people such as contractors, transporters and raw material suppliers etc.
- Benefit to nearby locality by providing services to the construction workers.
- In the operations phase, the residential complex would also create additional employment to the local people by way of security guard, driver, maid/servant, sweeper, gardener etc.
- The proposed residential project when completed would help in commercial development of surrounding area.

##### ➤ **Anticipated Negative Impacts**

- During construction phase about 550 workers would visit the construction site till the completion of proposed project activity; this would put some strain on infrastructure facilities in the area. However, this impact is only for the short duration and temporary in nature.
- During construction phase, there could be increase in the level of dust in the air.
- Vehicular traffic and construction activities may create noise pollution.

##### ➤ **Mitigation Measures:**

- Provision of adequate drinking water, toilet and bathing facilities on project site
- Water sprinkling for dust suppression during construction phase to control air pollution and thereby avoid adverse health impact
- Provision of proper living condition with appropriate facilities for residential labors
- Training and awareness programme for the workers to understand the importance of occupational health & safety.
- Efforts should be made to give employment opportunities to local people in the operational phase.

## 4.2 ENVIRONMENTAL LIABILITIES:

Waste management like treatment, recycle and adequacy and technical capabilities of the systems designed for the same are always priceless for making the project environmentally sustainable by minimizing negative impacts on city infrastructure, on the aesthetics and health and hygiene of project site and surrounding areas.

Following environmental liabilities shall be undertaken for this project:

### 4.2.1 WATER SAVING PRACTICES

The details of Water saving practices are as follows

- **Dual Flush Cisterns:**
  - Dual flushing cisterns shall be installed, which have two flush settings, one for normal operation to flush solids 6 lit per flush and a second reduced amount for liquids as 3 lit per flush, thus saving considerable amount of water
- Use of low loss plumbing fixtures
- **Rainwater Harvesting:** Provision of 2 RWH tanks of total capacity 160 KL

The ground water table at the project site is between 5.1 to 6.0 m. which is high hence ground water recharging is not proposed.

Layout showing RWH and SWD location is attached as **Enclosure**.

### 4.2.2 Wastewater Management During Operation Phase:

Total sewage generation from the proposed development will be 1394 KLD. This sewage will be treated in three Sewage Treatment Plants (STPs) of total capacity 1464 KL. Treated sewage generated will be reused for secondary requirements like gardening (109 KLD) and flushing (536 KLD). Excess treated sewage shall be disposed to existing sewer line of M.C.G.M.

While proposing location of STP, care is taken that it is not proposed near any underground domestic water storage tanks. The technology used for treatment of sewage is **Moving Bed Bio Reactor (MBBR)**. The STP location is indicated on the layout plan attached as **Enclosure** to this report.

The generated sewage will be collected by gravity through pipe network to STP. Basis characteristics of untreated and treated sewage are as follows:

**Table 4.10: Untreated & Treated Sewage Quality**

NO.	DETAILS	VALUES		UNITS
		UNTREATED	TREATED	
1.	pH	7.0 – 8.0	7.0 – 7.5	--
2.	Total Suspended solids	250	≤ 10	mg/lit
3.	Chemical Oxygen Demand	400	≤ 30	mg/lit
4.	BOD,3days,27 <sup>0</sup> C	250	≤ 10	mg/lit
5.	Oil & Grease	50	<5	mg/lit

#### ➤ Design Basis of Treatment plant –

##### Design Basis of Treatment plant – MBBR (Moving Bed Bio Reactor)

###### • **Preliminary Treatment:**

The treatment will include the following unit / equipment:

- **Bar Screen Chamber**
- **Oil & Grease Trap**
- **Raw Sewage Collection Tank**
- **Raw Sewage Transfer pumps**

All the sewage generated will gravitate through **Bar Screen Chamber**. The bar screen will take care of any floatable matter, which will be manually scraped out and collected in drums. Bar screen will comprise of SS plate type screen for removing floatable matter. From the bar screen it will then pass on to the **Oil & Grease Trap** for removal of free floating oil. The oil will be scrapped and collected in drums to be disposed as per statutory norms. The sewage will be collected in **Raw Sewage Collection Tank**. Uniform mixing is achieved by providing aeration grid (air sparing) in the collection tank. After completion of mixing, the sewage will be pumped at a uniform rate by **Sewage Transfer Pumps** to Biological Treatment.

- **Biological Treatment (Secondary Treatment):**

This will include the following;

- **Moving Bed Bio Reactor (MBBR)**
- **Secondary Clarifier**
- **Sludge Dewatering System-(Filter press)**

The process will be of activated sludge biological process of **Moving Bed Bio Reactor (MBBR)** type. The MBBR process will be an aerobic system having two biological growth process- attached growth and suspended growth. The pretreated sewage from raw sewage collection tank will be pumped into MBBR where support media will provide more surface area for Biological growth. Oxygen will be added for biological growth through tubular diffusers.

The sewage will be uniformly pumped to MBBR Reactor to biologically degrade the organic matter. The oxygen required for the bacterial growth will be supplied through Diffuser systems. The system envisages better oxygen transfer because of fine bubbles and increased contact with the sewage.

The overflow from MBBR Reactor will gravitate to the **Secondary clarifier**. The settled sludge will be pumped back to the Aeration tank to maintain the bacterial concentration in the tank and excess sludge will be sent to the Sludge collection pit and shall be dewatered using a **Sludge Dewatering System (Filter press)**. The filtrate will be taken to the Raw Sewage Collection Tank. The dried sludge shall be used as manure for gardening.

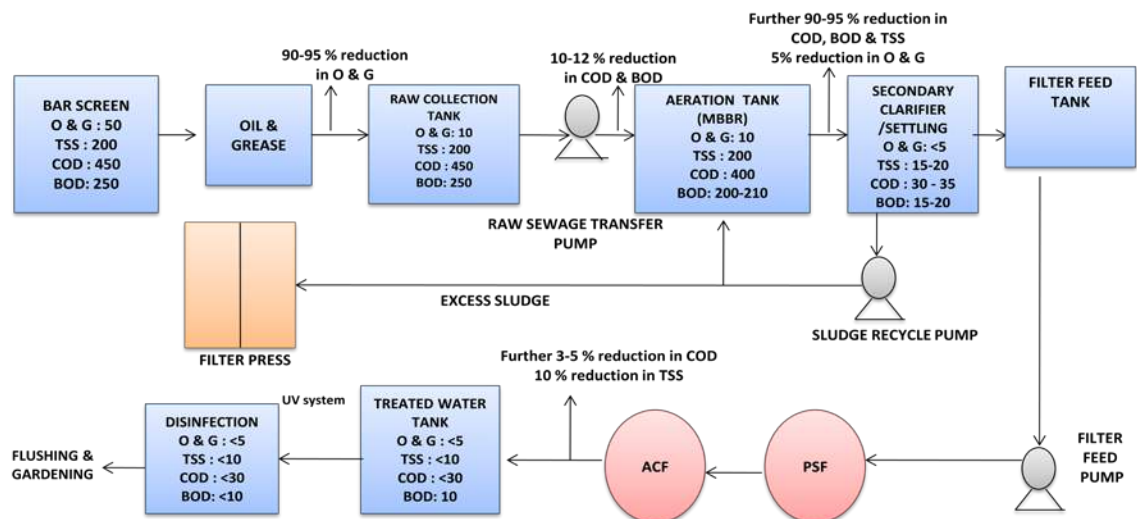
- **Tertiary Treatment:**

The treatment will include the following unit / equipment;

- Filter feed tank
- Pressure Sand Filter (PSF)
- Activated Carbon Filter (ACF)
- UV system

The clear supernatant from the Secondary clarifier will be collected in a **Filter feed tank** this tank will be provided with level switch for unmanned operations. The treated sewage will be pumped to **PSF** followed by **ACF**. After ACF treated sewage will be passed through UV filtration for disinfection. After UV filtration treated sewage will be collected in Treated Water Tank. Treated sewage from Treated Water Tank shall be used for secondary requirement.

The STP mass flow diagram is as follows:



**Fig. 4.8: STP Flow Diagram (MBBR process)**

## 4.2.3 SOLID WASTE MANAGEMENT:

### 4.2.3.1 During Demolition, Pre-construction and Construction Phase:

#### ➤ Anticipated Impacts –

- There are buildings such as stamping division and few administrative buildings of Crompton Greaves Ltd. on plot under consideration, for which part demolition has been done and remaining structures shall be demolished. Details and Quantities of demolition debris, excavation waste and construction waste are identified and calculated.
- Impact on environment due to improper disposal of construction waste other than Hazardous waste
- Nuisance created in & around site due to improper handling and disposal of construction debris and solid waste
- Accidental spillage of chemicals/oil may leads to soil contamination.
- Improper segregation and disposal of the solid waste by workers dwelling on site during construction phase may cause negative impacts on land environment

#### ➤ Mitigation Measures –

- Designated storage of demolition debris, construction material and waste
- Debris quantification and segregation of demolition waste is being done on site
- Disposal of demolition debris to designated dumping areas with prior permissions of M.C.G.M. and Steel given to Authorized recyclers
- Construction waste minimization and reuse
- As on date 91876 cum excavated material has been generated. Reuse of 3900 cum material on site and disposal of remaining excavation material (87976 cum) to authorized landfill site as per permission from M.C.G.M.
- In future total 180594 cum excavation material shall be disposed to authorized landfill site as per permission from M.C.G.M.
- Segregation of municipal waste into biodegradable and non-biodegradable and shall be handed over to M.C.G.M.
- Separate storage for Hazardous wastes and its disposal to authorized CHWTSDF sites.
- Collection, segregation , storage and transport of concrete, soil and other waste shall be done as per C & D waste management rules 2016
- Management plan is as follows:

**i. DEMOLITION DEBRIS AND CONSTRUCTION WASTE MANAGEMENT PLAN:**

**a. Demolition Debris Management Plan:**

Part demolition of some existing buildings has been carried out on site by personnel using appropriate health and safety procedures in accordance with the regulatory requirements. The generated debris has been stored for recycling and excess debris has been disposed to authorized landfill site. Details of demolition debris which will be generated due to demolition of existing structure are given in below table.

**Table 4.11: Demolition Debris Details**

No.	Item	Quantity	Disposal
1	Debris	6000 cum	Disposal to Authorized landfill site
2	Steel	450 ton	To Authorized recyclers

**b. Excavation and Construction Waste Management Plan:**

**Table 4.12: Excavation and Construction Waste Movement Plan**

Description	Total quantity (Cum)	Quantity Cum/day	Number Of Trips/day	Estimated Operation Period (Hrs) (Into site, Loading, Exiting)
<b>Excavation earth</b>	180594	752	53	9-10 hrs

- o Major portion of the excavation shall be done by mechanical means and shall be disposed off to landfill site using trucks during off peak hours
- o Approximately 53 nos. of trips (4Trips/day/dumper =  $53/4 = 13$  nos. dumpers) will be disposed from the site per day
- o The time required for loading a dumpers and release from site shall take 20-25 mins approximately
- o As per current plan approximately 5 dumpers shall be loaded at a time
- o There shall be a queuing provision within the plot for a minimum of 5 dumpers. It shall be ensured that at no point any dumpers shall be stationed on the road surrounding the plot during excavation
- o Major carting away shall be during off peak times. Such as 12 pm – 5 pm, 8 pm to 12 pm
- o The tyres of the dumpers shall be cleaned / washed before the vehicles move out of the project site and polymeric dust suppressors shall be used and covered with tarpaulin to prevent dust while transportation
- o The location of approved disposal will be determined from time to time as per approval from SWM Dept. of M.C.G.M. The receipts for disposed material shall be collected
- o The Traffic Commissioner of Police will be intimated well in time prior to starting of activity so that his remarks are available for compliance to avoid disturbance to the existing traffic

**c. Collection & Storage: Demolition & Construction Waste Management (As per C & D Waste Management Rules 2016)**

- o Collection, segregation and storage of concrete, soil and other waste shall be as notified in consonance with the rules
- o Other waste (such as municipal waste) does not get mixed with C & D waste and will be stored and disposed separately.
- o Waste shall be segregated into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar.
- o Waste management plan shall be prepared and appropriate approvals from the local authority shall be taken before starting construction/ demolition activity.

- Concerned authorities shall be informed regarding the relevant activities from the planning stage to the implementation stage.
- Demarcation and bifurcation of areas for storing C & D wastes/ construction material.
- Off-site: Prohibition from storing/ dumping C & D wastes/ construction material on metalled (pucca) roads to avoid obstruction of traffic flow
- On-site: Locations of storage/ dumping wastes within site will be such that dust dispersal during handling (loading/ unloading) will be minimum
- Construction Site in-charge will be instructed to maintain quantity log sheet so that quantity of construction material available at site synchronizes with its utilization and also the storage period is minimal thereby reducing dust dispersal.
- C & D waste shall be kept within the premise or the waste shall be deposited at collection center made available by the local body or handover it to the authorized processing facilities of construction and demolition waste
- To ensure that there is no littering or deposition of construction waste so as to prevent obstruction to the traffic or the public or drains

**d. Measures To Be Taken During Transportation Of Demolition & Construction Waste: (As per C & D Waste Management Rules 2016)**

- Use of covering sheets for trucks carrying construction material to prevent air borne dust.
- Trucks/ Lorries should not be overloaded to avoid overflow of material (C & D wastes/ construction material) during transportation.
- As the transport vehicles move generally during night time, the transport permit shall indicate the material/ waste being transported, quantity being transported and place of loading and unloading destinations.
- The unloading activities at dump sites will ensure that dust borne particles are damped either by water spray or aligning the waste disposal in such a way that minimizes dust dispersal (wind breakers).
- The unloading activities of construction material at site/ off site to ensure that dispersal of dust borne particles are minimized by either location of dumpsite or using water sprinklers or covered by a sheet made of either jute, tarpaulin, plastic or any other effective material.
- Roads surfaces within site will be well maintained so that transport vehicles are not subjected to jerks resulting in ejection of C & D wastes/ construction material on roads.

**e. Dust Suppression of C & D Waste (Mandatory implementation as per Environment (Protection) Amendment Rules, 2018)**

- Provision of paved and blacktopped (Metallic) roads to construction site
- Provision of wind breakers of appropriate heights
- Provision of water sprinkling system to suppress dust
- No excavation of soil shall be carried out without adequate dust mitigation measures in place.
- No loose soil or sand or Construction & Demolition Waste or any other construction material that causes dust shall be left uncovered.
- Grinding and cutting of building materials in open area shall be prohibited.
- Construction material and waste shall be stored only within earmarked area and road side storage of construction material and waste shall be prohibited.
- No uncovered vehicles carrying construction material and waste shall be permitted.
- Construction and Demolition Waste processing and disposal site shall be identified and required dust mitigation measures shall be notified at the site.
- Dust mitigation measures shall be displayed prominently at the construction site for easy public viewing.

**i. Expected Hazardous Waste & Management:**

Expected hazardous waste	Management
○ Fuel and Heating oil and other volatile/flammable liquids such as coolants, grease, etc	○ Use of dustbins made of durable materials like metal or even

Expected hazardous waste	Management
<ul style="list-style-type: none"> <li>○ Centering oil, formwork oil</li> <li>○ Tar and Tar products (bitumen, felt, water proofing compounds etc.)</li> <li>○ Chemicals, admixtures, sealants, adhesives solvents etc.</li> <li>○ Empty containers of Paints and primers</li> <li>○ Empty containers of pesticides, wood preservatives</li> <li>○ Tarpaulin</li> <li>○ Product packaging (cement bags, cartons, containers, plastic covers etc.)</li> <li>○ Plastics, Acrylics, Silica, PVC</li> <li>○ Fluorescent Lamps Intact and Crushed, Incandescent Lamps.</li> <li>○ Mercury Containing Lamps and Tubes, Mercury Containing Devices – Mercury switches, relays, regulators, thermostats, thermometers, manometers etc.</li> <li>○ All types of Batteries</li> <li>○ Electronic Ballasts, PCBs, Transformers, capacitors, switchgear, Lead Cable, Oil filled /gel filled cables</li> </ul>	<ul style="list-style-type: none"> <li>○ masonry for these wastes</li> <li>○ Isolated, covered and raised storage for hazardous wastes</li> <li>○ Installation of fire extinguisher near storage of hazardous wastes</li> <li>○ Disposal of hazardous waste within time to authorized CHWTSDF sites as per regulatio</li> </ul>

#### 4.2.3.2 During Operation Phase:

##### ➤ Anticipated Impacts & Mitigation Measures -

There are various types of wastes during operation phase their type and management are detailed out as under

##### ➤ Garbage Management (SWM):

The quantification of solid waste is given in sec. 2.6 of Chapter 2 of this report. During operation phase there will be provision for segregation and collection of biodegradable & non-biodegradable waste within the premises. Biodegradable waste will be treated by composting in Organic Waste Converter (OWC). Details of OWC machine are given below. The non-biodegradable waste will be segregated and handed over to recyclers for further disposal. Dried sludge from STP will be used as manure. Area requirement for SWM is as follows:

##### • Area requirement

Details	Area (Sq.mt.)	
	Building 1	Building 2
For collection & segregation	41	32
For machine	24	12
For Curing	37	37
Total Area required for SWM	102	81
Total Area provided for SWM	237	112

##### • Details of Organic Waste Converter (OWC):

Particulars	Details	
Machine Capacity	170 Kg/batch	170 Kg/batch
Machine Nos.	1 no.	1 no.
Total area provided for SWM	349	
Time required/ batch	20 to 25 min.	

Particulars	Details
Working Hours	8 Hr
End product	Manure

- The facility management services would transfer the biodegradable waste to be processed in an Organic Waste Convertors OWC
- Space Provision for solid waste management is approx. 349 Sq. mt. for the proposed development which includes the space required for the machine as well as collection segregation and curing of waste.
- Biodegradable waste will be converted into manure which will be used for gardening
- The Operation and maintenance of OWC shall be given on contract basis.
- The entire operation is extremely simple and the system once stabilized, it can be left to itself with very little human intervention. A Control panel takes care of the operation of the plant

The layout plan showing location of OWC is enclosed in Enclosure.

➤ **Hazardous waste Management (Hazardous waste generated at household level) & its Disposal:**

**Suggestions for waste Management:**

- Hazardous Waste generated at household level is always labeled as toxic, poisonous, corrosive, flammable, combustible or irritant. Hence while purchasing one can take care to buy non-toxic/less hazardous products and only what are really needed
- These materials should be kept out of reach of children and pets
- HHW should not be thrown into household garbage, toilets or sinks or never to be dumped on the ground or poured down into the storm drains as HHW can cause contamination of surface and ground water and hence posing health hazards
- There will be common storage facility for Hazardous wastes and its disposal shall be done to authorized CHWTSDF sites as per regulations

**4.2.5 Green Belt Development:**

Provision of 15507.63 sq.mt. recreational ground (RG) area. There are total 431 trees existing on the site out of which 24 trees have been cut as per the tree NOC received. 171 trees are affected due to development of project which shall be cut or transplanted with prior permission from Tree Authority. 236 trees shall be retained. After development, there shall be 1273 trees on the site (including retained and newly planted). The details are given in **Table 4.13**

List of existing trees inventory is attached as Enclosure

**Table 4.13: Proposed Plant Species on Ground**

No.	Common Name	Botanical name
1.	Bakul	<i>Mimusops elengi</i>
2.	Bahava	<i>Cassia fistula</i>
3.	Kadamba	<i>Neolamarckia cadamba</i>
4.	Palm	<i>Syagrus romanzoffiana</i>
5.	Mango	<i>Mangifera indica</i>
6.	Chiku	<i>Manilkara zapota</i>
7.	Tamhan	<i>Lagerstroemia speciosa (L.)</i>
8.	Ramphal	<i>Annona reticulata</i>
9.	Guava	<i>Psidium guajava</i>
10.	Phanas	<i>Artocarpus heterophyllus</i>
11.	Jambhul	<i>Syzygium cumini</i>
12.	Copper Pod	<i>Peltophorum pterocarpum</i>
13.	Karanj	<i>Millettia pinnata</i>
14.	Neem	<i>Azadirachta indica</i>

Layout plan of the project site showing tree plantation is given in **Enclosure**.

#### **4.2.6 Indoor Air Environment:**

There are many sources of indoor air pollution in homes. These sources of indoor air pollution include building materials, wet or damp carpet, cabinetry or furniture made of certain pressed wood products; household cleaning products, cooling systems, paints, resins, wood preservatives, fertilizers, pesticides and outdoor sources such as pollution. Additionally, polluted outdoor air due to heavy vehicular traffic on the adjacent roads would add to the increasing pollution levels from the outside.

In this project Indoor Air Pollution shall be mitigated through natural ventilation of the regularly occupied living spaces (Kitchens, Bedrooms, Living and dining spaces). Building Flush out has been proposed for the project before occupancy as a measure to reduce the indoor air quality problems resulting from construction to prevent comfort and wellbeing of building occupants. Interior finishing materials with low Volatile Organic Compounds (VOC) will be used for the project.

#### **4.3 DETAILS OF IMPACT ON EXISTING INFRASTRUCTURE DUE TO THE PROJECT :**

Detailed examination of the project and project site have been made with reference to impact on infrastructure covering water supply, carrying capacities of storm water drainage, sewers, electrical load etc.

##### **4.3.1 Details of the project with reference to water supply:**

The requirement of fresh water will be fulfilled from M.C.G.M. All other secondary requirements like flushing & gardening are getting fulfilled by treated water from STP. Hence the overall reduction in total water demand shall be 37%.

##### **4.3.2 Details of the project with reference to sewerage:**

The implementation of Sewerage Treatment plants and reuse of treated sewage for secondary requirements like gardening and flushing will result in reduced quantity of sewage in the city sewers.

##### **4.3.3 Details of the project with reference to Electrical Supply:**

- The power demand is **7352 KW**.
- With the use of various energy conservation and non-conventional methods energy shall be saved.
- Energy Conservation & Eco-Friendly Measures is as follows:
  - Provision of LED tubes & lamps for all habitable areas
  - Energy efficient five star rated split AC, high COP
  - Provision of solar PV panels
  - Provision of solar water heating system (to cater 20 % of hot water demand)
  - Use of LED lights for Landscape lighting, Basement, podium, lobby areas and Stilt floors, Lobby, Staircases and parking space
  - LED lamps with timer based control
  - Use of pumps and motors with high efficiency
  - Provision of energy efficient lifts with VVVF lift drive
  - **Energy saved as per Conventional Base Case is 22%**
  - **Saving through renewable energy 4.52%**

Detailed ECBC Compliance report is attached as **Enclosure**

#### 4.4 IMPACT ASSESSMENT BY INTEGRATION:

Impact identification for this project was done by using Delphi Technique.

##### 4.4.1 Technique:

For sitting of an activity, “**Delphi Technique**” is advised by MoEF. The Government of India has recommended this technique in the book on Sitting of Hazardous Waste Disposal Areas, prepared by NEERI, Nagpur and published by the Ministry of Environment and Forest (MoEF) in 1991. The same is proposed to be used with due improvisation, mutatis mutandis, covering other media of environment.

- a. (i) The Delphi Technique considers the following 34 attributes and Four weightages i.e.:
  - 7 attributes, receptor related
  - 10 attributes, pathway related
  - 8 attributes, pollutant related
  - 9 attributes, waste management related.
- (ii) The modified Technique used here considers 23 attributes and Five weightages i.e.:
  - 7 attributes, receptor related
  - 5 attributes, pathway related
  - 5 attributes, water pollution & waste management related
  - 4 attributes, air pollution and waste management related
  - 2 attributes, solid waste management related.
- b. Four types of marks for each attribute like 0 to 0.25, 0.25 to 0.5, 0.5 to 0.75 and 0.75 to 1.0 depending on facts of situations, chemical properties of pollutants and quantification are considered. These marks are known as Sensitivity Index (SI).
- c. Combined consideration of (1) and (2) together gives attribute-wise weight-ages. These are the negative marks out of 1000 and ranking of candidate sites is based on comparison of these marks.

Finding the sensitivity index (SI) shall be first task and is done in the table below.

##### 4.4.2 Marks Allocation and Ranking:

Site selection depends on site evaluation. Site evaluation will depend on consideration of sensitivities of various attributes and the weight-ages attachable to each. Finding the sensitivity index (SI) shall be first task and is done in the table given below.

The attribute measurements or values or description are known as the team has traversed the area. The sensitivity index is awarded based on attribute properties in above table. The attribute wise score is arrived at by multiplying the sensitivity index and the weight-age of each attribute and is given in **Table 4.14**.

**Table 4.14: Sensitivity Index and the Weight-Age of Each Attribute**

Attribute	Sensitivity Index			
	0.0 - 0.25	0.25 - 0.5	0.5 - 0.75	0.75 - 1.0
Receptor Related				
Population within 500 meters	0 to 100	100 to 250	250 to 1000	> 1000
Distance to nearest drinking water well	> 5000 m	2500 to 5000 m	1000 to 2500 m	< 1000 m
Use of site by	No used	Occasional	Moderate	Regular

Attribute	Sensitivity Index			
	0.0 - 0.25	0.25 - 0.5	0.5 - 0.75	0.75 - 1.0
nearby residents				
Distance to nearest off site building	> 3000 m	1500 to 3000 m	500 to 1500 m	< 500 m
Presence of major transportation routes	Airport	Internal road	Highway	Rail
Land use/ Zoning	Completely remote (Zoning not applicable)	Agricultural	Commercial or industrial	Residential
Critical environments	Not a critical environmental element	Pristine natural areas	Wetlands, flood plains, & preserved areas	Major habitat or endangered or threatened species
Pathway Related				
Distance to nearest surface water	> 8000 m	1500 to 8000 m	500 to 1500 m	< 500 m
Ground water depth	> 30 m	15 to 30 m	5 to 15 m	< 5 m
Type of contamination	No Contamination	Soil Contamination only	Biota contamination	Air, Water or food contamination
Precipitation effectiveness index	Semi arid	Semi humid	Humid	Wet
Susceptibility to erosion & run-off problem	0 - 0.25 not susceptible	0.25 - 0.50 Potential	0.50 - 0.75 Moderate	0.75 - 1 Severe
Waste Related				
Water				
BOD generation level	< 250 mg/l	250- 500 mg/l	500- 1000 mg/l	Above 1000 mg/l
Treatability COD-BOD	< 2.5	2.5 – 3.5	3.5 - 5	Above 5
Treatment	Tertiary	Secondary	Primary	No
Disposal	Land assured & crop perennial	Land seasonal	Stream up to 5km	Riparian
pH	6 - 8	5- 6 or 8 - 9	3 - 5 or 9- 11	<3 or >11
Air				
Industrial mix Fuel	Electricity	Oil	Bagasse	Coal
Control equipment	All including ESP or wet scrubber	Bag filter	Cyclone, Fly ash arrestor	None though required
Stacks heights	As per Act	30	< 30	None though required
Noise at boundary	upto 55 dB(A)	55 to 70 dB(A)	70 to 85 dB(A)	Above 85 dB(A)
Solid Waste				
Industrial mix (waste type)	None	Non-hazardous	Hazardous & Non-hazardous	Hazardous
Treatment -	Recycle/sale	Secured landfill	Low landfill	None though

Attribute	Sensitivity Index			
	0.0 - 0.25	0.25 - 0.5	0.5 - 0.75	0.75 - 1.0
• Non hazardous				required
• Hazardous	Recycle/ Incinerator	Secured landfill	Sanitary landfill	None though required

**Table 4.15: Ranking for Project Site**

Attribute	Attribute Measurement	Sensitivity	Weight-age	Attribute
		Index		Score
<b>Receptor Related</b>				
Population within 500 meters	> 1000	0.75	80	60
Distance to nearest drinking water well, m	< 1000 m	0.25	60	15
Use of site by nearby residents	Regular	0.75	50	37.5
Distance to nearest off site building	< 500 m	0.75	40	30
Land use/ Zoning	Residential	0.75	30	22.5
Presence of transportation routes	Road, Train	0.75	30	22.5
Critical environments	Not a critical environmental element	0.25	30	7.5
<b>Sub total</b>			<b>320</b>	<b>195</b>
<b>Pathway Related</b>				
Distance to nearest surface water	2000 to 8000 m	0.45	55	24.75
Depth of ground water	< 5 m	0.75	45	33.75
Type of contamination	No Contamination	0.25	45	11.25
Precipitation effectiveness index	Humid	0.5	25	12.5
Susceptibility to erosion and runoff problems	Potential	0.25	25	6.25
<b>Sub total</b>			<b>195</b>	<b>88.50</b>
<b>Waste related</b>				
BOD, mg/l	< 250 mg/l	0.10	40	4
PH	6 - 8	0.20	20	4
Treatability (COD:BOD)	About 2.5	0.25	40	10
Treatment	Tertiary	0.25	50	12.5
Disposals	Secured	0.05	50	2.5
<b>Air</b>				
Industrial mix (Fuel)	Electricity	0.1	70	7
Control equipment	Wet scrubber	0.1	50	5
Stacks	As per Act	0.1	50	5
Noise at boundary	55-70	0.1	30	3
<b>Solid Waste</b>				
Waste Type	Non Hazardous	0.5	45	22.5
Facilities	Recycle/sale	0.1	40	4
<b>Sub total</b>			<b>485</b>	<b>79.50</b>
<b>Total</b>				<b>363</b>

### **Ranking**

From the above considerations we have to place our present Project site at appropriate level as per following slabs.

Score 750 to 1000 = Pollution Potential Very High
Score 600 to 750 = Pollution Potential High
Score 450 to 600 = Pollution Potential Moderate
Score 300 to 450 = Pollution Potential Low
<b>Score below 300 = Pollution Potential Very Low</b>

### **Yard-Stick for Ranking**

Since with the methodical working of sensitivity index and weight-ages, the total scope of pollution potential has come to **363**, the site fits into “**LOW**” Pollution Potential.

*Chapter 5*  
*Environmental Monitoring*  
*Programme*

## CHAPTER 5

### ENVIRONMENTAL MONITORING PROGRAMME

#### 5.0 MONITORING PROGRAM:

A monitoring program has been detailed out in which the frequencies of measurement, the planned location of measurement and detailed budgets are listed.

The environmental monitoring program includes following:

- Ambient air quality
- Monitoring of exhausts from DG sets
- Noise level monitoring
- Water quality monitoring
- Wastewater Analysis
- Organic manure Analysis

The MoEF approved laboratory is appointed for the environmental monitoring during construction and operation phases. There will be one record section for recording all the sampling frequencies and analysis reports.

Provision of on-site sensors to monitor PM<sub>10</sub> and PM<sub>2.5</sub> during construction phase. This will help to keep record daily for the air quality. Particularly for wastewater analysis during operation phase onsite sensors for testing of treated waste water shall be provided. But the results shall be checked by MoEF approved laboratory to ascertain the water quality on six monthly basis.

#### 5.1 ENVIRONMENTAL MONITORING PLAN WITH BUDGETARY ALLOCATION:

During construction and operation phase the environmental monitoring shall be done regularly shall be done regularly as per the statutory conditions. The construction period for project is approximately 7 years.

The budgetary allocation for environmental monitoring plan for construction and operation phase of the project is as explained in **Table 5.1 & 5.2**.

**Table 5.1: Environmental Monitoring Plan with Costing During Construction Phase:**

No.	Item	Parameters	Location	Frequency of monitoring	Responsibility of Monitoring and Reporting	Unit cost (Rs.)	Basis of costing	Total Costing (Rs. in Lacs)
1.	Ambient Air Quality	PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO	At major construction Area and entry gate (3 locations)	Quarterly	MOEF/ NABL approved External Laboratory appointed by PP	5500	Unit cost of monitoring x 3 location x 4 samples a year x 7 Years	4.62
	Noise Level	Equivalent Noise Level dB(A)		Daily*	Supervisor( Environmental Cell) appointed by PP			
2.	Maintenance cost for sensors					50000	Unit cost of monitoring X 7 Years	3.50
3.	Water Analysis	Physical, Chemical and Bacteriological Parameters	Municipal Supply	Six Monthly	MOEF/ NABL approved External Laboratory appointed by PP	1500	Unit cost of monitoring x 1 location x 2 samples a year x 7 Years	0.21
4	EMP for Batching plant	Ambient Air Quality	Near Batching plant	Quarterly	MOEF/ NABL approved External Laboratory appointed by PP	5500	Unit cost of monitoring x 1 location x 4 samples a year x 6 Years	1.61
		Noise Level	Near Batching plant	Daily*	Supervisor (Environmental Cell) appointed by PP			
	Exhaust from DG Set	DG stack	Quarterly	MOEF/ NABL approved External Laboratory appointed by PP	1200			
<b>Total</b>								<b>9.94</b>

\*Daily Noise monitoring with the help of Noise Level meter. Set up cost of the noise meter is included in Environmental Management Plan of Construction Phase.

**Overall Responsibility of Coordination, Record keeping of the regular monitoring results by MOEF/ NABL approved External Laboratory is allotted to Manager (Environmental Cell)**

The budgetary allocation for operation phase of the project is given in Table 5.2.

**Table 5.2: Environmental Monitoring Plan with Costing (Per Annum) During Operation Phase**

#	Item	Parameters	Location	Frequency of monitoring	Responsibility of Monitoring and Reporting	Unit cost (Rs.)	Basis of Total costing	Costing (Rs in Lacs /yr)
1.	Ambient Air Quality	PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO	Project site	Quarterly	Online Monitoring sensors	5500	Maintenance cost	0.50
2.	Noise Level	Equivalent Noise level		Quarterly	MOEF/ NABL approved External Laboratory appointed by PP		Unit cost of monitoring X 2 location X 4 samples a year	0.44
3.	Exhaust from DG Set	SPM, SO <sub>2</sub>	Stack of DG sets	Quarterly	MOEF/ NABL approved External Laboratory appointed by PP	1200	Unit cost of monitoring X 2 locations X 4 samples a year	0.10
4.	Water Analysis (for rain water)	Physical, Chemical and Bacteriological Parameters	Rain water Storage tank (After treatment)	Monthly during rainy season	MOEF/ NABL approved External Laboratory appointed by PP	1500	Unit cost of monitoring X 2 locations X 3 samples a year	0.09
5.	Sewage Analysis	pH, BOD, COD, TSS, TDS, O & G	STP	Daily	Online Monitoring sensors	--	--	3.00
				Six monthly	MOEF/ NABL approved External Laboratory appointed by PP	1350	Unit cost of monitoring X 3 locations X 2 samples a year	0.08
6.	OWC Manure	pH, Conductivity, Colour, Bulk Density, Organic Carbon, Total Nitrogen as N, Total Phosphate as	OWC	Quarterly	MOEF/ NABL approved External Laboratory appointed by PP	2000	Unit cost of monitoring X 2 locations X 4 samples a year	0.16

#	Item	Parameters	Location	Frequency of monitoring	Responsibility of Monitoring and Reporting	Unit cost (Rs.)	Basis of Total costing	Costing (Rs in Lacs /yr)
		P2O5, Total Potash as K2O, C:N ratio, Moisture Content						
<b>Total</b>								<b>4.37</b>

**Overall Responsibility of Coordination Record keeping of the regular monitoring results by MOEF/ NABL approved External Laboratory will be allotted to Manager (Environmental Cell)**

*Chapter 6*  
*Additional Studies*

## CHAPTER 6

### ADDITIONAL STUDIES

#### 6. INTRODUCTION:

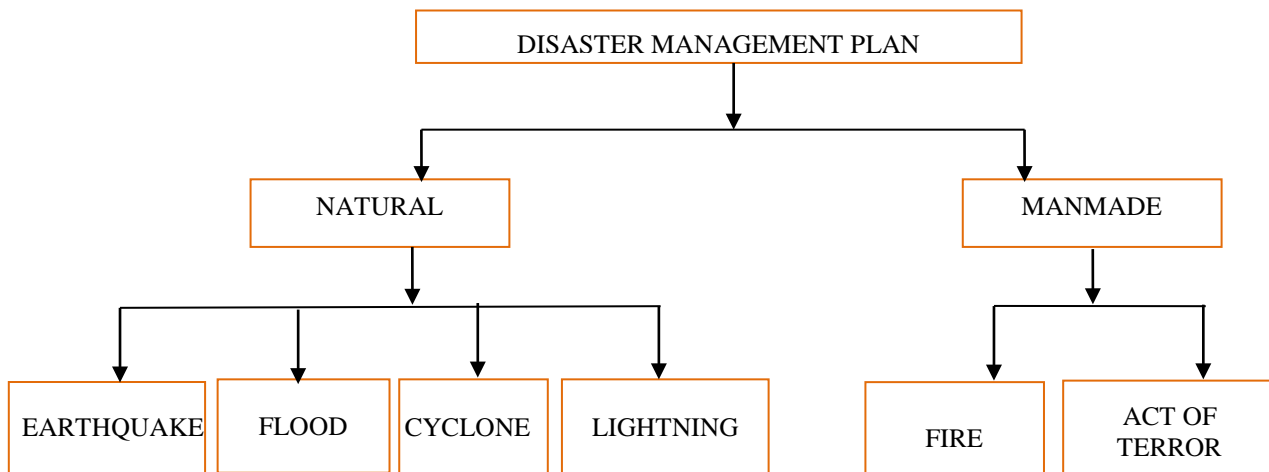
This chapter covers Risk Assessment Studies for the construction and operation phase, the safety precautions that have to be taken during construction phase and the Disaster Management Plan and Emergency Preparedness Plan Onsite and Offsite.

#### 6.1 DISASTER MANAGEMENT PLAN:

Disaster management means a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for;

- Prevention of danger or threat of any disaster.
- Mitigation or reduction of risk of any disaster or its severity or consequences.
- Capacity building.
- Preparedness to deal with any disaster.
- Prompt response to any threatening disaster situation or disaster.
- Assessing the severity or magnitude of effects of any disaster.
- Evacuation, rescue and relief.
- DM plan is intended to provide guidance to all emergency respondents within the department with a general concept of potential emergency assignments before, during, and following emergency situations.

DMP follows the Basic structure as shown in Figure 6.1



**Fig. 6.1: Basic Structure of DMP**

**RED PAGE**  
**EMERGENCY PHONE NUMBER**

<b>FIRE STATION</b>	
Vikhroli Fire Station	022 –2517 0730
<b>POLICE</b>	
Kanjurmarg Police Station	022 – 2578 0753
<b>HOSPITAL/ NURSING HOME</b>	
MCGM Hospital, Valmik Nagar, Bhandup West.	022 – 2594 8588, 022 – 2594 7570
<b>EMERGENCY COORDINATOR</b>	
Responsible persons of The Complex Housing Society	
<b>DISTRICT DISASTER CONTROL ROOM</b>	
Disaster Management Control Room	22 – 22704403

## 6.2 IDENTIFICATION OF HAZARD.

No.	Hazard	Phase of the project			
		Pre -construction	Construction	Operation	Post Operation / Decommissioning
Natural causes	Cyclone		√	√	√
	Earth quake		√	√	√
	Land slide		√	√	√
	Flooding - heavy rain		√	√	√
	Tsunami		√	√	√
Physical hazards	Noise		√	√	√
	Radiation (UV , radioactive materials )		√		
	Extreme temperatures		√		
	Vibration		√	√	√
Biohazards	Bio hazardous waste at hospital			√	
	Epidemics /Communicable diseases by pests ,insects ,rodents etc.		√	√	√
	Toxic marine organism near coastal region		√	√	√
	Animal / snake bites		√	√	√
	Occupational health hazards at industry			√	√
Electrical hazard	Transformer fire /explosion		√	√	√
	Power transmission tower line wire snap /up routing tower	√	√	√	√
	Lightning strike	√	√	√	√
	fires due to Short circuit		√	√	√
	Power outage		√	√	√
Hazardous substances and wastes	AC , Refrigerators , Air conditioners Units fire/ explosion		√	√	
	Accidental release of left over chemicals at closed industrial units				√
	Diesel fire at DG set		√	√	√
	Foul odor at garbage accumulation / dumping sites			√	√
	Hazardous waste uncontrolled disposal - batteries , Asbestos containing Dust, Glass, Plastics, steel		√	√	√
	Hazardous waste uncontrolled disposal - e –waste batteries		√	√	√
	Industrial accidents , toxic gas release , fire /explosion /			√	√
	PNG/LPG / Acetylene gas cylinders fire /explosion		√	√	√
	PNG / fuel pipeline failure fire /explosion	√	√	√	√
	Site decontamination				√
	Smoke in fire , acrid gases in fire , dumping yard			√	√
	Vehicles fuel fire	√	√	√	√

No.	Hazard	Phase of the project			
		Pre -construction	Construction	Operation	Post Operation / Decommissioning
<b>Mechanical</b>	Failure of machinery and equipment		√	√	√
	Lack of safety guards in machines		√	√	√
	Poor maintenance of machinery and equipment		√	√	√
	power driven tools , saws , grinders and abrasive cutting wheels		√	√	√
	scaffolding –fixed and portable failure		√	√	√
	structural failure		√	√	√
	Truck and transport vehicles		√	√	√
<b>Frequent causes of accidents during construction Activity</b>	Being struck by falling object		√	√	√
	Caught in or compressed		√	√	√
	Cranes , winches , hoisting and hauling equipments malfunction		√	√	√
	Dusting		√	√	√
	Electricity ( electrocution )		√	√	√
	Fall from height,		√	√	√
	Fire and explosion -Explosives , Blasting chemicals uncontrolled explosion during demolition / land development		√		√
	Hit by sharp objects		√		√
	Injuries during Handling heavy objects		√		√
	Lack of PPE , housekeeping practices , safety signs		√	√	√
	Oxygen deficiency in confined spaces			√	√
	Paint/ thinner cleaners, pesticides , waste oil , flammable combustible materials fire at store		√	√	√
	Poor illumination		√	√	√
	Slipping on wet surfaces		√		√
	Snapping cables , ropes , chains , slings , hooks , chains		√	√	√
Struck by moving objects	√	√	√	√	
Welding fumes and Radiations		√		√	
<b>Ergonomics &amp; psychosocial</b>	Repetitive and monotonous work, excessive workload , strain injuries		√	√	
	Mental stress , human relations ( aggressive behavior , alcohol and drug abuse , violance )		√	√	√
	Poverty , low wages , lack of education		√	√	√
	Long working hours , shift work , night work , temporary employment		√	√	√

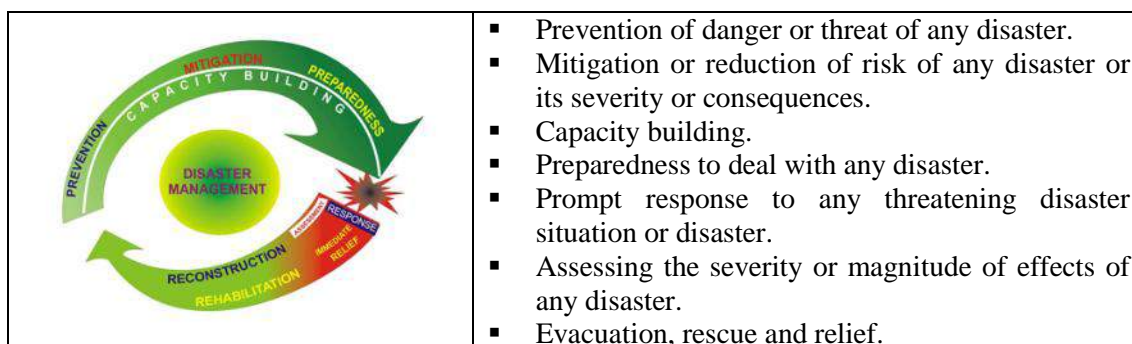
## TOP FIVE HAZMAT/ HAZARDOUS LOCATIONS

1	Transformer area at each building on ground floor
2	Industrial area nearby
3	Internal road used for industrial users vehicles and materials
4	LPG cylinders, refrigerants at flats
5	Diesel at DG sets

### 6.2.1 Purpose of the plan

#### Disaster Management

Disaster management means a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for;



DM plan is intended to provide guidance to all emergency respondents within the department with a general concept of potential emergency assignments before, during, and following emergency situations.

### 6.2.2 Scope

This document is designed to cover the following with dovetailing information for linkage to DMP:

- Emergency prevention;
- Emergency preparedness;
- Emergency mitigation;
- Activities for preparing for and prevention of emergencies such as training and maintenance;
- Overall control and coordination arrangements for emergency response.

### 6.2.3 Authorities, Codes, Policies

#### Authority

- Chief Site Controller.
- The District Disaster Management Authority under the chairmanship of the Collector/ District Magistrate/ Deputy Commissioner.
- The State Disaster Management Authority under the chairmanship of the state Chief minister.

#### Code

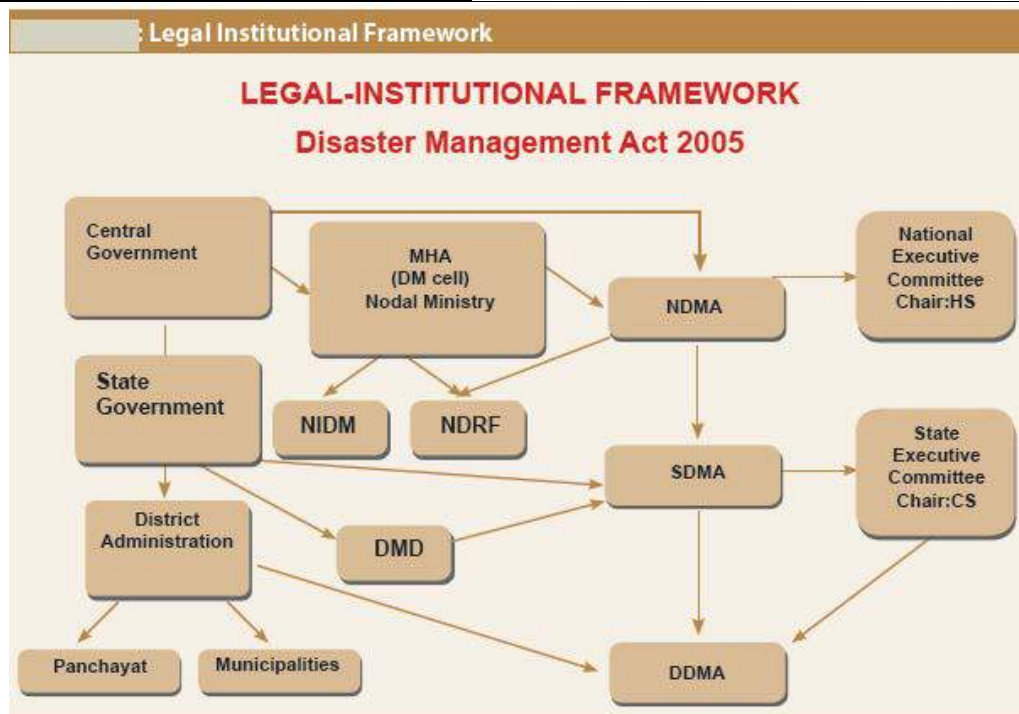
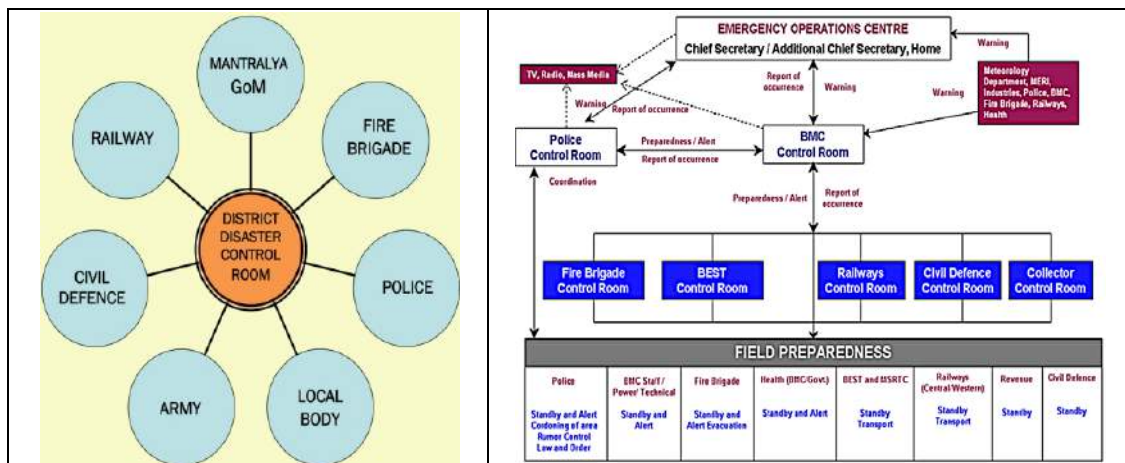
- National Building Code
- D. C. Rules.
- D. P. Rules.

#### Policies

- Withdraw the staff in case of the human life is in peril.

- Any equipment including PPE deployed in the rescue is inspected and replaced as required on the advice of the supplier. No access to the roof can be made in the interim unless an alternative system or kit is used.
- To insure all our rights and obligations under the relevant insurance policy and all losses are claimed
- The entire family would evacuate together as a unit. However, to avoid stampede, confusion and in cases of inadequate transport or limited time, emergency evacuation would be undertaken in the following order - Seriously injured & sick, Children, women & physically challenged, Old and able-bodies.
- In case of fire make sure that all elevators serving the fire floor are recalled to the lobby level (unless the fire is occurring in the lobby) and taken out of service.

### 6.2.4 Institutional Arrangements for Disaster



## 6.2.5 Plan Management

**Table 6.1: Disaster Management**

ACTIVITY	RESPONSIBILITY ON	FREQUENCY
Development & approval.	Project Proponents.	At project proposal stage.
Maintaining.	Fire Department.	Maintaining copies at concerned Dept.
Revision.	Fire Department.	Two years.
Updating.	Fire Department.	By creating – Live page.
Implementation.	Fire Department.	Need bases.
Review.	Fire Department.	Review of SOP, check list yearly.
Rehearsal/ Drill.	Fire Department.	As per following table.

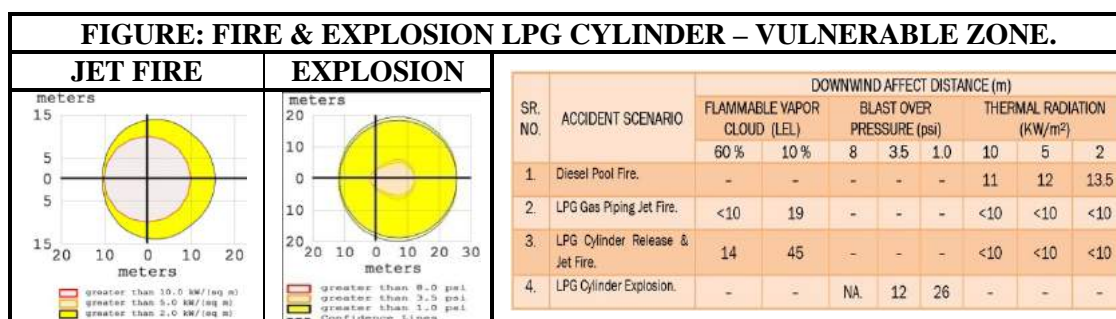
**TABLE 6.2: DMP Rehearsal/ Mock Drill Schedule**

Sr. No.	Activity	Frequency	Remarks
1	Fire Evacuation Exercise.	Annually.	Planned or false alarm.
2	Mock Drill <ul style="list-style-type: none"> <li>▪ Construction Phase</li> <li>▪ Operation Phase</li> </ul>	Quarterly Annually.	Table-top run through with testing Overall Plan Mobilization of Emergency Control Room, Evacuation.
3	Spill.	Annually.	Use of spill kit Practical demo.
4	Flammable Gas release.	Annually.	Awareness program.
5	Over all plan.	Annually.	Table top.
6	Fire Extinguisher.	Half Yearly.	Practical demo.
7	Fall & Rescue.	Half Yearly.	Ground & roof.
8	Fire Drill.	Quarterly.	Hydrant system preparedness.

## 6.3 RISK ASSESSMENT & VULNERABILITY ANALYSIS:

### 6.3.1 Fire and Explosion

#### Vulnerable Zones



**TABLE 6.3: EFFECT OF BLAST PRESSURE WAVE.**

OVER PRESSURE (psi)	EFFECTS
8	Red: Destruction of buildings.
3.5	Orange: Serious injury likely.
1	Yellow: Shatters glass.

**TABLE 6.4: EFFECT OF THERMAL RADIATION.**

RADIATION (KW/M <sup>2</sup> )	EFFECTS	
10	Red:	Potentially lethal within 60 sec).
5	Orange:	2 <sup>nd</sup> degree burns within 60 sec).
2	Yellow:	Pain within 60 sec.

### 6.3.2 Smoke

In the early stages, smoke from the fire will quickly rise into the roof space. The smoke can spread laterally at a velocity of up to 5 m/s. An average person will walk at 1 to 2 m/s and run at 7.5 m/s. Once the building roof space is full, the smoke will start to build down. The rate at which this occurs varies significantly with the nature of the combustibles and building geometry. Although the smoke is made up mainly of entrained air, it can contain sufficient toxic substances and asphyxiates to disorientate and disable within seconds and kill within minutes.

• **Suggested Risk Mitigation Measures:**

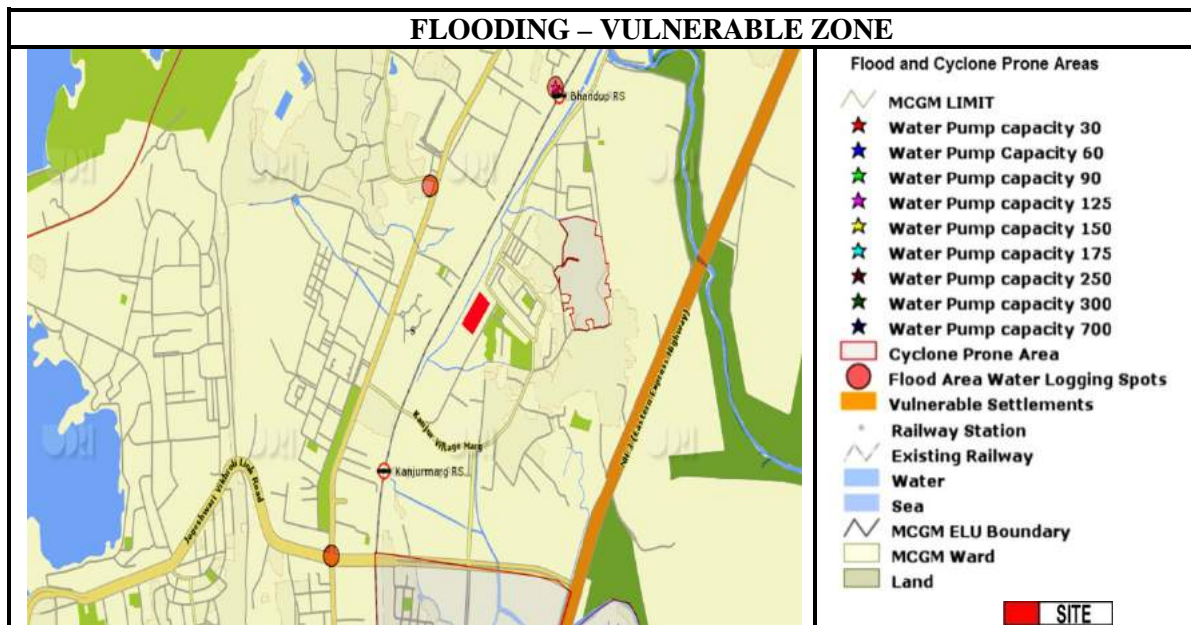
1.	Underground fire water storage tank and overhead fire water tank at terrace
2.	Fire hydrant system (fire water pumps diesel and electric, yard fire hydrants, wet risers, hoses),
3.	
4.	Fire detection and alarm at fire station.
5.	Automatic Smoke detector system
6.	Pressurization system for protection against ingress of smoke in escape routes
7.	Portable Fire extinguishers CO2 , DCP , Foam , sand buckets type ,
8.	Fire doors at basement opening
9.	Leak detector system.
10.	Automatic Water sprinkler system at basement
11.	Two hrs. Fire Resistant Doors at each floor landing lobby , entrance of residential
12.	units, refuge floors , inspection panel doors for electrical shafts
13.	Emergency power DG set ,
14.	Mechanical Ventilation system ,
15.	All entrance and exit gates with at least clearance of 6 meters by width & height.
16.	Paved Court yard to carry the fire tender load
17.	Separate ramp for IN and OUT entry
18.	CCTV security system
19.	Refuge floors
20.	Smoke extraction system
21.	Fire alarm system
22.	Fire drill
23.	Fire stopping cable ducts penetration
24.	Safety signs and symbols
25.	Fire drenchers at refuge floor
26.	Safety training in fire fighting and first aid to construction workers and fire /security
27.	personnel
28.	MOCK drill
29.	Dewatering system for basement
30.	Separate circuit for fire fighting pumps ,fire lifts , escape route lighting &
31.	pressurization system Blowers
32.	Fire check floors
33.	Steel protection against failure collapse of structure in cae of fire
34.	Fire doors 2 hrs fire resistance type

35.	PA system
36.	Fire control room with staff at ground floor
37.	Gas detector HC near flammable fuels , carbon monoxide detectors at parking
38.	Awareness program in DMP for occupants.

### 6.3.3 Flooding

- **Vulnerability**

Heavy rain considering with high tide timing. Construction activity may lead to Water logging or flooding on site or in the surrounding.



- **Impact**

- Flooding spots may affect emergency movements and rescue operations on the approach road for external help
- Direct impact in terms of Injury, fatality, loss of property and long term local and wide spread impacts on the residents.

- **Risk Mitigation**

- The SWD (storm water drain) system designed to cater the total runoff from site and avoid flooding on site or surrounding.
- Planed unpaved RG area on ground to allow natural percolation
- Minimizing the incremental runoff from the site with the help RWH tanks total of capacity 160 KL.
- Internal external storm water Drains design to carry the runoff contributing from plot and adjoining areas.
- Use of screens and silt traps to SWD , Proper maintenance of storm water drainage to ensure discharge of storm water from the site is clear of sediment.
- Awareness program and mock drill
- Provision of Dewatering pump, Life jackets, Floats, Ring buoys , ropes.

### 6.3.4 Cyclone Strike

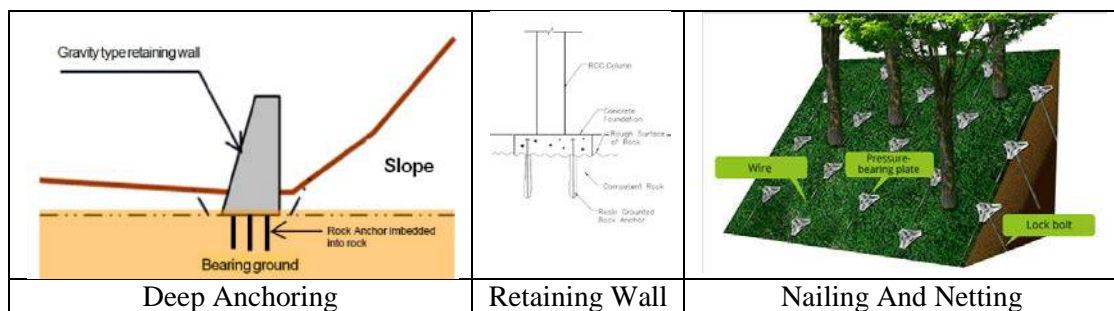
- **Vulnerability**

- Mumbai is considered vulnerable for cyclones.( Source : NIDM , Maharashtra , National risk reduction portal)
- Structures falling outside protection provided by lightning arrestor are vulnerable

- Exceptionally heavy rainfall associated with cyclone causes flooding. Storm surge inundates low-lying areas
- **Impact**
  - Cyclones bring in their wake considerable loss of life and property .
  - Long term wide spread impacts on the residents.
  - Destructive potential to damage lifeline infrastructure such as power and communication towers, hospitals, roads etc. due to high velocity winds .
  - Direct impact in terms of Injury, fatality, loss of property and long term local and wide spread impacts on the residents.
- **Risk Mitigation Measures**
  - Creating awareness program at levels in the concerned community.




### 6.3.5 Land Slide

- **Potential Land Slide Causes**
  - Interference with, or changes to, natural drainage
  - Vibrations caused by earthquake
- **Risk Mitigation Measures**
  - Afforestation and reforestation of the land.
  - Deep anchoring of building foundation into hard rock
  - RCC retaining wall at base of steep slope and RCC compound wall
  - Earth quake resistant design.
  - Natural slope stabilization – through soil nailing and netting



### 6.3.6 Bomb Threat

#### Bomb Threat Evacuation Guide

THREAT	DESCRIPTION	EXPLOSIVE QTY	MIN <sup>1</sup> (m)	MAX <sup>2</sup> (m)
	Pipe Bomb Small	100g	80	575
	Pipe Bomb Medium	500g	100	860
	Pipe Bomb Large	2.5kg	130	1,135
	Briefcase/Suitcase	23kg	185	1,520
	Compact Sedan	230kg	270	1,915

- **Impact**
  - Direct impact on occupants in terms of Injuries, trauma and fatality likely during evacuation. Long term trauma on the residents
  - Stampede during evacuation

- **Risk Mitigation Measures**

Compound wall	Search lights	Signages
CCTV system	Two way radio	Awareness programs
Alarm system	Hand operating siren	Display of police station emergency contact numbers
Portable loudspeaker	Security, watch and ward staff	Mock Drill

### 6.3.7 Earthquake

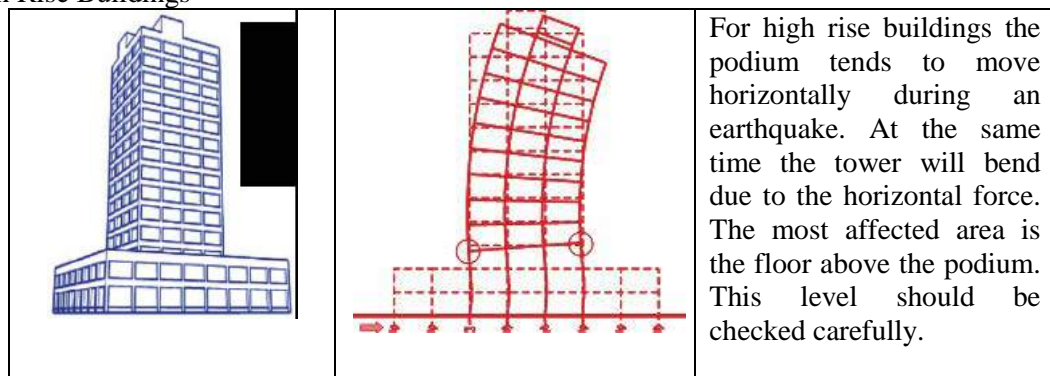
- **Seismic Vulnerability**

Mumbai city falls in seismic zone III which is Moderate Damage Risk Zone (MSK VII). The major earthquakes that have occurred in Mumbai region in the last 400 years are given below.

Intensity (MMI)	Year				
	IV	15 94	1678	1854	1877
IX	1618				
VI	1832	1906			
V	1926	1933	1966		
VIII	1951				

- **Impact (Unmitigated Risk)**

- Direct impact in terms of Injury, fatality, stampede during evacuation, loss of property and long term local and wide spread impacts on the residents.
- High Rise Buildings



**EARTH QUAKE EFFECT ON HIGH RISE BUILDING.**

- In Zone III, (moderate risk zone) earthquakes of higher intensity may be felt. Earthquakes that frightens everyone, making it difficult for people to stand. Even people in moving vehicles may feel such quakes. Structures/buildings of good design and construction suffer slight damage, while poorly designed/ built ones suffer considerable damages. (\*Intensity: VII).\* Intensity is here considered a classification of the severity of the ground shaking on the basis of observed effects in a limited area and is measured in the MSK Scale ranging from I to XII

- **Risk Mitigation Measures**

- Earth quake resistant design
- SOP for Evacuation
- Awareness programs for residents

- Mock drill

\* Adopted From National Disaster Management Guidelines, Management of Earthquakes, Seismic Zone Map of India (IS: 1893, 2002)}

#### 6.4 Classification Of Emergency/ Disaster

**TABLE 6.5: Disaster Category**

SN.	INCIDENCE	VULNERABILITY						CATEGORY/ LEVEL OF EMERGENCY
		Personnel			Property			
		Before Emergency	During Emergency	After Emergency	Before Emergency	During Emergency	After Emergency	
1.	Fall of structure.	Low.	High.	Moderate.	Low.	High.	Low.	1
2.	Trapped in lift.	Low.	Moderate.	Moderate.	Low.	Low.	Low.	1
3.	Fire/ Explosion.	Low.	High.	Moderate.	Low.	High.	Low.	3
4.	Bomb threat.	Low.	High.	Moderate.	Low.	High.	Low.	3
5.	Flooding.	Low.	Low.	Low.	Low.	Low.	Low.	1
6.	Cyclone.	Low.	High.	Low.	Low.	High.	Low.	3
7.	Earthquake.*	Low.	High.	Moderate.	Low.	High.	Moderate.	3

Where;

Category 1:	Events can be controlled by Fire/ Security department with local resources.
Category 2:	Events action plan requires additional help from local fire brigade and evacuation.
Category 3:	Events action plan requires mobilization of external agencies, resources and evacuation.

#### 6.5 MCA/ Worst Possible Scenario

The major concern of the assessment is to identify the activities falling in a matrix of high & low frequencies at which the failures occur and the degree of its impact. The high frequency, low impact activities can be managed by regular maintenance *i.e.*, LDAR (Leak detection and repair) programmes. Whereas, the low frequency, high impact activities (accidents) are of major concern in terms of risk assessment. As the frequency is low, often the required precautions are not realized or maintained. However, the risk assessment identifies the areas of major concerns, which require additional preventive measures; likely consequence distances considering domino effects, which will give the possible casualties and ecological loss in case of accidents.

This risk assessment exercise for the site under consideration establishes the significance of impacts first and proceeds to delineate the associated mitigation measures. So the significance here reflects the “worst-case scenario” before mitigation is applied, and therefore provides an understanding of what may happen if mitigation fails or is not as effective as predicted.

#### 6.6 Preventive Measures

##### • Safety Inspection

- Regular inspection of equipment and systems mandated by Chief Fire Officer in the NOC granted.

##### • Approved Plan

- Scrupulous adherence to approved plan of building.
- Protection of system put in place to handle disaster.

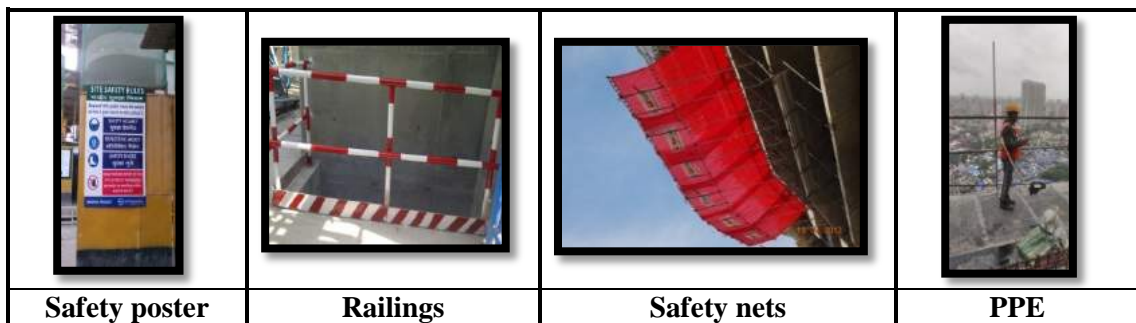
##### • Maintenance Of Equipment And Systems

- Preventive maintenance of following systems
- Fire hydrant system.

- Sprinkler system.
- Detectors calibration.
- CCTV system.
- Emergency power system.
- Rescue equipments.
- Emergency communication systems.

**• Precautions and Preparedness During Construction Phase**

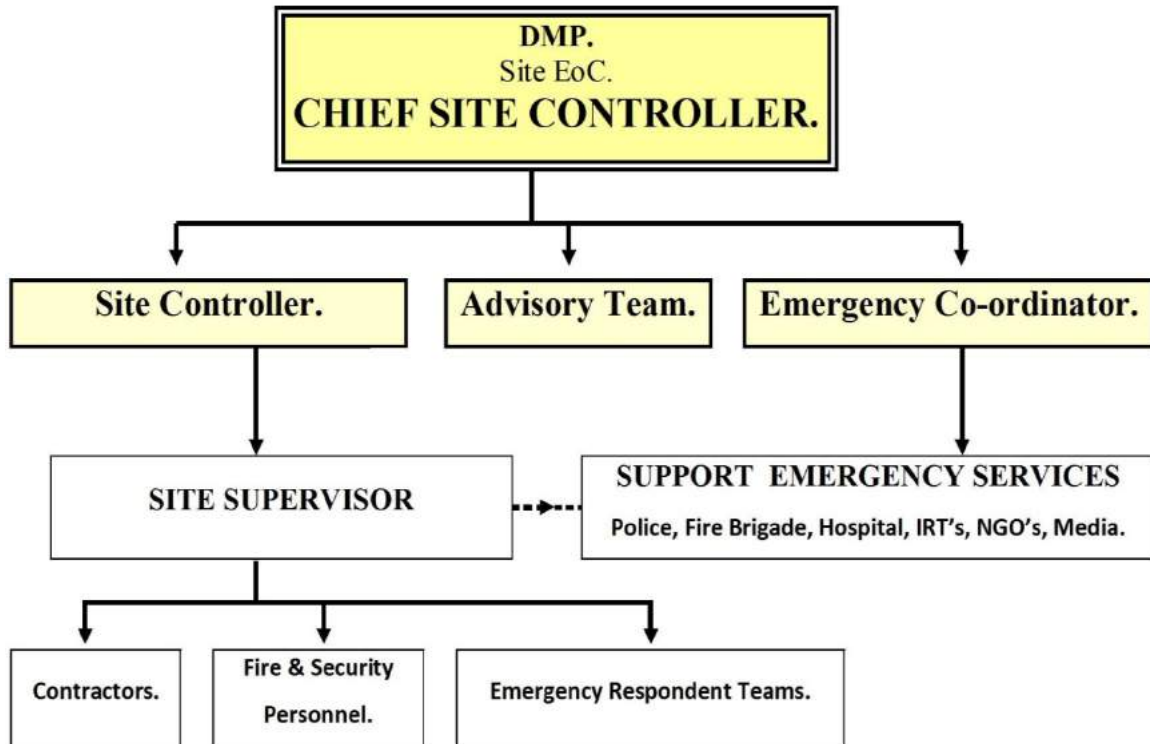
- Environment, Health & Safety Policy communication to all the employees & workmen through display boards, Posters, EHS Meetings & Pep Talk & etc.
- Appointment of OHSAS certified contactor
- Implementation of OHSAS 18001 during Construction work



- Observe "No Smoking" rule
- Periodical maintenance of safety construction machinery ,equipments by certified, competent person at regular intervals.
- Work Permit Systems.
- Use of Proper PPE's like Helmet, Goggles, boot & hand gloves etc
- Use of safety nets while working from heights, use of life line
- Safety trainings/ safety checks/ and use of PPE
- Storm water drain channel of adequate capacity
- Earthquake Resistant structure
- Maintaining obstruction free walkways and doorways
- Proper storage and handling of any potentially hazardous chemicals, gases.
- Educating / Training of all concerned on adoption of safe practices at construction site.
- Documentation, investigation of every dangerous occurrence and required notifications and reports to the appropriate authorities.

**6.6.1 Hierarchy of plans:**





## 6.6.2 Mitigation & Preparedness

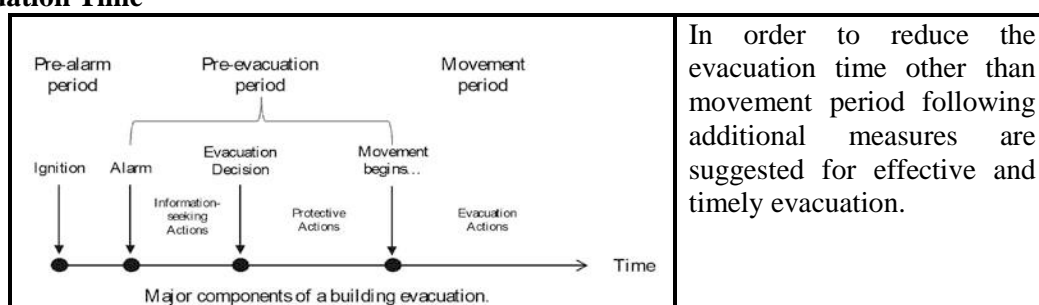
### • Risk Mitigation Measures

- **DMP (Operating Manual):** Incidents such as Fire/ Explosion, Flooding, Cyclone, Bomb Threat, Earthquake; either single or in combination are having potential for serious consequences/ disaster. In conclusion the incidence of “Earth Quake & Evacuation” the emergency level three incidence is considered as MCA/ Worst Possible Scenario. In view of these considerations this DMP operating manual is prepared. It details what measures are needed to decrease the likelihood of emergencies occurring and the associated impacts on people, installation and the environment. It also deals with measures that can reduce the impact of incidents.
- **Early warning system:** Fire detection and alarm at fire Control room system, Automatic Smoke detector system especially at lift machine room & electric meter room, Auto water sprinkler with Thermal Detector. CO, LPG /PNG leak detector system. CCTV security system
- **Fire protection and fire fighting:** Fire water Underground & Overhead storage tank, Fire hydrant system (fire water pumps diesel and electric, fire hydrants, wet risers, hoses), Portable Fire extinguishers CO<sub>2</sub>, DCP, Foam , sand buckets type , Automatic Water sprinkler system, Emergency power DG set, Mechanical Ventilation system ,Two hrs. Fire Resistant Doors, Fire lift, pressurized Fire chute.
- **Emergency communication:** Ensure effective emergency communication during evacuation to avoid panic and stampede. Siren / bell with clearly defined emergency alarm code for fire, evacuation and all clear. Intercoms & Cell phones, Two way radio, Hand held loud speaker, Efficient Public address system for entire building with standard Building management system. Voice evacuation system will be additional advantage.
- **Signages:** Signs at lift landings, Floor numbering signs, Stair and elevator identification signs, Stair reentry signs, Floor layout plans, Escape route near each change of direction in the route, Assembly point, Emergency Control Centre (ECC), First aid, Danger at electrical rooms, Exit signs at each exit door, escape route direction signs.
- **Search & Rescue Kit:** Torch with battery, Whistles, Ropes-Nylon (800 m) ,Ladder ,Search light ,Two way radio , Manual Siren ,Metal Cutting set , Hand tools (Axe, shovel) , Portable

Mega Phone, Barricade tape, Flags, First Aid Box, signages, Stretcher, Portable Gas Detector, Reflective jackets.

- **Personnel Protective Equipments (PPE):** Safety Helmet, Safety Goggles, Safety Shoes/Boots, Masks, SCBA, Life jackets Full Body Harness
- **Flood:** Dewatering pump Life jackets, Floats, Ring buoys, flood contour map.
- **Cyclone:** Provision of shelter
- **DMP Management:** Copy of DMP at ECC, Fire Audit, Structural audit, Mock drill , fire drill, Periodic DMP awareness programs, Construction workers , utility operators , Watch & Ward ,fire & security personnel safety training , Tenement induction process, Mock drill , and Fire drill.
- **DMP Organization:** DMP organization positions are defined for installation specific requirements such as building, school, hospital, hotel, Mall. Roles and responsibilities defined for each position.
- **SOP's (Standard Operating Procedures):** SOP's are prepared for coordination of all emergency respondents and effective disaster management.
- **DMP cost:** Provision / budgetary support towards DMP Capital cost and per annum towards DMP O&M cost for the effective implementation.

○ **Evacuation Time**



- **Pre Alarm Period**
  - Automatic smoke detection at lift machine room & electric meter room.
  - Round the clock trained & fire & safety , watch & ward staff
- **Pre Evacuation Period**
  - Periodic Safety Awareness programs.
- **Movement Period**
  - Mock drill in consultation with fire brigade.
  - Efficient PA System for entire building with standard Building management system.
  - Voice evacuation system will be additional advantage

**6.6.3 Preparedness**

• **Warning System**

- Nodal agencies for early warning of different natural hazards

Disasters	Agencies
Earthquakes	IMD, MERI
Floods	Meteorology Department, Irrigation Department Central Water Commission
Cyclones	IMD( Indian Meteorological Department)
Epidemics	Public Health Department
Road accidents	Police
Industrial & Chemical Accidents	Industry, Police
Fires	Fire Brigade, Police

Tsunami	Indian National Centre for Oceanic Information Services
Landslides	Geological Survey of India

- Warning of fire or emergency received at fire &/ security department by fire call point, CCTV panel, by watch ward staff, leak detector, smoke detector, intercom in flats, mobile, bell in lifts, hooters at control room.
- Two way communication to emergency respondents by walk, talky.
- Warning to occupants by PAS/ hand held loudspeaker and Siren electrical/ hand operated located at strategic location and operated from at ECC by fire &/ security department.

● **Siren Code**

**Emergency Level 1 : One continuous wailing sound of 30 seconds & 2 duration. Repeat after a minute.**

**Emergency Level 3 : Three interrupted wailing sounds of 15 seconds duration each with a gap of 30 seconds. Repeat after a minute gap.**

**All Clear : Long whistle of one minute duration.**

● **Fire Protection System:**

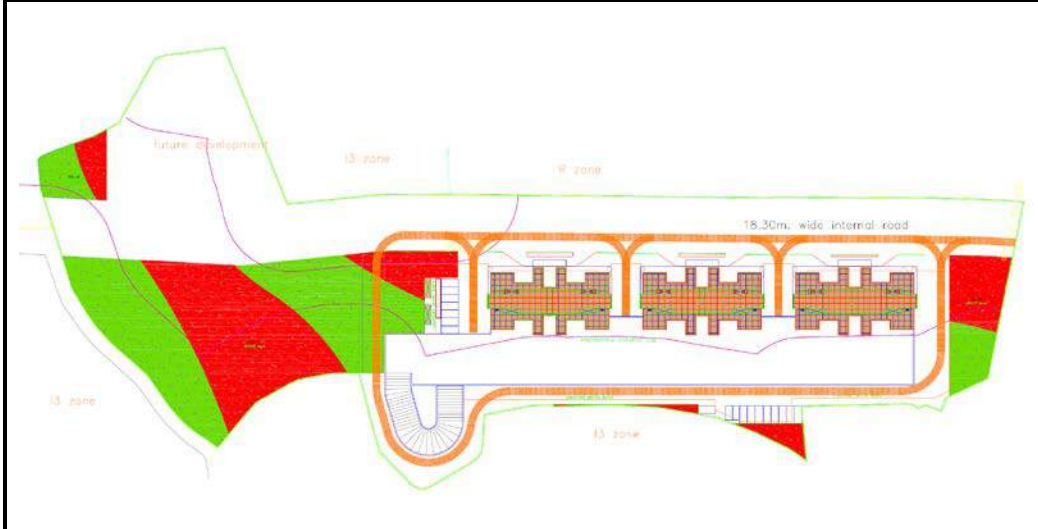
Building wise Fire protection system is given in the Building fact sheets

● **FIRE ENGINE MOVEMENT LAYOUT**

**FIRE ENGINE MOVEMENT –BUILDING 1 WING A , B , C , D & E**



## FIRE ENGINE MOVEMENT –BUIDING 2 WING I, J & K



- FIRE STATION RESPONSE**

### VIKHROLI FIRE STATION RESPONSE



- Emergency Control Centre**

#### EMERGENCY CONTROL CENTER/ ROOM

Emergency	CONSTRUCTION PHASE	OPERATION PHASE
Level 1	Site Office.	Security Office, Reception.
Level 2	Near Site Office.	Security Office, Reception.
Level 3	Near Site Office.	Society Office.

- **ECC equipped with following items;**

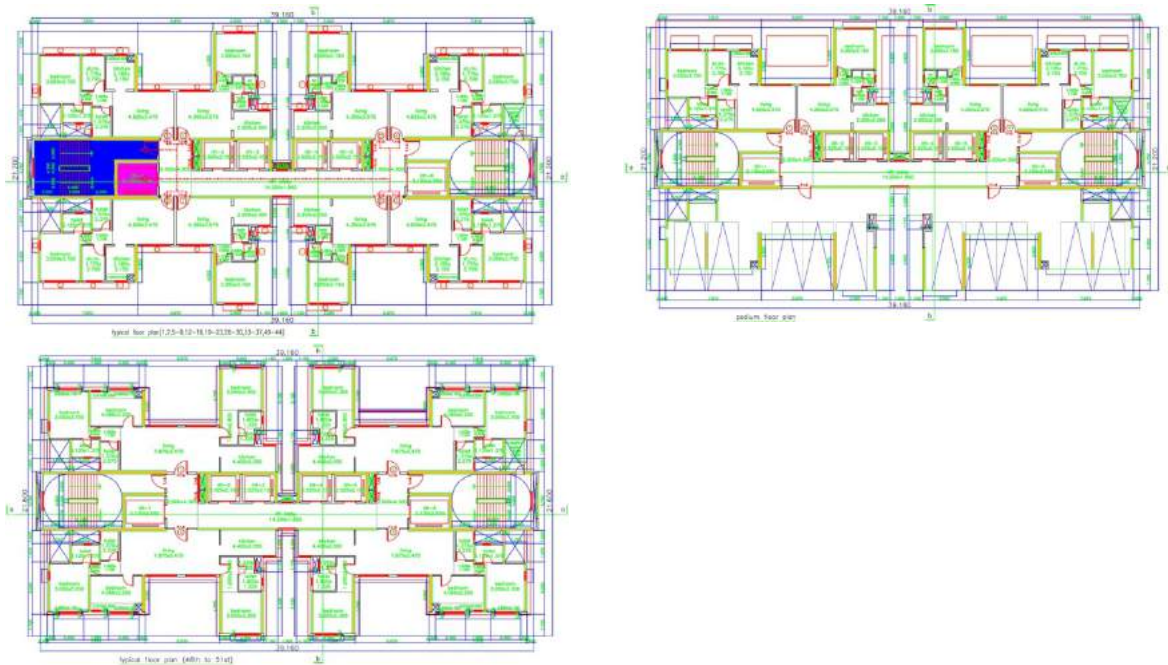
- Copy of “DMP” and Technical Manuals on operating, maintenance procedures.
- Telephone (Internal and External).
- Networked Computer Systems, Note pads, pencil etc.
- Personal Protective Equipments (PPE). Safety helmets ,Safety shoes, Safety goggles, Reflective jackets, SCBA , Full Body Harness
- Public Address System (PAS).
- Control panels & layout drawing for CCTV, fire hydrant and water sprinkler, Fire Alarm, ventilation, electrical single line diagram.
- First aid box , stretcher Hand tools (Axe, shovel),Mega Phone, Manual siren ,Ring buoys, Explosive meter Search light/ torch, Spare Portable fire extinguishers Essential keys and access cards or the location details of the same.
- Television sets tuned to major news channels.
- Conference and Press Rooms and Video Conferencing Setup.
- Uninterruptible Power Supplies with Generators.
- Pantry, Dormitory and Toilet facilities.

- **Life Saving Measures (Fire Safety Plan)**

- Individual floor layouts
- Refuge floors and area
- Number and kind of exits
- Occupant load
- Evacuation diagram
- Assembly point
- Site surroundings map

#### 6.6.4 Individual Floor Layouts

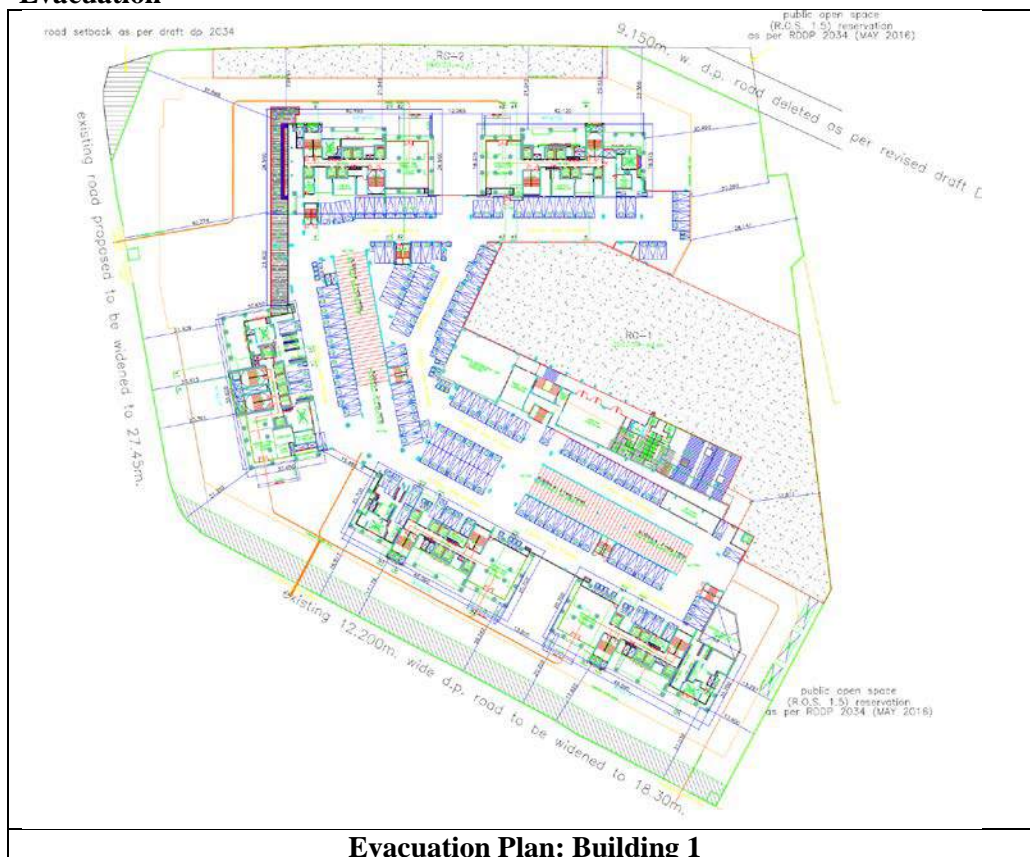




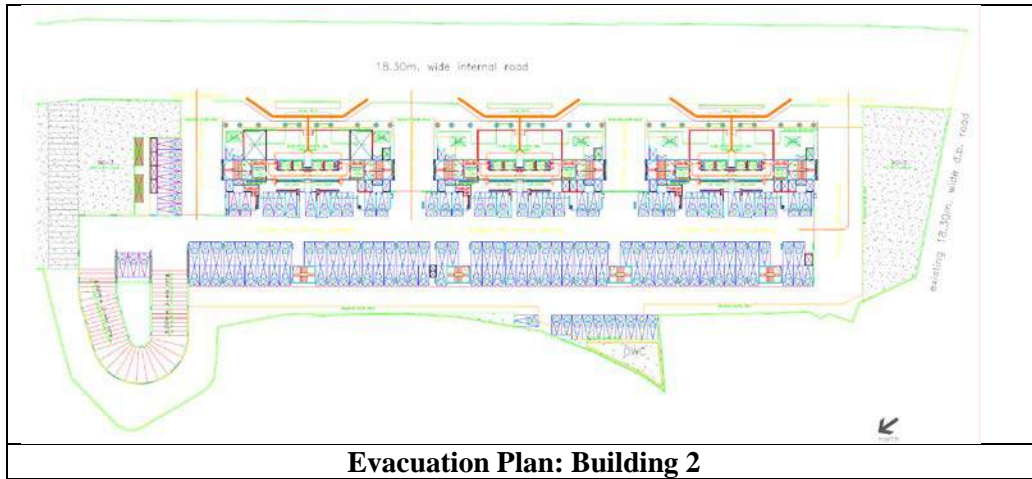
### 6.6.5 The Refuge Area equipped with following items;

- Copies of the DMP – Operating Manual
- First – Aid Kit.
- Communication equipment
- Requisite stationary items.
- Drinking water facility.


### 6.6.6 Evacuation



**Evacuation Plan: Building 1**



- **Assembly Point**

	ASSEMBLY POINT		
	Emergency Level	Construction Phase	Operation Phase
	Emergency Level 1	Site Office.	Security office
	Emergency Level 2	Near Site Office.	Refuge floor
	Emergency Level 3	Near Site Office.	Assembly point

- **Evacuation Time - Parking**

During emergency evacuation, the evacuation of all Podium levels, all Basement levels and Ground level will happen simultaneously (i.e. Upper Basement to Ground, Podium P2 to P1, P1 to Ground and so on). However this is the worst scenario in terms of obstruction by one vehicle to other.

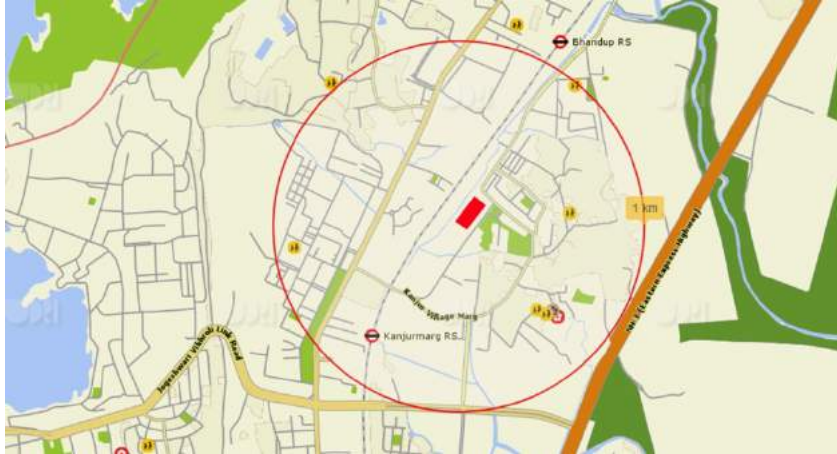
- **Assumptions**

- Occupants load as per NBC
- To ensure that all the occupants of a building could enter the staircase in 2.5 minutes
- Occupants are uniformly distributed over the floor area and so the time required for first person to enter staircase will be negligible
- Horizontal travel time 33 or 50 m /min if building is sprinkled or not
- Occupants per exit width as per NBC 2005 table 21
- Discharge capacity limiting evacuation condition is assumed out of congestion, free walk and discharge capacity limiting.

**Note:** One can imagine that many of the occupants would be unwilling or unable to walk down the large number of flight of stairs and may remain indoor at refuge floor and additional evacuation time will be required.

**The time delay to start evacuation represent large part of the total evacuation time and regular MOCK drills, training, awareness programs are essential to reduce the same.**

- **Site Surroundings**



- **Decontamination Support**

- Sources of contamination such as accidental oil spills e.g. Diesel, transformer oil; paint brush washings during construction phase and floor washing collected during sprinkler operation are likely.
- The measures for handling decontamination include spill control kit for oils and Drench tank water for collection of contaminated water for checking before safe disposal.

- **Special Population Support**

Special consideration during evacuation required construction workers families at site during construction phase and differently abled persons during operational phase.

- **Training & Capacity Building**

- **Orientation Exercise:** Involves bringing together the people who are involved in the emergency plan, or part of the emergency plan and orientate them to it. It can be useful in inducting new members to the Team, imparting awareness among persons having no previous experience of the plan, a new plan or new staff.

- **Drills:** These test a single emergency response function and involve an actual field response. Drills are generally practiced or tested under realistic conditions.

**Table – Top Exercise:** This is a means to undertake some problem solving and team building and familiarizes team members with what they might need to do as an emergency scenario unfolds. It is very useful in developing what ifs and responses.

- **Functional Drill:** This is used to assess the allocation of resources and manpower. It also evaluates the communication between different groups and assesses the adequacy of current procedures and policies. The exercise is a simulation and while it covers the complete extent of the deployment of resources at the simulated level it does not go beyond the exercise room.

- **Mock Drill/ Full Scale Exercise:** Evaluates the operational capability of the system in an interactive manner, allows for coordination of information, communication capabilities to be explored, inter-tenant and tenant landlord cooperation to be explored and for negotiation skills to be deployed. Full scale exercises will have a number of observers and invitation to the relevant government agency to attend. Observations will be recorded and actions will be implemented based on learning points that are discussed at the review session. Where necessary.

**Note: Real Emergencies During Exercises**

There is always the potential for a real emergency to arise during the conduct of a drill. This situation calls for an immediate cessation of the exercise/drill and Emergency respondents should stand by for further instructions 1.

**6.7 RESPONSE PLAN**

- **Disaster Management Organization**

<b>DMP ORGANISATION</b>			
<b>Sr. No.</b>	<b>Designation for DMP</b>	<b>Construction Phase</b>	<b>Housing Society Operation Phase</b>
		Designation /Agency /Group	Designation /Agency /Group
<b>1</b>	<b>Site Main Controller</b>	Project manager	Chairman of CHS
<b>2</b>	<b>Site Incident Controller</b>	<b>Site manager</b>	Secretary of CHS
<b>3</b>	<b>Emergency Coordinator</b>	EHS Manager	Manager CHS
<b>4</b>	<b>Supervisor</b>	Site Supervisor Contractor supervisor	Fire & Safety staff
<b>5.1</b>	<b>SAR Team</b>	Security guards ,First aiders , Fire fighters, staff & workmen, External IRTS	watch & ward personnel, Police, fire brigade; Agencies sent by district disaster control room such as Civil defense, NDRF, medical team, home guard etc.
<b>5.2</b>	<b>Engineering Team</b>	Electricians , operators	Pump operators Electricians
<b>5.3</b>	<b>Advisory Team</b>	Architect , Consultants	Active past committee members
<b>6</b>	<b>All others at site</b>	Contractors, Staff, Workers, Visitors, Drivers, construction workers colony	Residents Occupants Visitors

- **Roles And Responsibilities**

Roles and responsibilities for all the emergency respondents are detailed in respective SOP's..

- **Emergency Response Guide**

### Emergency Response Guide Table

Sr. No.	Emergency Respondent →	Chief Site	Site Incident	Emergency	Supervisor	Emergency Response Teams	All Other Site Personnel
	↓ Hazards	Controller	Controller.	Co-Ordinator			
1.	FALL OF STRUCTURE.	Task 3,8,16,17,20.	Task 1,2,4,13,14,15,19,21	Task 5,6,7,9,18.	Task 11.	Task 10.	Task 12.
2.	TRAPPED IN LIFT.	Task 3,8,16,17,20.	Task 1,2,19,21.	Task 7,18.	Task 11.	Task 10.	-
3.	FIRE/ EXPLOSION.	Task 3,8,16,17,20.	Task 1,2,4,13,14,15,19,21	Task 5,6,7,9,18.	Task 11.	Task 10.	Task 12.
4.	BOMB THREAT.	Task 3,8,16,17,20.	Task 1,2,4,13,14,15,19,21	Task 5,6,7,9,18.	Task 11.	Task 10.	Task 12.
5.	FLOODING.	Task 3,8,16,17,20.	Task 1,2,4,13,14,15,19,21	Task 5,6,7,9,18.	Task 11.	Task 10.	Task 12.
6.	CYCLONE.	Task 3,8,16,17,20.	Task 1,2,4,13,14,15,19,21	Task 5,6,7,9,18.	Task 11.	Task 10.	Task 12.
7.	EARTHQUAKE.*	Task 3,8,16,17,20.	Task 1,2,4,13,14,15,19,21	Task 5,6,7,9,18.	Task 11.	Task 10.	Task 12.

Where the numerical indicate task number detailed in the following table.

DMP FLOW CHART	N	Task
<pre> graph TD     Start[EMERGENCY OCCURS] --&gt; MD[Manual Detection]     Start --&gt; ES[Equipment/ Sensor Detection]     MD --&gt; SA[Site alarm activated at Fire Control Room/ Security Department]     ES --&gt; SA     SA --&gt; D1{Fire &amp; Security Department to verify fire alarm activated, LEVEL, if emergency determined. Is need to activate emergency three alarm?}     D1 -- Yes --&gt; EER[External emergency respondents - Fire Brigade, Police informed]     D1 -- No --&gt; IIR[Internal resources activated to attend emergency, Fire &amp; Security Dept. activates emergency control operations, Site Incident Controller take over the control of operations, informs Chief Site Controller.]     IIR --&gt; D2{Emergency under control?}     D2 -- No --&gt; CSCE[Chief Site Controller assess the potential for off-site emergency event, District Disaster Control Room informed, take evacuation decision]     CSCE --&gt; CSCE_S[Chief Site Controller activates institutional emergency respondents service]     CSCE_S --&gt; EER_A[External emergency respondents, IRT's arrive at site and take over the control of operations]     EER_A --&gt; EEO[Emergency Co-Ordinator to co-ordinate the operations.]     EEO --&gt; EUC[Emergency under control]     EUC --&gt; EER_C[External emergency respondents services involvement complete]     D2 -- Yes --&gt; CSCE_I[Chief Site Controller activates Institutional Emergency Respondents, informs District Disaster Control Room]     CSCE_I --&gt; D3{Emergency under control?}     D3 -- No --&gt; CSCE_I     D3 -- Yes --&gt; ACS[All clear signal]     ACS --&gt; R[Recovery, waste control, debriefing, investigations, reporting, review &amp; DMP revision]                     </pre>	1	Raising the site emergency alarm.
	2	Inform police, Fire brigade and Mobilizing site emergency services.
	3	Determination of level of emergency, help from Advisory team, if required.
	4	Mobilizing ECC and AP.
	5	Mobilizing Emergency Respondent teams, IRT's, NGO's.
	6	Mobilize resources for emergency response teams
	7	Ensure Co -ordination between site emergency services.
	8	Review situation , assess the emergency level , consult advisory team , take external help if required , inform district disaster control cell , and declare off site emergency.
	9	Evacuation
	10	Ensure operations as per SOP
	11	Ensure proper coordination between all IRTs
	12	Head count at assembly point
	13	Feed back of head count to SAR
	14	Ensure traffic , law & Order and crowd control
	15	Withdraw the staff if the human life is in peril.
	16	Ensure any conflict resolved at the earliest
	17	Authorize release of information to the media
	18	Release of authorized information to the media.
	19	Emergency under control , inform to CSC
	20	Authorize to raise 'All Clear ' alarm
	21	Raise 'All Clear ' alarm

- **Rescue And Relief Operation**

The priority of the SAR will be to:

- Protect life;
- Maintain safety;
- Protect assets;
- Ensure security; and
- Maintain or return business continuity.

- **Response Activities Specific To Disaster**

SOP's specific to disaster enclosed to this report.

- **Requisition Of Services/ Assistance**

Emergency co-ordinator to establish communication to district disaster control room for requisition of services/ assistance of IRTs /NGO's.

## 6.8 RECOVERY

- **Recovery**

- Deactivation of the ECC once the recovery operations are over as declared by chief site controller.
- Replenishment of used stocks of firefighting materials
- Follow up of injured at hospital.
- Record keeping
- Clean and rehabilitate the disaster site.
- Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.
- Contact insurers.
- Analyze the disaster and improve the plan in the light of experience.

- **Medical**

- Information and help desk at site.
- Informing the relatives of the injured.
- Follow up of injured at hospital, if any.

- **Damage Assessment for insurance survey with following objectives.**

- Reduce the loss in terms of assets if a disaster happens; and
- Reduce lost income in the event that the facility becomes unavailable or partly unavailable.

## 6.9 FINANCIAL ARRANGEMENTS

- **Inventory of Resources**

Building wise inventory of DMP resources are detailed in the individual Building fact sheets

- **DMP Cost**

Cost estimate is indicative may change as per market conditions.

No.	Description	Particulars	Rs. In Lacs
1	Excavation/ Debris and Construction Waste	Barricades, Shore Pilling, Protective systems and Equipments	40.0
2	Safety Tools and Lifting Crane/ Material Hoists / Passenger lift/Portable electrical equipment/ Pressure vessel (working in hot air section)	Safety guard, Safety Belts, personnel, Harnesses, First aid kits etc., Approved Electrical safety personnel, safety measures for batching plant	78.5
3	Scaffolding	PPE	7.5
4	DMP Team	Allotting safety team	5.5

<b>TOTAL (INR)</b>	<b>131.5</b>
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<b>No.</b>	<b>Description</b>		<b>Cost Per Annum (Rs. In Lacs)</b>
1	Flood	Emergency Dewatering cutter pump	4.42
		sump pump in basement	15.45
		SWD system with oil and grease traps	18.93
2	Lightning	Lightning Arrester	6.3
3	Fire	DG. Set	153
		Fire Fighting System with (with All pumps) Wet Risers, External Hydrant System, Sprinkler System, Drenchers (@ Fire break Floor& Podiums) Fire Extinguishers, Fire Buckets, Signages & FHC doors	1644.48
		Fire Elevators (Service)	95
		Fire Alarm System	155
4	Ventilation	Mechanical Ventilation System	150
5	Rescue equipments	Steel ropes, ropes, chains, harness, torches, radium signal & symbol sign boards, walky talky, dust masks, tyres, Hammer, shovel, spade, mud pan etc.	12
		Wheel chairs, Stretchers, First aid box containing general medicines and equipments, harness etc.	0.5
6	Medical Equipments	for emergencies	0.5
7	CCTV & PA system	Installation cost for CCTV and Hooters and other PA system	80
<b>TOTAL (INR)</b>			<b>2338.07</b>

***Chapter 7***  
***Project Benefits***

## CHAPTER 7 PROJECT BENEFITS

This chapter includes benefits accruing to the locality, neighborhood, region and nation as a whole. The foremost benefits are listed as follows;

<b>A</b>	<b>SOCIO ECONOMY</b>
1.	Main vision of the project is to offer residential development within gated community, setting a new standard of living
2.	The project offers EWS housing for economically weaker section of society which will facilitate living conditions for this section.
3.	The project envisages bringing various other communities to the area and thereby enabling rapid enhancement of an urban environment.
4.	This project has generated temporary employment to many unskilled and semi-skilled laborers in nearby areas for construction and other related works
5.	Employment opportunities for local people in the operational phase as security guard, driver, maid/servant, sweeper, gardener etc
<b>B</b>	<b>TREE PLANTATION AND LANDSCAPING</b>
1.	Landscaping shall reduce energy use by reducing heat island effect
2.	Pleasing aesthetic and visual impact
3.	Provide tolerance to air pollutants like PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> and CO
4.	Trees act as natural noise barriers
<b>C</b>	<b>WATER SAVING AND WASTE WATER MANAGEMENT</b>
1.	By using treated sewage for flushing & gardening and minimizing the requirement of fresh water from M.C.G.M.
<b>D</b>	<b>ENERGY SAVING</b>
1.	Use of renewable energy conservation measures like provision of Solar PV panels and solar water heating system
2.	Various other energy saving measures shall ensure saving in energy
<b>E</b>	<b>SOLID AND HAZARDOUS WASTE MANAGEMENT</b>
1.	Waste Minimization, reuse/ recycling and treatment of biodegradable garbage and its use as manure shall ensure handover of only the non-recyclable garbage to the local authorities thereby reducing the load on dumping grounds of local authority.
<b>F</b>	<b>ENVIRONMENTAL MONITORING &amp; ENVIRONMENTAL MANAGEMENT PLAN</b>
1.	Environmental Management Plan and its judicious implementation with operation and maintenance of environmental facilities and proper budgetary allocations for the same will ensure a long term benefits to the project and surrounding areas.

## *Chapter 8*

# *Environmental Management Plan*

## CHAPTER 8

### ENVIRONMENTAL MANAGEMENT PLAN

#### 8.0 INTRODUCTION:

Environmental Management Plan (EMP) deals with evaluation of significance of unavoidable or residual impacts following mitigation and the proposed monitoring.

#### 8.1 OVERVIEW:

The Environmental Management Plan (EMP) is a site specific plan developed to ensure that the project is implemented in an environmentally sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental risks arising from the project and take appropriate actions to properly manage that risk. EMP also ensures the project implementation is carried out in accordance with the design by taking appropriate mitigative actions to reduce adverse environmental impacts during its life cycle. The plan outlines existing and potential problems that may adversely impact the environment and recommends corrective measures where required. Also, the plan outlines roles and responsibility of the key personnel and contractors who are charged with the responsibility to manage the site.

#### 8.2 ENVIRONMENT MANAGEMENT SYSTEMS:

The following components will be part of the EMS:

- Environmental Policy
- Objectives & Targets
- Structure and Responsibility
- Emergency Planning
- Environmental Monitoring Program
- Operation of and Maintenance of Environmental Management Facilities like STP, Rain water harvesting, Solar Systems, other energy saving measures, landscape development, Solid waste management system
- Non-conformance & Corrective and Preventive Action
- Short term and long term budgetary provisions for the EMP
- Submission of six monthly report to Regional office, MoEF for compliance of conditions in Environmental Clearance

#### 8.3 ENVIRONMENT MANAGEMENT PLAN:

No.	Environmental Aspects/ Findings of studies	Standards	Impacts	Design Considerations/ Mitigation Measures
<b>DESIGN SPECIFIC</b>				
1.	<b>Shadow Analysis:</b> The aim of the study is to assess the potential impact of the development on the neighboring properties which falls under key sunlight sensitive areas.	Not more than 50% of surface area of any building should be shaded for more than 40% time as per BRE standards.	Shadow analysis result shows that the most affected building is Proposed Building No. CB, Club House with average impact time of 03:30 hrs. 35% will be the percentage impact which is not higher than 40 % as per BRE standards.	No mitigation measure is required.

No.	Environmental Aspects/ Findings of studies	Standards	Design Considerations/Mitigation Measures																																							
<b>DESIGN SPECIFIC</b>																																										
2.	<p><b>Daylight Analysis:</b> For the daylight simulation, worst case scenario has considered i.e. the units on 2<sup>nd</sup> floor of each of the typical proposed towers are considered as the worst case. It is to be noted that the DL level achieved in these flat would be the lowest among all the units.</p>	<p>Daylight levels available should meet the minimum lighting levels mentioned in SP 41 / NBC 2016 which are as follows:</p> <table border="1"> <thead> <tr> <th>Space</th> <th>Required lux levels (SP 41)</th> </tr> </thead> <tbody> <tr> <td>Living room</td> <td>50</td> </tr> <tr> <td>Bedroom</td> <td>152</td> </tr> <tr> <td>Kitchen</td> <td>200</td> </tr> <tr> <td>Toilet</td> <td>25</td> </tr> <tr> <td>Circulation</td> <td>25</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Space</th> <th>Required lux levels (NBC 2016)</th> </tr> </thead> <tbody> <tr> <td>Badminton</td> <td>300</td> </tr> <tr> <td>Squash</td> <td>300</td> </tr> <tr> <td>Party Hall</td> <td>200</td> </tr> </tbody> </table>	Space	Required lux levels (SP 41)	Living room	50	Bedroom	152	Kitchen	200	Toilet	25	Circulation	25	Space	Required lux levels (NBC 2016)	Badminton	300	Squash	300	Party Hall	200	<ul style="list-style-type: none"> <li>The external facades are painted light which helps in maximum light reflectance.</li> <li>Light coloured grid pavers/ tiles for hardscaping around the buildings are used which helps in ground reflectance resulting increment in diffused light levels.</li> <li>Window Glass with visual light transmission of 45% is used which helps in maximum penetration of daylight in the internal spaces.</li> </ul>	<p>The project is achieving an average of more than 200 lux in all habitable spaces which is higher than the requirement.</p> <table border="1"> <thead> <tr> <th>Space</th> <th>Achieved lux levels (SP 41)</th> </tr> </thead> <tbody> <tr> <td>Living room</td> <td>235</td> </tr> <tr> <td>Bedroom</td> <td>290</td> </tr> <tr> <td>Kitchen</td> <td>205</td> </tr> <tr> <td>Toilet</td> <td>115</td> </tr> <tr> <td>Circulation</td> <td>75</td> </tr> <tr> <td>Badminton</td> <td>355</td> </tr> <tr> <td>Squash</td> <td>310</td> </tr> <tr> <td>Party Hall</td> <td>475</td> </tr> </tbody> </table>	Space	Achieved lux levels (SP 41)	Living room	235	Bedroom	290	Kitchen	205	Toilet	115	Circulation	75	Badminton	355	Squash	310	Party Hall	475
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No.	Environmental Aspects/ Findings of studies	Standards	Design Considerations/Mitigation measures																	
<b>DESIGN SPECIFIC</b>																				
3.	<p><b>Wind &amp; Ventilation Analysis:</b> Wind Analysis is done for external environment around the buildings to ensure that all the habitable areas are meeting the required ventilation rates.</p>	<p>Ventilation Requirement as per NBC 2016 has specified minimum ACPH required for various habitable spaces which are as follows:</p> <table border="1"> <thead> <tr> <th>Space</th> <th>Required lux levels (NBC 2016)</th> </tr> </thead> <tbody> <tr> <td>Living room</td> <td>3-6</td> </tr> <tr> <td>Bedroom</td> <td>2-4</td> </tr> <tr> <td>Kitchen</td> <td>4.5</td> </tr> </tbody> </table>	Space	Required lux levels (NBC 2016)	Living room	3-6	Bedroom	2-4	Kitchen	4.5	<p>Wind speed observed at various heights in various cases are as follows- Min. avg. wind speed – 0.15 m/s to 0.75 m/s which ranges in light air. Avg. wind speed – 0.85 m/s to 2.9 m/s which ranges from light air to gentle breeze. Max. avg. wind speed – 1.6 m/s to 4.9 m/s which ranges from light breeze to moderate breeze. Ventilation rates achieved for various habitable spaces are as follows:</p> <table border="1"> <thead> <tr> <th>Space</th> <th>Achieved ACH</th> </tr> </thead> <tbody> <tr> <td>Living room</td> <td>&gt;9</td> </tr> <tr> <td>Bedroom</td> <td>&gt;9</td> </tr> <tr> <td>Kitchen</td> <td>&gt;9</td> </tr> </tbody> </table>	Space	Achieved ACH	Living room	>9	Bedroom	>9	Kitchen	>9	<ul style="list-style-type: none"> <li>Provision of Horizontal Projections on alternate floors with varying depths are effective against down drafted winds.</li> <li>The Vertical Fins deflects the direct wind and helps in cutting down the wind pressure on the façade caused by the funnelled or skew winds.</li> <li>No Funnel effect has been observed in the wind analysis at any point.</li> <li>These recommendations will reduce the wind velocity to desired range.</li> </ul>
Space	Required lux levels (NBC 2016)																			
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Kitchen	>9																			

No.	Environmental Aspects/Findings of studies	Standards	Impacts	Design Mitigation Measures	Considerations/
<b>DESIGN SPECIFIC</b>					
4.	<b>Heat Island Effect Analysis:</b> An urban heat island is a climatic phenomenon in which urban areas have higher air temperature than their rural surroundings as a result of anthropogenic modifications of land surfaces, significant energy use and its consequent generation of waste heat.	There are no standards as such to measure the Heat Island Effect impact. But the comparison between Base Case & Proposed Case can be analysed in terms of incident Solar Radiation reduction & change in ambient air temperature.	Ambient air temperature may increase from 27.42 °C to 27.55°C i.e., an increase of 0.13°C in temperature due to Proposed Project.	Though ambient temp will increase the solar insolation will decrease. There is reduction in solar insolation on site due to the following proposed measures <ul style="list-style-type: none"> <li>▪ Mutual shading</li> <li>▪ Symbiotic Landscape</li> <li>▪ China Mosaic Tiles</li> <li>▪ Shaded Parking</li> <li>▪ Medium Coloured Finish</li> <li>▪ Light coloured Grid pavers</li> <li>▪ High albedo roads</li> <li>▪ Light coloured façade</li> </ul>	There is reduction in solar insolation from 5,305 to 4,134 Wh/sq.m. i.e., a reduction of 22.0% due to Proposed Project.

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
<b>LOCATION SPECIFIC</b>					
1.	Nallah passing through the plot	<ul style="list-style-type: none"> <li>• Tree plantation at the boundary of nallah</li> <li>• Conditions stipulated in nallah remarks to be followed strictly</li> </ul>	Project proponents	Nallah Remarks from MCGM	At design stage

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
<b>CONSTRUCTION PHASE</b>					
1.	Increase in water demand due to water usage for construction, dust suppression and for domestic purpose of workers	<ul style="list-style-type: none"> <li>• Use of polymeric spray for dust suppression instead of water wherever possible</li> <li>• Curing water being sprayed on concrete structures,</li> <li>• Avoid free flow of water for curing</li> <li>• Use of wet jute cloth covering the walls and soaking the same with minimum quantity of water to avoid dripping</li> </ul>	1. Construction Contractors  2. Supervisor (Environmental Cell)	--	1. For Workers : Throughout the construction phase (approximately 7 yrs) 2. For construction : 3. For Dust Suppression :
2.	Sewage generation (72 KLD) and disposal	<ul style="list-style-type: none"> <li>• Disposal of sewage to existing municipal sewer line only</li> <li>• Sanitation facilities, drains &amp; good housekeeping</li> </ul>	1. Construction Contractors  2. Supervisor (Environmental Cell)	--	Throughout the construction phase (approximately 7 yrs )
3.	Waste generation (55 kg/day) by workers	<ul style="list-style-type: none"> <li>• Segregation of biodegradable (22 kg/day) and non-biodegradable garbage (33 kg/day)</li> <li>• Disposal of segregated garbage to authorized recyclers</li> </ul>	1. Supervisor (Environmental Cell)	--	Throughout the construction phase (approximately 7 yrs )
4.	Site preparation or construction activity may lead to : <ul style="list-style-type: none"> <li>• Water logging or flooding on site or in the surrounding</li> <li>• Unsanitary conditions and mosquito breeding on site</li> <li>• Sedimentation of outside drains</li> </ul>	<ul style="list-style-type: none"> <li>• Computation of the runoff from the plot.</li> <li>• Proper management of channelization of storm water</li> <li>• Designing storm water drainage with adequate capacity to cater the total runoff from site and outside catchment area and avoid flooding on site or surrounding</li> <li>• Use of screens and silt traps in advance of earthworks</li> <li>• Proper maintenance of storm water drainage to avoid choking of drains and flooding on site</li> <li>• Prompt completion of works relating to drainage and sediment control</li> </ul>	1. MEP Consultants, 2. Site Engineer  3. Construction Contractors  4. Supervisor (Environmental Cell)	Storm water drainage remarks from M.C.G.M.	1. For site preparation : only for first 2 - 3 months before starting Construction of the new buildings  2. For construction: (approximately 7 yrs)
5.	Demolition/Excavation/construction activity				

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
a.	Dust generation	<ul style="list-style-type: none"> <li>• Water sprinkling on unpaved surfaces and loose soil for dust suppression/ Use of polymeric spray wherever possible</li> <li>• Tree plantation in mid of construction phase</li> <li>• Provision of On site sensors to monitor PM<sub>10</sub> and PM<sub>2.5</sub></li> <li>• Provision of Barricades of adequate height along the periphery of the site</li> <li>• Use of Plastic/tarpaulin covering sheets while transporting the material</li> <li>• Wheel washing of the vehicles</li> <li>• Proper covering of Sand, murrum, loose soil, cement, or Construction &amp; Demolition Waste or any construction material</li> <li>• Provision of Wet jet for grinding and stone cutting.</li> <li>• Provision of dust masks , goggles, health checkup for workers</li> <li>• Roads leading to or at construction sites must be paved and blacktopped</li> <li>• No excavation of soil is carried out without adequate dust mitigation measures</li> <li>• Provision of Wind-breaker of appropriate height i.e. 1/3<sup>rd</sup> of the building height and maximum up to 10 meters</li> <li>• Display of Dust mitigation measures prominently at the construction site for easy public viewing.</li> <li>• No Grinding and cutting of building materials in open area</li> <li>• Separate storage space for Construction material and</li> </ul>	<p>1. Site Engineer , Site Architect , Demolition/ Excavation Contractors/</p> <p>2. <b>Supervisor (Environmental Cell) :</b> Reporting for the status of Pollution prevention and control measures to Manager ( Environmental Cell )</p> <p>3. <b>Manager (Environmental Cell) :</b> Coordination with MOEF/ NABL approved External Laboratory for monitoring and Overall documentation and record keeping for the statutory approvals</p>	--	Demolition Activity & Excavation Activity : 6-8 months Construction phase : 7 yr

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
		<p>waste and road side storage of construction material</p> <ul style="list-style-type: none"> <li>• No permission to uncovered/ overloaded vehicles carrying construction material and waste</li> <li>• DG sets with acoustic enclosures as per CPCB guidelines</li> <li>• Adequate parking provision and proper traffic movement for smooth traffic flow</li> <li>• Vehicles having valid pollution under control certificate shall be allowed to ply on site.</li> <li>• No Open burning of solid waste</li> </ul>			
b.	Noise & Vibration	<ul style="list-style-type: none"> <li>• Provision of barricades of adequate height along the periphery of the site</li> <li>• Regular noise monitoring to ascertain the noise levels are within limits</li> <li>• Provision of ear for construction labour and staff</li> <li>• Use of high efficiency mufflers</li> <li>• No noise polluting work in night shifts</li> <li>• In-built acoustic enclosure for DG sets</li> <li>• Hydraulic pumps and compressors are covered with Acoustical Enclosures with 20 dB Transmission Loss Rating in order to reduce the noise</li> </ul>		--	Throughout the construction phase (approximately 7 yrs)
c.	Disruption of soil & runoff	<ul style="list-style-type: none"> <li>• Sedimentary controls are implemented</li> </ul>			Throughout the construction phase (approximately 7 yrs)
d.	Oil leaks	<ul style="list-style-type: none"> <li>• Regular maintenance of excavation/construction machineries to prevent and repair leaks</li> </ul>		--	Throughout the construction phase (approximately 7 yrs)

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
		<ul style="list-style-type: none"> <li>Contaminated soil to authorized CHWTSDF</li> </ul>			yrs)
e.	Generation of demolition debris, construction waste - Excavated material	<ul style="list-style-type: none"> <li>Designated storage of demolition debris and construction material</li> <li>As on date 91876 cum excavated material has been generated. Reuse of 3900 cum material on site and disposal of remaining excavation material (87976 cum) to authorized landfill site as per permission from M.C.G.M.</li> <li>In future total 180594 cum excavation material shall be disposed to authorized landfill site as per permission from M.C.G.M.</li> <li>Separate storage for debris, excavation and construction waste</li> <li>Proper segregation of construction waste and preparation of item wise quantification and management plan</li> <li>Disposal of hazardous waste (if any) to CHWTSDF</li> <li>Construction waste material shall be partly recycled and remaining shall be disposed to the authorized land fill site.</li> <li>Use of Construction waste (Brick, blocks, ceramic tiles, marbles etc.) for waterproofing work, paving &amp; landscaping areas</li> <li>Construction waste (Empty Cement Bags, Paint container, other Barrels &amp; Scrap metal) will be handed over/sold to Authorized recyclers</li> <li>Use of covering sheets for trucks carrying construction material to</li> </ul>		NOC for Solid Waste Management/ Excavation permission from M.C.G.M.	Demolition Activity & Excavation Activity : 6-8 months Construction phase : 7 yr

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
		<p>prevent air borne dust.</p> <ul style="list-style-type: none"> <li>• Trucks/ Lorries should not be overloaded to avoid overflow of material (C &amp; D wastes/ construction material) during transportation</li> <li>• Maintain Roads surfaces within site to avoid jerks to transport vehicles resulting in ejection of C &amp; D wastes/ construction material on roads</li> <li>• Collection, segregation and storage of concrete, soil and other waste shall be done as per Construction and Demolition Waste Management Rules, 2016</li> </ul>			
f.	Water logging in excavated areas	<ul style="list-style-type: none"> <li>• Preparation of dewatering plan</li> <li>• Provision of dewatering pumps with adequate capacity</li> <li>• Proper drainage channel with connection to external SWD</li> <li>• Sedimentation controls measures are followed</li> <li>• Regular pest control</li> <li>• Water is allowed to settle overnight to ensure sedimentation and minimize the silt in discharge</li> <li>• Suction points of the pump are equipped with silt screens, appropriate filters</li> </ul>		--	Excavation Activity : 6 months
6.	<p>Vehicular movement leads to</p> <ul style="list-style-type: none"> <li>• Increase in traffic</li> <li>• Air emissions &amp; Noise</li> <li>• Oil leaks</li> </ul>	<ul style="list-style-type: none"> <li>• Proper traffic management</li> <li>• Entry to vehicles with valid PUC certificate</li> <li>• Provision of oil and grease traps to the Storm water drains</li> <li>• Contaminated soil found if any to authorized CHWTSDF</li> <li>• Regular maintenance of vehicles with suitable</li> </ul>	<p>1. Site Architect 2. Site Engineer 3. Construction Contractors</p> <p>And</p> <p>4. Documentation check by</p>	--	Throughout the construction phase (approximately 7 yrs)

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
		enclosures and intake silencers <ul style="list-style-type: none"> <li>• Preparation of bar charts for demolition and excavation activity</li> <li>• Planning and ensuring effective implementation of the waste movement plan for loading and offsite movement in non-traffic hours</li> </ul>	Manager (Environmental Cell )		
7.	Use of DG sets	<ul style="list-style-type: none"> <li>• DG sets with inbuilt acoustic enclosures</li> <li>• Site barricading</li> <li>• Regular maintenance</li> </ul>	1. Site Architect 2. Site Engineer, 3. Construction Contractors 4. Overall check by Manager (Environmental Cell )		Throughout the construction phase (approximately 7 yrs)
8.	Use of onsite Batching Plant	<ul style="list-style-type: none"> <li>• Provision of dust collector</li> <li>• Air pollution control devices &amp; water sprinkling to dust suppression</li> <li>• Metallic approach road to the plan</li> <li>• Tin covers/shed at material handling/loading section</li> <li>• Compound wall of brick machinery/tin sheet</li> <li>• Tyre washing system for vehicles</li> <li>• Regular ambient air monitoring to ensure the emissions are within NAAQS limits</li> </ul>	1. Site Engineer 2. Construction Contractors 3. Documentation and record keeping by Manager (Environmental Cell ) for the statutory approvals & Effective implementation of Pollution prevention measures with the help of Supervisor	Consent to Operate from MPCB	Throughout the construction phase (approximately 7 yrs)
9.	Impact on health of workers Accidents, Hazards, injuries to workers	<ul style="list-style-type: none"> <li>• Adequate drinking water, canteen, toilet and bathing facilities.</li> <li>• First aid facility</li> <li>• Regular health check-up of workers</li> <li>• Risk assessment and preparation of disaster management plan is followed</li> <li>• Provision of temporary</li> </ul>	1. Safety officer 2. Manager (Environmental Cell )	--	Throughout the construction phase (approximately 7 yrs)

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents	Legal / Other Compliances OR Compliance to guidelines from various Committees	Timelines for implementation
		water tank for fire-fighting and appropriate fire suppression measures. <ul style="list-style-type: none"> <li>• Safety educational and awareness programme</li> <li>• Proper security arrangements</li> </ul>			

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents or Society	Legal / Other Compliances OR Compliance to guidelines from various Committees
<b>OPERATION PHASE</b>				
1.	Water demand (1072 KLD)	<ul style="list-style-type: none"> <li>• Use of treated sewage for flushing (536 KLD) and gardening (109 KLD)</li> <li>• Excess treated sewage (610 KLD) shall be disposed to the sewer line</li> <li>• Rain water collection (43 KLD) from terraces into 2 RWH tanks of total capacity 160 KL and its reuse thereby reducing the fresh water demand in monsoon season</li> </ul>	Overall Environmental cell	Water supply NOC from MCGM
2.	Sewage generation (1394 KLD) and disposal of sewage	<ul style="list-style-type: none"> <li>• Provision of 3 STPs of total capacity 1464 KL for treatment of sewage upto tertiary level</li> <li>• Proper operation and maintenance of STP and Daily analysis of general parameters like pH, BOD, COD and TSS &amp; O &amp; G of the STP outlet with the help of onsite sensors to ensure good treatment of waste water</li> <li>• Provision of natural ventilation with the help of cut-outs</li> <li>• Proper operation and maintenance of STP and daily analysis of the STP outlet to ensure discharge standards as per EP Act</li> <li>• Proper arrangements for sludge handling and reusing it as manure</li> </ul>	Overall Environmental cell	--
3.	Increment in Runoff (0.55 m <sup>3</sup> /sec) from site	<ul style="list-style-type: none"> <li>• Minimizing the incremental runoff from the site with the help of 2 rain water harvesting tanks of total capacity 160 KL.</li> <li>• Provision of internal storm water drainage system with adequate capacity (4.24 m<sup>3</sup>/sec)</li> <li>• Adequate carrying capacity of road side drain carrying storm water from plot and adjoining areas (43.34</li> </ul>	Facility Management system	SWD NOC from MCGM

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents or Society	Legal / Other Compliances OR Compliance to guidelines from various Committees
		m <sup>3</sup> /sec) <ul style="list-style-type: none"> <li>• Use of screens and silt traps to SWD</li> <li>• Proper maintenance of storm water drainage to avoid choking of drains and flooding on site</li> </ul>		
4.	Power demand	<b>Energy saving measures as follows:</b> <ul style="list-style-type: none"> <li>• Provision of LED tubes &amp; lamps for all habitable areas</li> <li>• Energy efficient five star rated split AC, high COP</li> <li>• Provision of solar PV panels</li> <li>• Provision of solar water heating system (to cater 20 % of hot water demand)</li> <li>• Use of LED lights for Landscape lighting, Basement, podium, lobby areas and Stilt floors, Lobby, Staircases and parking space</li> <li>• LED lamps with timer based control</li> <li>• Use of pumps and motors with high efficiency</li> <li>• Provision of energy efficient lifts with VVVF lift drive</li> <li>• <b>Energy saved as per Conventional Base Case is 22%</b></li> <li>• <b>Saving through renewable energy 4.52%</b></li> </ul>	Facility Management system and Over all check by Manager (Environmental Cell )	ECBC norms
5.	Use of DG sets may leads to air and noise pollution	<ul style="list-style-type: none"> <li>• Stack height as per CPCB norms</li> <li>• DG sets with inbuilt acoustic enclosures</li> <li>• After development, there shall be 1273 trees on the site (including retained, transplanted and newly planted).</li> </ul>	1. Landscape /Horticulture Consultants  2. Supervisor & Manager (Environmental cell)	CPCB specification
6.	Vehicular movement, <ul style="list-style-type: none"> <li>• Increase in traffic</li> <li>• Air emissions &amp; Noise</li> <li>• Contamination of soil due to Oil leaks</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of adequate traffic signs to notify the residents</li> <li>• Most of the junctions inside the premises will be made 3-arm junctions and the potential points of conflicts are removed/ minimized</li> <li>• Separate entry and exit to the proposed development</li> <li>• Provision of speed humps/Speed Breakers for traffic calming and restricting the internal vehicular speed to 10km/hr.</li> <li>• Provision of pedestrian facilities like pedestrian strip and pedestrian crossing</li> <li>• Assigning the traffic wardens to regulate the traffic flow during peak</li> </ul>	1. Supervisor & Manager Environmental cell : For coordination with external MoEF approved Lab for Air pollution monitoring  2. Watchmen/ Supervisors/ Traffic wardens specially appointed for Traffic	Traffic NOC from M.C.G.M.

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility of the Staff / Consultants appointed by Project Proponents or Society	Legal / Other Compliances OR Compliance to guidelines from various Committees
		hours • Bituminous materials /any other chemicals not allowed to leach into the soil	management	
7.	Odour and unsanitary conditions due to STP and Composting of biodegradable garbage	<ul style="list-style-type: none"> <li>• Proper ventilation around STP (with the help of cutout) and OWC</li> <li>• Proper housekeeping and maintenance</li> </ul>	1. Facility Management Team for SWM 2. Overall frequent checks by Manager (Environmental cell)	Air act 1981, Amended 1987
8.	Solid waste generation	<ul style="list-style-type: none"> <li>• Informing and educating occupants for solid waste management</li> <li>• Provision of adequate space (349 sq.mt.) for solid waste management</li> <li>• Proper segregation on site to biodegradable and non-biodegradable.</li> <li>• Non-Biodegradable (3214 kg/day): To be Handed over to recyclers</li> <li>• Biodegradable waste (2143 kg/day) shall be treated in OWC</li> <li>• Manure &amp; sludge generated from OWC &amp; STP shall be used as manure on site and other surrounding areas</li> <li>• Quarterly monitoring of manure</li> </ul>	Facility Management Team for SWM 2. Manager (Environmental Cell): For coordination with external lab. for quality checks and overall guidance if any	
9.	Disasters like Fire, Earthquake etc.	<ul style="list-style-type: none"> <li>• Preparation of Disaster Management Plan</li> <li>• Provision of Safety officer , Security and First aid team</li> <li>• Regular review of DMP and mock drill</li> <li>• Effective implementation of DMP</li> </ul>	Manager, CHS	CFO NOC from M.C.G.M.

### 8.3.1 BUDGETARY ALLOCATION FOR EMP:

Table 8.1 & 8.2 gives the expenditure to be incurred by M/s. Evie Real Estate Private Limited on environmental matters during construction and operational phase.

**Table 8.1: Expenditure on Environmental Matters during Construction Phase**

No.	Component	Description	Basis of costing	Total Cost (Rs. In Lacs)
1	Air Environment	Dust suppression	15 nos. of Tankers/ Month x 12 Months x 7yrs x Rs. 600/ Tankers	7.56
		Air and Noise quality	Sensors for Air and Noise quality	*13.50

No.	Component	Description	Basis of costing	Total Cost (Rs. In Lacs)
		monitoring		
		By outside MOEF Approved Laboratory	--	4.62
		EMP for Batching plant	--	1.61
2	Water Environment	Drinking water analysis	--	0.21
3	Land Environment	Site Sanitation	--	5.00
4	Health & Hygiene	Disinfection- Pest Control at site	10000/ Month x 12 Months x 7 yrs.	8.40
		Health-check-up of workers	Workers x Rs. 150/ Workers/ Month x 12 Months x 7 yrs	69.30
<b>Total cost</b>				<b>110.20</b>

\*Operation and maintenance cost of sensors for Air and Noise quality monitoring is already considered in this value.

**Table 8.2: Expenditure on Environmental Matters during Operation Phase**

No.	Component	Description	Capital cost Rs. In lacs	Operational and Maintenance cost (Rs. in lacs/yr)
<b>1</b>	<b>AIR &amp; NOISE ENVIRONMENT</b>			
1.1	Cost for Ambient Air quality & Noise Monitoring	By outside MoEF & CC Approved Laboratory	*No set up cost is involved	0.44
		On site sensors	No set up cost is involved as already considered Construction Phase	0.50
1.2	Cost for DG Stack Exhaust Monitoring	2 nos. of stacks	*No set up cost is involved	0.10
1.3	Cost for Plantation	15507.63 Sq.mt. of green area on ground & podium	85.29	1.20
<b>2</b>	<b>WATER ENVIRONMENT</b>			
2.1	Cost for Waste water treatment	Cost for Sewage Treatment Plants	306.10	66.13
2.2	Cost for water & waste water Monitoring	On site sensors	54.00	3.00
		By outside MoEF & CC Approved Laboratory	*No set up cost is involved	0.08
2.3	Cost for Water Conservation (Rain Water Harvesting System)	Cost for RWH tanks	16.00	0.80
		Cost for treatment unit for Rain Water collected in tanks	6.00	0.02
		Cost for Rainwater Monitoring	*No set up cost is involved	0.09
<b>3</b>	<b>LAND ENVIRONMENT</b>			

No.	Component	Description	Capital cost Rs. In lacs	Operational and Maintenance cost (Rs. in lacs/yr)
3.1	Cost for Solid Waste Management	Cost for Treatment of biodegradable garbage in OWC	18.00	7.84
		Cost for monitoring of OWC manure	*No set up cost is involved	0.16
<b>4</b>	<b>ENERGY CONSERVATION</b>			
4.1	Use of renewable energy	Solar system	147.75	6.20
<b>Total cost</b>			<b>633.14</b>	<b>86.56</b>

\* No set up cost is involved as monitoring shall be given to outside MoEF approved laboratory

#### Quantum and generation of Corpus fund:

Project proponents shall operate and maintain EMF for proposed development for 5 years after giving possession and shall also generate corpus fund during 5 years for O & M of **Rs. 432.80 Lacs (i.e. 86.56 Lacs x 5 years)**

#### Responsibility for further O &M:

Corpus fund shall be handed over to the society. While handing over Environmental Management Facilities (E.M.F.) M.O.U. shall be made with society to accept responsibility of further O & M of EMF

#### 8.4 ORGANISATIONAL STRUCTURE & RESPONSIBILITY:

In addition to regular operational roles & responsibilities defined for the **M/s. Evie Real Estate Private Limited** team, all personnel directly or indirectly have a role to play towards effective environment management of the project. The entire project team will co-operate with government agencies and other stakeholders who may have environmental concerns with the project.

The major duties and responsibilities of **Environmental Management Cell** shall be as given below:

- To implement the environmental management plan,
- To assure regulatory compliance with all relevant rules and regulations,
- To ensure regular operation and maintenance of pollution control devices,
- To minimize environmental impacts of operations as by strict adherence to the EMP,
- To initiate environmental monitoring as per approved schedule
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit
- Maintain documentation of good environmental practices and applicable environmental laws as ready reference
- Maintain environmental related records
- Coordination with regulatory agencies, external consultants, monitoring laboratories
- Maintain of log of public complaints and the action taken

#### Organization of Environment Management Cell

No.	Designation	Qualification
<b>During Construction Phase</b>		
1.	Site Manager	M.Sc./B.E
2.	Supervisor	B.Sc.
<b>During Operation Phase</b>		
1.	Site Manager	M.Sc./B.E
2.	Supervisor	B.Sc.
3.	Operator (2 Nos. & 1 Standby)	10 <sup>th</sup> /12 <sup>th</sup> Pass

## 8.5 RECORD KEEPING:

Record keeping and reporting of performance is an important management tool for ensuring sustainable operation of the proposed project. Records should be maintained for regulatory, monitoring and operational issues. Typical record keeping requirements is summarized in **Table 8.3**

**Table 8.3: Record Keeping Requirements**

Parameter	Particulars
Air emissions	<ul style="list-style-type: none"> <li>• Random checks of equipment logs/ manuals to check equipments/ vehicles are operated within specified parameters</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• Noise reading</li> <li>• Working hour records to minimize night shift</li> <li>• Maintenance records of vehicles to minimize noise from vehicles</li> <li>• Site working practices records and noise reading implement good working practices</li> <li>• Random checks of equipment logs/ manuals to check equipments operated within specified design parameters</li> </ul>
Solid Waste Handling and Disposal	<ul style="list-style-type: none"> <li>• Daily quantity of waste generated</li> <li>• Daily quantity treated and recycled</li> <li>• Daily quantity sent outside for disposal</li> <li>• Comprehensive Waste Management Plan in place and available for inspection on-site.</li> </ul>
E waste /Hazardous Wastes	<ul style="list-style-type: none"> <li>• Quantity of waste generated</li> <li>• Quantity of wastes sent out for treatment/disposal.</li> <li>• Waste manifests as per regulations</li> </ul>
Wastewater Discharge	<ul style="list-style-type: none"> <li>• Daily quantity of raw and treated sewage</li> <li>• Treated wastewater quality</li> </ul>
Drainage	<ul style="list-style-type: none"> <li>• Visual inspection of drainage and records thereof</li> </ul>
Regulatory Licenses (Environmental)	<ul style="list-style-type: none"> <li>• Environmental Permits / High-rise clearance from Maharashtra State, /Post clearance submissions to Regional office of MoEF etc.</li> <li>• Copy of Waste manifests as per requirement</li> </ul>
Monitoring and Survey	<ul style="list-style-type: none"> <li>• Records of all monitoring carried out as per the finalized monitoring protocol.</li> </ul>
Accident reporting	<ul style="list-style-type: none"> <li>• Date and time of the accident if any mainly during construction phase</li> <li>• Sequence of events leading to accident</li> <li>• Emergency measure taken</li> <li>• Step to prevent recurrence of such events</li> <li>• Mock drills</li> </ul>
Others	<ul style="list-style-type: none"> <li>• Log book of compliance</li> <li>• Environmental, health and safety records for the employees during construction phase</li> <li>• Vehicle maintenance and inspection records</li> </ul>

## 8.6 TRAINING AND CAPACITY BUILDING:

Training and human resource development is an important link to achieve sustainable operation of the facility and environmental management. For successful functioning of the project, relevant EMPs should be communicated to the following groups of people:

**Occupants and Contractors:** All occupants must be made aware of the importance of waste segregation and disposal, water and energy conservation. This awareness can be provided through leaflets and periodic housing society meetings. They should be informed of their responsibilities for successful operation of various environmental and energy management schemes inside the premises.

**Site Staff:** Relevant personnel at site must be trained for the following:

- Techniques for waste minimization, water conservation and energy conservation
- Collection, transport, treatment and disposal solid and hazardous/E waste
- Operation and maintenance of Sewage Treatment Plant and reclamation system
- Requirements of the Disaster Management Plan in case of an emergency.
- Applicable environmental, health and safety regulations and compliance requirements for the same.
- Functioning of the Environmental Management System including environmental monitoring, reporting and documentation needs.

## *Chapter 9*

# *Summary and Conclusions*

## CHAPTER 9

### SUMMARY AND CONCLUSIONS

No.	Detail	Compliance				
1.	Environmental Impacts of the project.	With the methodical working of sensitivity index and weight-ages, the total scope of pollution potential has come to <b>363</b> , the site fits into “ <b>LOW</b> ” Pollution Potential				
2.	Water Budget	<ul style="list-style-type: none"> <li>• Total water requirement during Non-Monsoon season: 1743 KLD</li> <li>• Total water requirement during Monsoon season: 1634 KLD</li> </ul>				
3.	Waste Water Treatment	<ul style="list-style-type: none"> <li>• Sewage Generation: 1394 KLD</li> <li>• STP Capacity: 3 STPs of total capacity 1464 KL</li> <li>• Technology: Moving Bed Bio Reactor (MBBR)</li> </ul>				
4.	Drainage pattern of the project	After development storm water from the plot is proposed to be disposed in to an road side drain and main drain.				
5.	Ground water parameters	Ground water sample has been collected from project site. The parameters selected for analysis of ground water are based on the guidelines given by Central pollution Control Board (CPCB) for ground water bodies.				
6.	Solid Waste Management	<p><b>Quantities :</b></p> <ul style="list-style-type: none"> <li>• Biodegradable: 2143 Kg/day</li> <li>• Non-Biodegradable: 3214 Kg/day</li> <li>• STP Sludge : 209 kg/day</li> </ul> <p><b>Treatment/ Disposal :</b></p> <ul style="list-style-type: none"> <li>• Biodegradable waste: Treatment by Organic Waste Converter (OWC)</li> <li>• Non-Biodegradable waste: To authorized recyclers</li> <li>• STP Sludge (Dry sludge): Use as manure</li> </ul>				
7.	Air Quality & Noise Level issues	<ul style="list-style-type: none"> <li>• All the parameters (PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO) are within the limits specified by CPCB.</li> <li>• Comparison of the ambient noise levels with the standards specified by CPCB reveals that the day time and night time noise readings at all the locations are exceeding CPCB standards owing to vehicular movement in nearby roads.</li> </ul>				
8.	Energy Management	<ul style="list-style-type: none"> <li>• Energy saved as per Conventional Base Case is 22%</li> <li>• Saving through renewable energy 4.52%</li> </ul>				
9.	Traffic circulation system and risk assessment	Total Evacuation time (Peak hour): Building 1: 20 minutes Building 2: 19 minutes				
10.	Landscape Plan	Recreational Ground Area: 15507.63 Sq. mt. New tree plantation: 1037 nos.				
11.	Disaster Management System and Risk Assessment	<ul style="list-style-type: none"> <li>• Detailed DMP plan is prepared. PP will periodically review and update the Plan and will take the initiative to institutionalize the relationship between all Emergency Security and Rescue Forces (e.g. Police, Municipality, Fire Brigade, Medi-Care Centres etc.)</li> <li>• Costing for Disaster Management Plan <ul style="list-style-type: none"> <li>○ During Construction phase: Rs. 131.50 lacs</li> <li>○ During Operation phase: Rs. 2338.07 lacs</li> </ul> </li> </ul>				
12.	Socioeconomic impact assessment. Environmental Management Plan	<ul style="list-style-type: none"> <li>• The project offers EWS housing for economically weaker section of society which will facilitate living conditions for this section. The project envisages bringing various other communities to the area and thereby enabling rapid enhancement of an urban environment.</li> <li>• Costing for Environmental Management Plan. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">During Construction phase</td> <td style="width: 50%;">During Operation phase</td> </tr> <tr> <td>Rs.110.20 Lacs</td> <td>Set Up cost : Rs. 633.14 Lacs</td> </tr> </table> </li> </ul>	During Construction phase	During Operation phase	Rs.110.20 Lacs	Set Up cost : Rs. 633.14 Lacs
During Construction phase	During Operation phase					
Rs.110.20 Lacs	Set Up cost : Rs. 633.14 Lacs					

No.	Detail	Compliance		
			O & M cost: Rs. 86.56 Lacs/annum	

The project proponents & developers “**M/s. Evie Real Estate Private Limited**” seems to be safety conscious and alert about good housekeeping and is environment friendly. Based on the environmental assessment, the associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures.

***Chapter 10***  
***Disclosure of Consultants***

## CHAPTER 10

### DISCLOSURE OF CONSULTANTS

This EIA report is prepared on behalf of the proponents, taking inputs from proponents office staff, Architects, Project Management Professionals etc. by Environmental Consultants M/s ULTRA TECH, Thane.

ULTRA TECH has received Accreditation under the QCI-NABET scheme for Accreditation of EIA Consultant Organizations (Version 3)

**Certificate No: NABET/EIA/1720/RA0094 Dated 28/05/2018**

#### ENVIRONMENTAL CONSULTANTS ORGANIZATION

ULTRA TECH [Lab Gazetted by MoEF – Govt. of India] not only give environmental solutions for sustainable development, but make sure that they are economically feasible. With innovative ideas and impact mitigation measures offered, make them distinguished in environmental consulting business. The completion of tasks in record time is the key feature of Ultra-Tech. A team of more than hundred environmental brigadiers consists of engineers, experts, ecologists, hydrologists, geologists, socio-economic experts, solid waste and hazard waste experts apart from environmental media sampling and monitoring experts and management experts, strive hard to serve the clients with up to mark and best services.

ULTRA TECH offers environmental consultancy services to assist its clients to obtain environmental clearance for their large buildings, construction, CRZ, SEZ, high rise buildings, township projects and industries covering sugar and distilleries from respective authorities.

ULTRA TECH also provides STP/ ETP/ WTP project consultancy on turn-key basis apart from Operation and Maintenance of these projects on annual contract basis. Also, having MoEF approved environmental laboratory, Ultra-Tech provide laboratory services for monitoring and analysis of various environmental media like air, water, waste water, stack, noise and meteorological data to its clients all over India and abroad.

#### CREDENTIALS

- State of Art Environmental Laboratory & Trained Manpower, Gazetted by MoEF.
- Environmental Advisor for Municipal Corporation.
- Affiliated to Indian Green Building Council (IGBC), Hyderabad.
- Affiliated to United States Green Building Council (USGBC), US.
- Environmental Consultants for Federation of All India Textile Manufacturing Association (FAITMA)
- Environmental Consultants for All India Lead Manufacturing Association.
- NABET, Quality Council of India, Accreditation for EIA
- ISO 9001:2015, Quality Management System implemented

#### HONORS

We are honored by the following reputed firms for our unflinching quality environmental & consultancy and monitoring services.

- **TECHNICAL CONSULTANT OF CRISIL, MUMBAI**  
For Common Effluent Treatment Plant issues in Gujarat, India
- **TECHNICAL CONSULTANT OF FAITMA, MUMBAI** [Fed. of All India Textile Manufacturer's Associations] For Environmental issues
- **TECHNICAL CONSULTANCY SERVICE, PUNE**  
For Environmental Quality Monitoring Services at Panvel-Karjat Rail-way Project
- **RASTRIYA CHEMICALS & FERTILIZERS, MUMBAI**  
For Ambient Air Monitoring in nearby villages

### ISO 9001:2015 CERTIFICATION

ULTRA TECH is one of the leading environmental consultancy and laboratory services providing companies and is ISO 9001:2015.

All it means that ULTRA TECH is certified for offering High Quality Environmental Services aiming at customer satisfaction. Its quality policy reflects its obligation to serve their customers at the best of their skills and to go extra mile to attain and exceed the expectations of valuable customers with an additional responsibility of contributing to the drive of turning this universe into green universe. Continuous efforts to enhance the specific skills which are critical to acquire is making ULTRA TECH to attaining Excellency in providing environmental clearances through impact assessment.

### LIST OF EIA CO-ORDINATOR, FUNCTIONAL AREA EXPERTS & ASSOCIATES

S. No	Name of sector	Name of project	Name of Client	EIA Coordinator	Functional Area Experts involved	
				Name	FA	Name/s
1	Construction with activity number '8 (b)'	Residential Development at Kanjurmarg, Mumbai.	M/s. Evie Real Estate Private Limited.	Mrs. Deepa Tamhane - Karnik	LU	Mr. Yogesh Raskar
					AQ	Mr. Satish Yevale
					AP	Mr. Shekhar Tamhane
					WP	Mrs. Rekha Margam
					EB	Mrs. Padmini Shinde
					SE	Mrs. Mamta Bavskar
					NV	Mr. Chintan Athalye
					SC	Mrs. Padmini Shinde
					RH	Mr. Bonde
					SHW	Ms. Deepa Tamhane Karnik

### Other Experts Involvement:

Area	Name of expert	Organization
Assessment Of Storm water Disposal System	Dr. Vinay Nikam	Enviro-con Urban Hydro Environment Centre
Geotechnical Investigation Study	Mr. Jaydeep Wagh	Geocon International Pvt. Ltd.

**TEAM MEMBERS**

No.	Name of Members
<b>Team member</b>	
1.	Mrs. Trupti Kumbhar
<b>Laboratory Team members</b>	
2.	Mr. Rahul Kolhapurkar
3.	Mr. Shailesh Salvi

**SOURCES OF PROJECT DETAILS, PLANNING, SERVICES & UTILITIES**

NO.	DETAILS OF DATA / STUDY	DATA SOURCE / STUDY CONDUCTED AGENCY
1.	Architect (L.S.)	Sunil Ambre & Associates
2.	Architect (Design)	Hafeez Contractor
3.	MEP Plan and Study	S.N. Joshi Consultant
4.	Structural Consultant	JW Consultants LLP
5.	Traffic Consultants	M/s. Transport and Traffic Engineering Consultants (TTEC)

# *Questionnaire*

**QUESTIONNAIRE FOR THE ENVIRONMENTAL IMPACT  
ASSESSMENT OF NEW CONSTRUCTION PROJECTS**

**I. BACKGROUND INFORMATION OF THE PROPOSED PROJECT**

State clearly the objective of the project:	<p>The project site under reference is located at Village Kanjur, Kanjurmarg (E), Mumbai and is under the jurisdiction of Municipal Corporation of Greater Mumbai (MCGM).</p> <p>The project offers EWS housing for economically weaker section of society which will facilitate living conditions for this section. This Project is being developed by <b>M/s. Evie Real Estate Private Limited</b></p>
Location of the project (attach map to a suitable scale) :	<p>Tehsil: Mumbai Suburb District: Mumbai Suburb State: Maharashtra Latitude: 19°7'55.57"N Longitude: 72°55'56.88"E Location map of the project site with 10 Km radius around the plot boundary is given in <i>Chapter 2 of the Report enclosed.</i></p>
Names & distances from the nearest :	<p>Railway Station: Kanjurmarg Railway Station: Within 1.00 Km Airport: Mumbai Chhatrapati Shivaji Maharaj Terminals: Within 13.00 Km (Road Distance)</p>
Name of the agency proposing the new construction project:	<b>M/s. Evie Real Estate Private Limited</b>
Name of the Chief Executive & Postal address: Contact particulars (Tel/Fax/e-mail):	<p><b>M/s. Evie Real Estate Private Limited</b> <b>Mr. Subodh Runwal (Director)</b> 4<sup>th</sup> Floor, Runwal &amp; Omkar Esquare, Opp. Sion Chunnabhatti Signal, Off Eastern Express Highway, Sion (E), Mumbai – 400 022 <b>Tel. Nos. :</b> 022 - 61162000 <b>Fax Nos.:</b> 022 - 24033702 <b>E- mail :</b> <a href="mailto:subodhrunwal@runwal.com">subodhrunwal@runwal.com</a></p>
Type of project: Housing project/Industrial Estate or others:	Housing project
Estimated cost of the project: Land cost Estimated construction cost Cost of the Plant & machinery	Total cost: Rs. 980 Cr.

## II. SITUATION WITHIN 10 KM RADIUS FROM PROJECT SITE

General topography	The site is flat land <i>The details are referred in Chapter 3 of the Report enclosed.</i>
Specify general features of land	<i>The land use details for 10 km radius around the project site are referred in Chapter 3 sec 3.1.1 of the Report enclosed.</i>
Tree cover-prominent species	The details are referred in Chapter 3 of the Report enclosed
Fauna-wildlife/domesticated	
Avifauna	
Soil characteristics	The predominant soil cover in Mumbai city is sandy, whereas in the suburban district, the soil cover is alluvial and loamy.  <b>Soil Type at project site:</b> Brown colored soil with Low Productivity and Moderate Absorptivity  <b>On site subsurface layers:</b> Layer I – Fill consisting mostly of Clay with boulders Layer II: Residual Soil consisting of Yellowish/ Reddish brown Clay Layer III: Completely Weathered rock Layer IV: Hard Basalt Bedrock Soil sampling was done to further establish the baseline characteristics <i>The details are referred in Chapter 3 of the Report enclosed</i>
Natural drainage pattern	The site is flat land
Flood prone areas	The study area for this project falls under S Ward of MCGM. The following places in S ward are low-lying areas prone to flooding in monsoon: <ul style="list-style-type: none"> <li>○ Fitwel Industries, L.B.S.Marg, Vikhroli (W)</li> <li>○ Junction of Vikhroli - Jogeshwari Link Road and L.B.S.Marg, Gandhi Nagar, Junction</li> <li>○ Opp. Kanjur Railway Station (W), Laxmi Udyog Bhavan</li> <li>○ Opp. Bombay oil Mill, L.B.S. Marg, Bhandup (W)</li> <li>○ Maharashtra Nagar, Quarry Road, Bhandup (W)</li> <li>○ Along Konkan Nagar near Culvert, Bhandup (W)</li> <li>○ Gamdevi Road and Khot Roat Junction, Bhandup (W)</li> <li>○ Bhattipada, National High School, Bhandup (W)</li> <li>○ Kastury Vidyalaya, Village Road, Bhandup (W)</li> <li>○ Usha Nagar, Village Road, Bhandup (W)</li> <li>○ Sub-way, Filterpada, Powai near Powai Garden</li> </ul>
Geological features including seismic zone	Greater Bombay is a-small archipelago scattered along the west coast of India. The three major islands, Bombay, Trombay and Salsette are separated by tidal flats and creeks. <i>The details of geographical features are referred in Chapter 3 of the Report enclosed.</i>  As per the Seismic Zoning Map of India, study region falls under Seismic Zone-III. The structural design shall be as per prevalent IS Code.
Existing landuse (area &percentages) map (to include agricultural & non-agricultural uses, commercial, industrial	The land use for the radius of 10 km has been studied on the basis of the satellite data collected from LANDSAT_8, OLI_TIRS software. Landuse pattern of the study area shows 6 landuse classes

dense/open forests, fallow land, human settlements, water bodies, transport systems etc.)	Details of Landuse of study area are referred in section 3.1.1 of Chapter 3 of the Report enclosed.
Predominant activities – residential, institutional, commercial etc.	Project site is partly in residential zone as per DP remarks and partly in industrial zone. Received NOC for change in Land use from Industrial (I) to Residential (R) zone.
Special features : (such as tourist spots, monuments/archaeological sites, hospitals, schools, institutions, religious places, heritage areas and places of other interests)	This project site is situated in S ward of M.C.G.M. There are 2 centers of tourist places in the S-ward. There are no historical and religious places in the S-ward. <i>The details are referred in sec 3.7.2 of Chapter 3 of the Report enclosed.</i>
Specific environmental problems, if any (such as water and air pollution, land spoliation by natural & manmade factors, endemic diseases, traffic congestion spots in the vicinity of project site, loss of tree cover, open spaces etc.)	<i>The details are referred in Chapter 3 of the Report enclosed.</i>
Ground level concentrations (major parameters) SPM/RSPM, SO <sub>2</sub> , NO <sub>x</sub> , HC, Noise	Environmental Impact Assessment Report has been prepared on baseline collected during 15 <sup>th</sup> October 2017 to 15 <sup>th</sup> January 2018  PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO are within prescribed limit, Comparison of the ambient noise levels with the standards specified by CPCB reveals that the day time noise readings at all the locations are exceeding CPCB standards owing to vehicular movement in nearby roads also the night time  <i>The details are referred in section 3.3 of Chapter 3 of the Report enclosed.</i>
Furnish wind rose diagram	Wind rose diagrams are enclosed <i>Sub-section 3.3.1 of Chapter 3 of the Report enclosed.</i>
General meteorological data(wind direction, speed, rainfall, temperature Details if any of heat islands, inversions, venturi effect. Impacts on the conceptualization of the proposal	Meteorological data representing the summer season of Mumbai have been collected from the IMD for the year 2018. <i>The details are referred in Sub-section 3.3.1 of Chapter 3 of the Report enclosed.</i>
Human Resources i. Population of study area (10 km radius),  ii. Decadal growth rate, settlement pattern and growth,  iii. Socio-economic conditions  iv. Health: Endemic diseases, Mortality, Epidemics.	<i>The details are referred in Sub-section 3.5 of chapter 3 of the Report enclosed.</i>  <i>The details are referred in Sub- section 3.5 of chapter 3 of the Report enclosed.</i>  Study area is a developed city area having all modern amenities. Civil structures, School, Colleges, Hospitals, Recreation facilities, Markets, etc. are available in the area.  No epidemic health problems are reported due to waste water/ air/ soil.
Environmental assessment and suitability of the proposed development (specifically identifying the limits)	Environmental Impact assessment for this project has been done by using Delphi Technique. With the methodical working of sensitivity index and weight-ages, the total scope of pollution potential has come to 363, the site fits into “ <b>LOW</b> ” Pollution Potential.

*The details are referred in section 4.4 of Chapter 4 of the Report enclosed.*

### III. PROMINENT FEATURES WITHIN ABOUT 100 METRES RADIUS FROM THE SITE BOUNDARY (LOCAL AND IMMEDIATE VICINITY)

General description (contours at 1m intervals)	The site is flat land Contour Plan is attached as enclosure.
Natural resources i. Water: a. Ground water table, rate of recharge present restrictions on withdrawal, available yield, quality of water (physical, chemical, biological)  b. Surface water location, source and yield, present use (for agriculture, human consumption, industry, etc.)  ii. Ambient air quality levels (standard parameters including noise)  iii. Minerals: type, location, quantum (estimated)  iv. Energy: consumption pattern for hydrocarbons, gas, electricity and any other non-conventional energy source	The ground water table at the project site is between 5.1 to 6.0 m. which is high hence ground water recharging is not proposed. Ground water sample has been collected from project site. The parameters selected for analysis of ground water are based on the guidelines given by Central pollution Control Board (CPCB) for ground water bodies <i>The details are referred in section 3.3.2 of Chapter 3 of the EIA Report enclosed</i>  No surface water bodies were observed within 100 meters radius from the site boundary. <i>The details are referred in section 3.2 of Chapter 3 of the EIA Report enclosed</i>  PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO is within prescribed limit of CPCB. <i>The details are referred in section 3.3 of Chapter 3 of the Report enclosed.</i>  Not Applicable.  <i>The details are referred in Sub-section 4.2.4 of Chapter 2 of the Report enclosed.</i>
Details of new construction Plot coverage, height, FSI (permissible/proposed)	This study is limited to project site. Details of project proposal and area statement are given in <i>section 2.5.1 of Chapter 2 of the Report enclosed.</i>
Details of public utilities required for the project during: (may be indicated separately for construction & operation phases) i. Water supply: a. Source of water supply and quantities to be drawn.	<i>The details are referred in chapter 2 of the Report enclosed.</i>  Fresh Water Supply: 1072 KLD [i.e. For Domestic purpose: Source: M.C.G.M.] and 26 KLD [For Swimming pool make up: Source: tanker water of potable quality]  Secondary requirements: 645 KLD [i.e. For gardening (109 KLD) and flushing (536 KLD)]  <i>The details are referred in Section 2.6 of Chapter 2 of the Report enclosed.</i>
b. Type of treatment, if any.	No
c. Continuous/Intermittent supply	Continuous supply from M.C.G.M.

<p>ii. Sewage, Collection, Treatment &amp; Disposal</p> <p>a. Mode of collection of domestic effluent</p> <ul style="list-style-type: none"> <li>- Surface drains</li> <li>- Underground</li> <li>- System and capacity</li> </ul>	<p>Sewage shall be collected through pipe networks to Sewage Treatment Plant.</p>								
<p>b. Mode of treatment</p> <ul style="list-style-type: none"> <li>- Septic tank and filters (capacity)</li> <li>- Biological treatment capacity &amp; other details</li> </ul>	<p>Construction phase: Disposal to existing sewer line Operation phase: 3 STPs of total capacity 1464 KL</p>								
<p>c. Mode of disposal</p> <ul style="list-style-type: none"> <li>- Soak pits / Disposal to local sewer/ water bodies (specify)</li> <li>- Use for cultivation</li> </ul>	<p>Treated sewage from proposed project shall be reused for secondary requirements like gardening and flushing. Excess treated sewage shall be disposed to sewer line.</p>								
<p>iii. Solid Wastes:</p> <ul style="list-style-type: none"> <li>- estimated quantity of each types of solid waste:</li> <li>- Mode of collection and disposal:</li> <li>- Recycling to be instituted, if any:</li> </ul>	<p>The total quantities of solid waste that will be generated in the project will be 5357 kg/day. Out of which 3214 kg/day will be non-biodegradable and 2143 kg/day will be biodegradable.</p> <p>There will be provision for storage, collection and segregation of biodegradable, non-biodegradable waste within the premises. Biodegradable waste will be treated by composting in Organic Waste Converter. Segregated waste shall be given to Authorized recyclers Dried sludge from STP will be used as manure.</p>								
<p>iv. Power System:</p> <ul style="list-style-type: none"> <li>- Sources of power and supply capacity</li> <li>- Distribution System</li> <li>- Alternate supply for essential services</li> <li>- DG Set: Type of fuel used and capacity</li> </ul>	<p>For construction phase: Source: Maharashtra state Electricity Distribution company Ltd. (MSEDCL) D.G. Sets: As per requirement</p> <p>For operation phase: Source: MSEDCL</p> <table border="1"> <thead> <tr> <th>Details</th> <th>Residential (KW)</th> </tr> </thead> <tbody> <tr> <td>Connected load</td> <td>15777 KW</td> </tr> <tr> <td>Maximum demand</td> <td>7352 KW</td> </tr> <tr> <td>For emergency backup during power failure</td> <td>2 DG sets of 750 KVA and 2 DG sets of 500 KVA</td> </tr> </tbody> </table> <p><b>Fuel : Diesel</b></p>	Details	Residential (KW)	Connected load	15777 KW	Maximum demand	7352 KW	For emergency backup during power failure	2 DG sets of 750 KVA and 2 DG sets of 500 KVA
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Connected load	15777 KW								
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<p>Impact of the new development on the surrounding areas</p> <p>i. Traffic management at peak hours</p> <p>ii. Provision of service roads</p> <p>iii. Buffer zone planned, if so, details</p> <p>iv. Activities likely to come up in the surrounding areas from the project during construction &amp; operation phases.</p>	<p>Transport of construction materials during construction phase. Precautions are taken to reduce the impact of the vehicular movement by restricting movement in non-peak hours</p> <p>No.</p> <p>Yes. Segregating distance from Surrounding industrial zone has been marked in the Layout Plan as per DCR</p> <p>The Proponent will continue regular environmental awareness programs to bring forth the benefits of development in terms of improvement in quality of life The Project Area is under Administrative control of</p>								

<p>v. Agencies and the measures proposed to regulate unplanned developments like slums, shops, etc.</p>	<p>MCGM. Any work development to be done here has to have the express approval of the MCGM. As such no unauthorized or unplanned development can take place.</p>
<p>State briefly impacts predicted on the quality and quantity of natural resources from the proposed new development:</p> <ul style="list-style-type: none"> <li>- Air quality</li> <li>- Vegetation</li> <li>- Animal/Aquatic life</li> <li>Surface/ Ground Water</li> </ul>	<p>Environmental Impact assessment for this project was done by using Delphi Technique. <i>The details are referred in Chapter 4 of the Report enclosed.</i></p>
<p>State briefly impacts predicted on the quality and quantity of manmade features from the proposed new development:</p> <ul style="list-style-type: none"> <li>- Transport Linkages: <ul style="list-style-type: none"> <li>a. Road</li> <li>b. Rail</li> <li>c. Water</li> <li>d. Air</li> <li>e. Others</li> </ul> </li> <li>- Heritage areas/ecologically sensitive areas</li> </ul>	<p>The project site is located in a developed area with well developed infrastructural facilities and there will be no major impact on the existing infrastructure and amenities. <i>The details are referred in Chapter 4 of the Report enclosed.</i> Traffic survey is done and detailed Report is enclosed as Enclosure.</p>
<p>Landscaping /Tree Plantation</p> <ol style="list-style-type: none"> <li>i. Numbers and types of trees to be planted inside &amp; outside the plot: <ol style="list-style-type: none"> <li>a. Parks and gardens</li> <li>b. Along roads and pedestrian movement</li> <li>c. In public areas</li> </ol> </li> <li>ii. Other special features of proposed landscape design</li> <li>iii. Likely impacts from proposed landscaping</li> </ol>	<p>After development, there shall be 1273 trees on the site (including retained, transplanted and newly planted).  <i>The details are referred in Chapter 4 sec 4.2 sub sec 4.2.5 of the Report enclosed.</i></p> <p>Existing old Indian National tree <i>Ficus benghalensis</i> (Banyan tree) at project site. On 30<sup>th</sup> November 2010 this tree aged 147 years. --</p>
<p>Any other relevant information of environmental significance-such as disabled-friendly design, flyash utilization, Greening of supply chain, heat islands/inversions/venturi effects, Timber-free construction, Green rating, energy efficiency for lighting &amp; ventilation, Intelligent building, life cycle costs, measurable design impacts on human health, indoor environment related to occupational health etc.</p>	<p>Details of energy conservation measures are given in Chapter 4 sec 4.2 sub sec 4.2.4 of the Report enclosed.</p>

*Enclosures*

*Enclosure 4*



# *Enclosure 15*

## SOP NO. 1: FIRE/ EXPLOSION & EVACUATION

<b>I CHIEF SITE CONTROLLER</b>	
1	Proceed to ECC when informed of the disaster/ potential disastrous event at site.
2	On arrival at ECC the Chief Site Controller shall relieve the Site Incident Controller of responsibility of overall main control of the event.
3	In consultation with the Site Incident Controller and advisory team The Chief Site Controller will take stock of the situation like exact location, number of people and the area affected etc. decide on level of emergency, establish immediate priorities and Guide The Site Incident Controller and emergency co-ordinator accordingly.
4	Ensure that all the key persons are available on site/ performing the task.
5	Delegate any extra duty to relevant person depending upon the situation.
6	Ensure that adequate safety measures for responders and affected communities are in place all the time.
7	Ensure smooth working of all the emergency respondents and make sure that all conflicts (if any) are resolved.
8	Withdraw the staff in case of the human life is in peril.
9	Authorize release of information to the media.
10	Ensure financial support for the disaster control activities and relief materials.
11	Keep contact with District Disaster Control Room.
12	Get the de-warning from District Control Room and announce the same.
13	Give authorization for clearance signal to the Site Incident Controller and emergency coordinator when everything becomes normal.
14	Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.
<b>II SITE INCIDENT CONTROLLER</b>	
1	On hearing of emergency alarm immediately proceed to site of incident (unless already present there) to take charge and give guidance over public address system.
2	Assume the additional responsibility of the Chief Site Controller till the arrival of the Chief Site Controller.
3	Assess the level of emergency and activate emergency services of Fire and security department, inform Fire Brigade, Police, Site Chief Controller and Site Emergency Coordinator.
4	Identify the areas likely to be affected by the emergency. Give information as required by the Fire Brigade and Police.
5	Direct out the fire fighting and evacuation operations.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team.
9	Guide the search and rescue team with geographic information and persons trapped.
<b>II SITE INCIDENT CONTROLLER</b>	
10	Assist the law and order machinery.
11	Get the de-warning authorization from the Chief Site Controller and communicate the same to Security Head for giving all clear alarm.
12	Update the Record and documentation.

13	Perform such other duties as assigned by Chief Site Controller.
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<b>III EMERGENCY CO-ORDINATOR</b>	
1	On receiving emergency information Proceed to Emergency Control Centre.
2	Call Police, Fire Brigade and mobilizing site emergency services.
3	Give immediate assessment to the authority on damage, massive casualty etc.
4	Mobilizing resources required for emergency response teams working.
5	Call for participating in the emergency response and Coordinate between all emergency respondents such as various line departments, representatives of Govt. authorities/ IRT's/ NGO's and ULB's etc.
6	Release of authorized information to the media and take steps to reduce/ eliminate panic. Set up of help desk and Information centers to provide response information to the public, relatives of victims and media.
7	Assure occupants of continuous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinery.
9	Perform such other duties as assigned by Chief Site Controller.
10	Follow up of injured at hospital.
11	Mobilizing Emergency Respondent teams, IRT's, NGO's.
12	Communication with district disaster control cell and declaring off site emergency (if situation escalates).
13	Release of authorized information to the media.
14	Emergency under control report to Chief Site Controller.
15	Termination of emergency and 'All Clear Alarm'.
16	Analyze the disaster and improve the DMP in the light of experience.
17	Contact insurers.
18	Disseminate precautionary information on post disaster health hazards and remedies.
19	Replenish depleted resources such as firefighting materials, rescue materials.
20	Establish a program to restore both the disaster site and the damaged materials to a stable and usable condition.
21	Maintain the DMP resources.
22	Organize fire drill, safety audits, Mock drills and periodic training and DMP awareness program.

<b>IV SUPERVISOR</b>	
1	On receiving signal, information of the incident Security person to confirm and raise the site emergency alarm, Inform the Site Incident Controller.
2	On receiving emergency alert supervisor of the affected area to proceed to site (if not already at incident spot) as directed from ECC.

<b>IV SUPERVISOR</b>	
3	Supervisor of the non-affected area to keep attention to announcements and follow Emergency Co-Ordinator instructions.
4	Watch and ward & security persons carry out Traffic control, law and order situation and crowd control at Assembly point. Keep the fire tender routes free from obstruction.
5	Guide and assist to carry out firefighting operations.
6	Supervise and assist the search and rescue team for evacuation, search of the trapped persons and rescue of the same to assembly area.
7	Alert all occupants without further compromising life and assist those which are persons with special needs.
8	If people are buried under the debris, call for help of the rescue teams and render your help.

9	Assist in head count at assembly point and give feedback to Site Incident Controller.
10	Maintain an updated list of emergency telephone numbers at ECC.
11	Clean and rehabilitate the disaster site.
12	Perform such other duties as assigned by Chief Site Controller.
13	Ensure occupants do not attempt to re-enter the building until it is safe to do so.

<b>V EMERGENCY RESPONDENT TEAMS – (SAR) TEAM</b>	
1	On receiving emergency alert SAR team members to proceed to ECC, get equipped with required PPE and proceed to incident site or as directed from ECC.
2	Firefighting trained persons to Carry out Firefighting operations and try to put it out with help of people around you if safe to do so. On arrival of fire brigade; assist and provide required information.
3	Search for the trapped persons and rescue of the same to assembly area.
4	Provide first aid trained persons to provide first aid to injure where ever necessary and shift to first aid room for further action.
5	Carry out evacuation of the building as per directions from ECC. Ensure the safe evacuation of all occupants from the building.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Perform such other duties as assigned by Chief Site Controller.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Ensure uninterrupted water supply to fire hydrant system. (Water re-connection is a priority if affected in the incidence).
3	Restore power supply in case affected to emergency equipments (Loss of power will mean loss of fire systems if prolonged).
4	Ensure uninterrupted power supply to fire water pumps and emergency lighting.
5	Restore Power supply to emergency lighting.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
6	Restore and maintain communication network such as PAS system, siren, phones, TV, radio systems.
7	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts, bring the lifts to safe position.
8	Attend Lift failures.
9	Ensure working of drainage, de watering pumps.
10	Assist the search and rescue team in case of any metal cutting operation, vehicle failures etc.
11	Perform such other duties as assigned by Chief Site Controller.

<b>VII EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM</b>	
1	When informed of the disaster/ potential disastrous event at site, proceed to ECC or keep available for communication.
2	Assess the relevant data received at ECC.
3	Assist the Chief Site Controller in decision making process.
4	Collect relevant information and Take stock of situation time to time and advise the Site Chief Controller.
5	Give feedback on revision of the DMP in view of the lessons learnt from the incident.

<b>VIII ALL OTHER AT SITE</b>	
1	In Case of noticing Fire:
	a) Raise the raise break glass fire alert.
	b) Dial '(101 fire brigade emergency number)'and inform fire/ security department location and incidence.
	c) Raise verbal fire alarm to activate other persons in the area.
2	Contain the fire by closing windows and doors to minimize the danger of the fire and smoke spreading.
3	Extinguish the fire if; you have been trained in the use of a fire extinguisher, it is safe to do so or you have someone in support.
4	Remove or help to Rescue occupants from the area of immediate danger. To refuge area and follow further instructions from ECC regarding evacuation.
5	On receiving emergency evacuation proceed to Assembly point.
6	Persons of non-affected building/ area keep attention to announcements and follow Emergency Co-Ordinator instructions.
7	Co-operate in evacuation head count procedure at Assembly Point.
8	Keep calm, switch on the transistor radio and obey any instructions you receive on the TV, radio, public address system, siren alarm or verbal mode of communication.

**SOP NO. 2: BOMB THREAT, SUSPECT MAIL/ PARCEL**

<b>I</b>	<b>CHIEF SITE CONTROLLER</b>
1	Proceed to ECC when informed of the disaster/ potential disastrous event at site.
2	On arrival at ECC The Chief Site Controller Shall relieve the Site Incident Controller of responsibility of overall main control of the event.
3	In consultation with Site Incident Controller and advisory team The Chief Site Controller will take stock of the situation like exact location, number of people and the area affected etc. decide on level of emergency, establish immediate priorities and Guide The Site Incident Controller and Emergency Co-Ordinator accordingly.
4	Ensure that all the key persons are available on site/ performing the task.
5	Delegate any extra duty to relevant person depending upon the situation.
6	Ensure that adequate safety measures for responders and affected communities are in place all the time.
7	Ensure smooth working of all the emergency respondents and make sure that all conflicts (if any) are resolved.
8	Withdraw the staff in case of the human life is in peril.
9	Authorize release of information to the media.
10	Ensure financial support for the disaster control activities and relief materials.
11	Keep contact with District Disaster Control Room
12	Get the de-warning from District Control Room and announce the same
13	Give authorization for clearance signal to the Site Incident Controller and emergency coordinator when everything becomes normal.
14	Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
1	On hearing of emergency alarm immediately proceed to site of incident (unless already present there). to take charge and give guidance over public address system.
2	Assume the additional responsibility of the Chief Site Controller till the arrival of the Chief Site Controller.
3	Assess the level of emergency and activate emergency services of Fire and security department, inform Fire Brigade, Police, Site Chief Controller and Site Emergency Co-Ordinator.
4	Identify the areas likely to be affected by the emergency. Give information as required by the Fire Brigade and Police.
5	Guide and assist the Bomb detection squad.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinery.
9	Carry out firefighting and evacuation operations, keep communication with emergency teams and the affected persons in the building especially in lifts and rooms.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
10	Account for all occupants at the assembly area and give head count, missing persons feedback to SAR team.
11	Guide the search and rescue team with geographic information and persons trapped.
12	Get the de-warning authorization from the Chief Site Controller and communicate the same to security head for giving all clear alarm.

13	Update the Record and documentation.
14	Perform such other duties as assigned by Chief Site Controller.

<b>III EMERGENCY CO - ORDINATOR</b>	
1	On receiving emergency information proceed to Emergency Control Centre.
2	Call Police, Fire Brigade and mobilizing site emergency services.
3	Give immediate assessment to the authority on damage, massive casualty etc.
4	Inform Police, Fire Brigade and mobilizing site emergency services.
5	Mobilizing resources required for emergency response teams working.
6	Release of authorized information to the media and take steps to reduce/ eliminate panic. Set up of help desk and Information centers to provide response information to the public, relatives of victims and media.
7	Assure occupants of continuous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinery.
9	Call for participating in the emergency response and Coordinate between all emergency respondents such as various line departments, representatives of Govt. authorities/ IRT's/ NGO's and ULB's etc.
10	Release of authorized information to the media and take steps to reduce/ eliminate panic.
11	Assure occupants of continuous communication and take all measures to keep up their morale high.
12	Liaise with the law and order machinery.
13	Perform such other duties as assigned by Chief Site Controller.
14	Follow up of injured (if any) at hospital.
15	Setting up help desk and Information centers will be set up to provide response information to the public, relatives of victims and media.
16	Mobilizing Bomb detection squad.
17	Communication with district disaster control cell and declaring off site emergency (if situation escalates).
18	Release of authorized information to the media.
19	Emergency under control report to Chief Site Controller.
20	Termination of emergency and 'All Clear Alarm'.
21	Analyze the disaster and improve the DMP in the light of experience.
22	Contact insurers.
23	Disseminate precautionary information on post disaster health hazards and remedies.
24	Replenish depleted resources such as firefighting materials, rescue materials.

<b>III EMERGENCY CO - ORDINATOR</b>	
25	Establish a program to restore both the disaster site and the damaged materials to a stable and usable condition.
26	Maintain the DMP resources.
27	Organize Fire Drill, Safety Audits, Mock Drills and periodic training and DMP awareness program.

<b>IV SUPERVISOR</b>	
1	On receiving signal, information of the incident Security person to confirm and raise the site emergency alarm, Inform the Site Incident Controller.
2	On receiving emergency alert supervisor of the affected area to proceed to site (if not already at incident spot) as directed from ECC.
3	Supervisor of the non-affected area to keep attention to announcements and follow Emergency

	Co-Ordinator instructions.
4	Watch and ward & security persons carry out Traffic control, law and order situation and crowd control at Assembly point. Keep the fire tender routes free from obstruction.
5	Guide and assist the Bomb detection squad.
6	Supervise and assist the search and rescue team for evacuation, search of the trapped persons and rescue of the same to assembly area.
7	Alert all occupants without further compromising life and assist those which are persons with special needs.
8	If people are buried under the debris, call for help of the rescue teams and render your help.
9	Assist in head count at assembly point and give feedback to Site Incident Controller.
10	Maintain an updated list of emergency telephone numbers at ECC.
11	Clean and rehabilitate the disaster site.
12	Perform such other duties as assigned by Chief Site Controller.
13	Ensure occupants do not attempt to re-enter the building until it is safe to do so.

<b>V</b>	<b>EMERGENCY RESPONDENT TEAMS – (SAR) TEAM</b>
1	On receiving emergency alert SAR team members to proceed to ECC, get equipped with required PPE and proceed to incident site or as directed from ECC.
2	Firefighting trained persons to Carry out Firefighting operations and try to put it out with help of people around you if safe to do so. On arrival of fire brigade; assist and provide required information.
3	Search for the trapped persons and rescue of the same to assembly area.
4	Provide first aid trained persons to provide first aid to injured where ever necessary and shift to first aid room for further action.
5	Carry out evacuation of the building as per directions from ECC. Ensure the safe evacuation of all occupants from the building.
6	Perform such other duties as assigned by Chief Site Controller.

<b>VI</b>	<b>EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Ensure uninterrupted power supply in case affected to emergency equipments.
3	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts; bring the lifts to safe position.
4	Assist the search and rescue team in case of any metal cutting operation, vehicle failures etc.
5	Attend Lift failures.
6	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts; bring the lifts to safe position.
7	Perform such other duties as assigned by Chief Site Controller.

<b>VII</b>	<b>EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM</b>
1	When informed of the disaster/ potential disastrous event at site, proceed to ECC or keep available for communication.
2	Assess the relevant data received at ECC.
3	Assist the Chief Site Controller in decision making process.
4	Collect relevant information and Take stock of situation time to time and advise the Site Chief Controller.
5	Give feedback on revision of the DMP in view of the lessons learnt from the incident.

<b>VIII</b>	<b>ALL OTHER AT SITE</b>
1	In Case of noticing any doubtful object / threat call :
	a) Do not run, walk fast away from the object, do not create panic.
	b) Inform Site Incident Controller.
2	On receiving emergency evacuation proceed to Assembly point. If assemble point is affected by incident use alternate assembly point/ outside location as declared by site main controller. While evacuating take visitors, and physically challenged personnel along.
3	Persons of non-affected building/ area keep attention to announcements and follow Emergency Co-Ordinator instructions.
4	Co-operate in evacuation head count procedure at Assembly Point.
5	Keep calm, switch on the transistor radio and obey any instructions you receive on the TV, radio, Public Address System, siren alarm or verbal mode of communication.

## SOP NO. 3: EVACUATION

<b>I</b>	<b>CHIEF SITE CONTROLLER</b>
1	Proceed to ECC when informed of the disaster/ potential disastrous event at site.
2	On arrival at ECC The Chief Site Controller Shall relieve the Site Incident Controller of responsibility of overall main control of the event.
3	In consultation with Site Incident Controller and advisory team The Chief Site Controller will take stock of the situation like exact location, number of people and the area affected etc. decide on level of emergency, establish immediate priorities and Guide The Site Incident Controller and emergency co-ordinator accordingly.
4	Ensure that all the key persons are available on site/ performing the task.
5	Delegate any extra duty to relevant person depending upon the situation.
6	Ensure that adequate safety measures for responders and affected communities are in place all the time.
7	Ensure smooth working of all the emergency respondents and make sure that all conflicts (if any) are resolved.
8	Withdraw the staff in case of the human life is in peril.
9	Authorize release of information to the media.
10	Ensure financial support for the disaster control activities and relief materials.
11	Keep contact with District Disaster Control Room.
12	Get the de-warning from District Control Room and announce the same.
13	Give authorization for clearance signal to the Site Incident Controller and emergency coordinator when everything becomes normal.
14	Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
1	On hearing of emergency alarm immediately proceed to site of incident (unless already present there). to take charge and give guidance over public address system.
2	Assume the additional responsibility of the Chief Site Controller till the arrival of the Chief Site Controller.
3	Assess the level of emergency and activate emergency services of Fire and security department, inform Fire brigade, Police, Site Chief Controller and Site Emergency Co-Ordinator.
4	Identify the areas likely to be affected by the emergency. Give information as required by the Fire Brigade and Police.
5	Carry out fire fighting and evacuation operations.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinery.
9	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
10	Guide the search and rescue team with geographic information and persons trapped.
11	Get the de-warning authorization from the Chief Site Controller and communicate the same to security head for giving all clear alarm.
12	Update the Record and documentation.

13	Perform such other duties as assigned by Chief Site Controller.
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<b>III EMERGENCY CO - ORDINATOR</b>	
1	On receiving emergency information Proceed to Emergency Control Centre.
2	Call Police, Fire brigade and Mobilizing site emergency services.
3	Give immediate assessment to the authority on damage, massive casualty etc.
4	Inform Police, Fire brigade and Mobilizing site emergency services.
5	Mobilizing resources required for emergency response teams working.
6	Release of authorized information to the media and take steps to reduce/ eliminate panic. Set up of help desk and information centers to provide response information to the public, relatives of victims and media.
7	Assure occupants of continuous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinery.
9	Call for participating in the emergency response and coordinate between all emergency respondents such as various line departments, representatives of Govt. authorities/ IRT's/ NGO's and ULB's etc.
10	Perform such other duties as assigned by Chief Site Controller.
11	Follow up of injured at hospital.
12	Setting up help desk and information centers will be set up to provide response information to the public, relatives of victims and media.
13	Mobilizing Emergency Respondent teams, IRT's, NGO's.
14	Communication with district disaster control cell and declaring off site emergency (if situation escalates).
15	Release of authorized information to the media.
16	Emergency under control report to Chief Site Controller.
17	Termination of emergency and 'All Clear Alarm'.
18	Analyze the disaster and improve the DMP in the light of experience.
19	Contact insurers.
20	Disseminate precautionary information on post disaster health hazards and remedies.
21	Replenish depleted resources such as fire fighting materials, rescue materials.
22	Establish a program to restore both the disaster site and the damaged materials to a stable and usable condition.
23	Maintain the DMP resources.
24	Organize Fire Drill, Safety Audits, Mock Drills and periodic training and DMP awareness program.

<b>IV SUPERVISOR</b>	
1	On receiving signal, information of the incident Security person to confirm and raise the site emergency alarm, Inform the Site Incident Controller.
2	On receiving emergency alert supervisor of the affected area to proceed to site (if not already at incident spot) as directed from ECC.
3	Supervisor of the non affected area to keep attention to announcements and follow Emergency Co-Ordinator instructions.
4	Watch and ward & security persons carry out Traffic control, law and order situation and crowd control at Assembly point. Keep the fire tender routes free from obstruction.
5	Guide and assist to carry out fire fighting operations.
6	Supervise and assist the search and rescue team for evacuation, search of the trapped persons and rescue of the same to assembly area.
7	Alert all occupants without further compromising life and assist those which are persons with

	special needs.
8	If people are buried under the debris, call for help of the rescue teams and render your help.
9	Assist in head count at assembly point and give feed back to Site Incident Controller.
10	Maintain an updated list of emergency telephone numbers at ECC.
11	Clean and rehabilitate the disaster site.
12	Perform such other duties as assigned by Chief Site Controller.
13	Ensure occupants do not attempt to re-enter the building until it is safe to do so.

<b>V EMERGENCY RESPONDENT TEAMS – (SAR) TEAM</b>	
1	On receiving emergency alert SAR team members to proceed to ECC, get equipped with required PPE and proceed to incident site or as directed from ECC.
2	Fire fighting trained persons to Carry out Fire fighting operations and try to put it out with help of people around you if safe to do so. On arrival of fire brigade; assist and provide required information.
3	Search for the trapped persons and rescue of the same to assembly area.
4	Provide first aid trained persons to provide first aid to injured where ever necessary and shift to first aid room for further action.
5	Carry out evacuation of the building as per directions from ECC. Ensure the safe evacuation of all occupants from the building.
6	Perform such other duties as assigned by Chief Site Controller.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Ensure uninturepted water supply to fire hydrant system. (Water re-connection is a priority if affected in the incidence).
3	Restore power supply in case affected to emergency equipments (Loss of power will mean loss of fire systems if prolonged).
4	Ensure uninturepted power supply to fire water pumps and emergency lighting.
5	Restore Power supply to emergency lighting.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
6	Restore and maintain communication network such as PAS system, siren, phones, TV, radio systems.
7	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts, bring the lifts to safe position.
8	Attend Lift failures.
9	Ensure working of drantage, de watering pumps.
10	Assist the search and rescue team in case of any metal cutting operation, vehicle failures etc.
11	Perform such other duties as assigned by Chief Site Controller.

<b>VII EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM</b>	
1	When informed of the disaster/ potential disastrous event at site, proceed to ECC or keep available for communication.
2	Assess the relevent data received at ECC.
3	Assist the Chief Site Controller in decision making process.
4	Collect relevant information and take stock of situation time to time and advise the Site Chief Controller.
5	Give feed back on revision of the DMP in view of the lessons learnt from the incident.

<b>VIII</b>		<b>ALL OTHER AT SITE</b>	
1	In Case of noticing Fire:		
	a)	Raise the raise break glass fire alert.	
	b)	Dial '(101 fire brigade emergency number)'and inform fire/ security department location and incidence.	
	c)	Raise verbal fire alarm to activate other persons in the area.	
2	Contain the fire by closing windows and doors to minimize the danger of the fire and smoke spreading.		
3	Extinguish the fire if; you have been trained in the use of a fire extinguisher, it is safe to do so or you have someone in support.		
4	Remove or help to Rescue occupants from the area of immediate danger. To refuge area and follow further instructions from ECC regarding evacuation.		
5	On receiving emergency evacuation evacuation proceed to Assembly point.		
6	Persons of non affected building/ area keep attention to announcements and and follow Emergency Co-Ordinator instructions.		
7	Co-operate in evacuation head count procedure at Assembly Point.		
8	Keep calm, switch on the transistor radio and obey any instructions you receive on the TV, radio, public address system, siren alarm or verbal mode of communication.		

## SOP NO. 4: CYCLONE

<b>I</b>	<b>CHIEF SITE CONTROLLER</b>
1	Proceed to ECC when informed of the disaster/ potential disastrous event at site.
2	On arrival at ECC The Chief Site Controller Shall relieve the Site Incident Controller of responsibility of overall main control of the event.
3	In consultation with Site Incident Controller and advisory team The Chief Site Controller will take stock of the situation like exact location, number of people and the area affected etc. decide on level of emergency, establish immediate priorities and Guide The Site Incident Controller and Emergency Co-Ordinator accordingly.
4	Ensure that all the key persons are available on site/ performing the task.
5	Delegate any extra duty to relevant person depending upon the situation.
6	Ensure that adequate safety measures for responders and affected communities are in place all the time.
7	Ensure smooth working of all the emergency respondents and make sure that all conflicts (if any) are resolved.
8	Withdraw the staff in case of the human life is in peril.
9	Authorize release of information to the media.
10	Ensure financial support for the disaster control activities and relief materials.
11	Keep contact with District Disaster Control Room.
12	Get the de-warning from District Control Room and announce the same.
13	Give authorization for clearance signal to the Site Incident Controller and emergency coordinator when everything becomes normal.
14	Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
1	On hearing of emergency alarm immediately proceed to site of incident (unless already present there) to take charge and give guidance over public address system.
2	Assume the additional responsibility of the Chief Site Controller till the arrival of the Chief Site Controller.
3	Assess the level of emergency and activate emergency services of Fire and security department, inform Fire brigade, Police, Site Chief Controller and Site Emergency Co-Ordinator.
4	Identify the areas likely to be affected by the emergency. Give information as required by the Fire Brigade and Police.
5	Carry out fire fighting and evacuation operations.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinery.
9	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
10	Guide the search and rescue team with geographic information and persons trapped.
11	Get the de-warning authorization from the Chief Site Controller and communicate the same to security head for giving all clear alarm.

12	Update the Record and documentation.
13	Perform such other duties as assigned by Chief Site Controller.

<b>III EMERGENCY CO-ORDINATOR</b>	
1	On receiving emergency information Proceed to Emergency Control Centre.
2	Call Police, Fire brigade and Mobilizing site emergency services.
3	Give immediate assessment to the authority on damage, massive casualty etc.
4	Inform Police, Fire brigade and Mobilizing site emergency services.
5	Mobilizing resources required for emergency response teams working.
6	Release of authorized information to the media and take steps to reduce/ eliminate panic. Set up of help desk and information centers to provide response information to the public, relatives of victims and media.
7	Assure occupants of continuous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinery.
9	Call for participating in the emergency response and Coordinate between all emergency respondents such as various line departments, representatives of Govt. authorities/ IRT's/ NGO's and ULB's etc.
10	Perform such other duties as assigned by Chief Site Controller.
11	Follow up of injured at hospital.
12	Setting up help desk and information centers will be set up to provide response information to the public, relatives of victims and media.
13	Mobilizing Emergency Respondent teams, IRT's, NGO's.
14	Communication with district disaster control cell and declaring off site emergency (if situation escalates).
15	Release of authorized information to the media.
16	Emergency under control report to Chief Site Controller.
17	Termination of emergency and 'All Clear Alarm'.
18	Analyze the disaster and improve the DMP in the light of experience.
19	Contact insurers.
20	Disseminate precautionary information on post disaster health hazards and remedies.
21	Replenish depleted resources such as fire fighting materials, rescue materials.
22	Establish a program to restore both the disaster site and the damaged materials to a stable and usable condition.
23	Maintain the DMP resources
24	Organize Fire Drill, Safety Audits, Mock Drills and periodic training and DMP awareness program.

<b>IV SUPERVISOR</b>	
1	On receiving signal, information of the incident Security person to confirm and raise the site emergency alarm, Inform the Site Incident Controller.
2	On receiving emergency alert supervisor of the affected area to proceed to site (if not already at incident spot) as directed from ECC.
3	Supervisor of the non affected area to keep attention to announcements and follow Emergency Co-Ordinator instructions.
4	Watch and ward & security persons carry out Traffic control, law and order situation and crowd control at Assembly point. Keep the fire tender routes free from obstruction.
5	Guide and assist to carry out rescue operations.
6	Supervise and assist the search and rescue team for evacuation, search of the trapped persons and rescue of the same to assembly area.
7	Alert all occupants without further compromising life and assist those which are persons with

	special needs.
8	If people are buried under the debris, call for help of the rescue teams and render your help.
9	Assist in head count at assembly point and give feed back to Site Incident Controller
10	Maintain an updated list of emergency telephone numbers at ECC.
11	Clean and rehabilitate the disaster site.
12	Perform such other duties as assigned by Chief Site Controller.
13	Ensure occupants do not attempt to re-enter the building until it is safe to do so.

<b>V EMERGENCY RESPONDENT TEAMS – (SAR) TEAM</b>	
1	On receiving emergency alert SAR team members to proceed to ECC, get equipped with required PPE and proceed to incident site or as directed from ECC.
2	Search for the trapped persons and rescue of the same to assembly area.
3	Provide first aid trained persons to provide first aid to injured where ever necessary and shift to first aid room for further action.
4	Carry out evacuation of the building as per directions from ECC. Ensure the safe evacuation of all occupants from the building.
5	Perform such other duties as assigned by Chief Site Controller.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Ensure uninturepted water supply to fire hydrant system. (Water re-connection is a priority if affected in the incidence).
3	Restore power supply in case affected to emergency equipments (Loss of power will mean loss of fire systems if prolonged).
4	Restore and maintain communication network such as PAS system, siren, phones, TV, radio systems.
5	Attend Lift failures.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
6	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts, bring the lifts to safe position.
7	Ensure working of drainage, de watering pumps if flooding is likely.
8	Assist the search and rescue team in case of any metal cutting operation, vehicle failures etc.
9	Perform such other duties as assigned by Chief Site Controller.

<b>VII EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM</b>	
1	When informed of the disaster/ potential disastrous event at site, proceed to ECC or keep available for communication.
2	Assess the relevent data received at ECC.
3	Assist the Chief Site Controller in decision making process.
4	Collect relevant information and Take stock of situation time to time and advise the Site Chief Controller.
5	Give feed back on revision of the DMP in view of the lessons learnt from the incident.

<b>VIII ALL OTHER AT SITE</b>	
1	In Case of receiving cyclone warning follow the instructions from ECC.
2	Remove or help to Rescue occupants from the area of immediate danger. To refuge area and

	follow further instructions from ECC regarding evacuation.
3	On receiving emergency evacuation evacuation proceed to Assembly point.
4	Persons of non affected building/ area keep attention to announcements and and follow Emergency Co-Ordinator instructions.
5	Co-operate in evacuation head count procedure at Assembly Point.
6	Keep calm, switch on the transistor radio and obey any instructions you receive on the TV, radio, public address system, siren alarm or verbal mode of communication.

## SOP NO. 5: EARTHQUAKE

<b>I</b>	<b>CHIEF SITE CONTROLLER</b>
1	Proceed to ECC when informed of the disaster/ potential disastrous event at site.
2	On arrival at ECC The Chief Site Controller Shall relieve the Site Incident Controller of responsibility of overall main control of the event.
3	Analyze the available initial information on damage and needs. Verify the authentic of the incident and take decision on the level of the disaster, inform District Disaster Control Cell and mobilize external support agencies.
4	Ensure that all the key persons are available on site/ performing the task.
5	Delegate any extra duty to relevant person depending upon the situation.
6	Ensure that adequate safety measures for responders and affected communities are in place all the time.
7	Ensure smooth working of all the emergency respondents and make sure that all conflicts (if any) are resolved.
8	Withdraw the staff in case of the human life is in peril.
9	Authorize release of information to the media.
10	Ensure financial support for the disaster control activities and relief materials.
11	Keep contact with District Disaster Control Room.
12	Get the de-warning from District Control Room and announce the same.
13	Give authorization for clearance signal to the Site Incident Controller and emergency coordinator when everything becomes normal.
14	Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
1	On hearing of emergency alarm immediately proceed to site of incident (unless already present there) to take charge and give guidance over public address system.
2	Assume the additional responsibility of the Chief Site Controller till the arrival of the Chief Site Controller.
3	Assess the level of emergency and activate emergency services of Fire and security department, inform fire brigade, Police, Site Chief Controller and Site Emergency Co-Ordinator.
4	Identify the areas likely to be affected by the emergency. Give information as required by the Fire Brigade and Police.
5	Inform the Chief Site Controller and activate DMP Activate emergency services for firefighting (if any), the search and rescue teams in the affected areas with immediate effect.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
8	Activate first aiders to provide first aid to affected and arranges to shift injured people to hospital if required. Emergency Co-ordinator to ensure appropriate mobilization of medical services from external agencies.
9	Activate Maintenance team to reestablish communication links and restoration of critical utility services like water for fire fighting, restoration of access roads.
10	Assist the law and order machinery.

11	Carry out fire fighting and evacuation operations, keep communication with emergency teams and the affected persons in the building especially in lifts and rooms.
12	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team so that rescue team knows where to concentrate their efforts in the event of building collapse.
13	Guide the search and rescue team with geographic information and persons trapped.
14	Get the de-warning authorization from the Chief Site Controller and communicate the same to security head for giving all clear alarm.
15	Update the Record and documentation.
16	Perform such other duties as assigned by Chief Site Controller.

<b>III EMERGENCY CO-ORDINATOR</b>	
1	On receiving emergency information Proceed to Emergency Control Centre.
2	Call Police, Fire brigade and Mobilizing site emergency services.
3	Give immediate assessment to the authority on damage, massive casualty etc.
4	Mobilize emergency response teams, co ordinate with District disaster cell for IRT's. NGO's help and establish media management/ guidance to volunteers and aid agencies and for rumor control.
5	Mobilize resources required for emergency response teams working.
6	Release of authorized information to the media and take steps to reduce/ eliminate panic. Set up of help desk and Information centers to provide response information to the public, relatives of victims and media.
7	Assure occupants of contineous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinary.
9	Liaise with the law and order machinary.
10	Perform such other duties as assigned by Chief Site Controller.
11	Follow up of injured at hospital.
12	Setting up help desk and information centers will be set up to provide response information to the public, relatives of victims and media.
13	Emergency Co-coordinator to Mobilize ECC if not affected or alternate ECC if required and feasible; Assembly point and head count.
14	Communication with district disaster control cell and declaring off site emergency (if situation escalates).
15	Release of authorized information to the media.
16	Emergency under control report to Chief Site Controller.
17	Termination of emergency and 'All Clear Alarm'.

<b>III EMERGENCY CO-ORDINATOR</b>	
18	Provide additional security in affected areas and maintain law and order situation.
19	Analyze the disaster and improve the DMP in the light of experience.
20	Contact insurers.
21	Disseminate precautionary information on post disaster health hazards and remedies.
22	Replenish depleted resources such as fire fighting materials, rescue materials.
23	Develop situation report of the affected areas and share with all Stakeholders. Establish a program to restore both the disaster site and the damaged materials to a stable and usable condition.
24	Maintain the DMP resources.
25	Organize Fire Drill, Safety Audits, Mock Drills and periodic training and DMP awareness program.

<b>IV SUPERVISOR</b>	
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1	Earth quake noticed manually or detected on equipment/ sensor fire department supervisor to activate at site alarm from control room.
2	Watch and ward & security persons carry out Traffic control, law and order situation and crowd control at Assembly point. Keep the fire tender routes free from obstruction
3	Guide and assist to carry out fire fighting operations.
4	Supervise and assist the search and rescue team for evacuation, search of the trapped persons and rescue of the same to assembly area.
5	Alert all occupants without further compromising life and assist those which are persons with special needs.
6	If people are buried under the debris, call for help of the rescue teams and render your help.
7	Assist in head count at assembly point and give feed back to Site Incident Controller.
8	Maintain an updated list of emergency telephone numbers at ECC.
9	Clean and rehabilitate the disaster site.
10	Perform such other duties as assigned by Chief Site Controller.
11	Ensure occupants do not attempt to re-enter the building until it is safe to do so.

<b>V EMERGENCY RESPONDENT TEAMS – (SAR) TEAM</b>	
1	On receiving emergency alert SAR team members to proceed to ECC, get equipped with required PPE and proceed to incident site or as directed from ECC.
2	Fire fighting trained persons to carry out Fire fighting operations and try to put it out with help of people around you if safe to do so. On arrival of fire brigade; assist and provide required information.
3	Search for the trapped persons and rescue of the same to assembly area.
4	Provide first aid trained persons to provide first aid to injured where ever necessary and shift to first aid room for further action.
5	Carry out evacuation of the building as per directions from ECC. Ensure the safe evacuation of all occupants from the building.
6	Perform such other duties as assigned by Chief Site Controller.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Restore essential services i.e. power, water supply, communication Facilities such as PAS system, siren, phones, TV, radio systems. etc. on priority basis.
3	Ensure working of drainage, de watering pumps.
4	Assist the search and rescue team in case of any metal cutting operation, vehicle failures etc.
5	Attend Lift failures.
6	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts, bring the lifts to safe position.
7	Regular maintenance of lightening arrestor.
8	Perform such other duties as assigned by Chief Site Controller.

<b>VII EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM</b>	
1	When informed of the disaster/ potential disastrous event at site, proceed to ECC or keep available for communication.
2	Assess the relevant data received at ECC.
3	Assist the Chief Site Controller in decision making process.
4	Collect relevant information and Take stock of situation time to time and advise the Site Chief

	Controller.
5	Give feed back on revision of the DMP in view of the lessons learnt from the incident.

<b>VIII</b>	<b>ALL OTHER AT SITE</b>
1	Practice Drop, Cover, protect head with both hands.and Hold on to it so that it do not move away from you Wait there until the shaking stops.
2	Extinguish the fire if; you have been trained in the use of a fire extinguisher, it is safe to do so or you have someone in support.
3	Remove or help to Rescue occupants from the area of immediate danger. To refuge area and follow further instructions from ECC regarding evacuation.
4	On receiving emergency evacuation evacuation proceed to Assembly point.
5	Persons of non affected building/ area keep attention to announcements and and follow Emergency Co-Ordinator instructions.
6	Co-operate in evacuation head count procedure at Assembly Point.
7	Keep calm, switch on the transistor radio and obey any instructions you receive on the TV, radio, Public Address System, siren alarm or verbal mode of communication.
	Note: expect earthquake aftershocks be aware that items, especially those stored overhead may well have become dislodged.
8	Re-occupy when safe to do so.

## SOP NO. 6: FLOOD

<b>I</b>	<b>CHIEF SITE CONTROLLER</b>
1	Proceed to ECC when informed of the disaster/ potential disastrous event at site.
2	On arrival at ECC The Chief Site Controller Shall relieve the Site Incident Controller of responsibility of overall main control of the event.
3	In consultation with Site Incident Controller and advisory team The Chief Site Controller will take stock of the situation like exact location, number of people and the area affected etc. decide on level of emergency, establish immediate priorities and Guide The Site Incident Controller and Emergency Co-Ordinator accordingly.
4	Ensure that all the key persons are available on site/ performing the task.
5	Delegate any extra duty to relevant person depending upon the situation.
6	Ensure that adequate safety measures for responders and affected communities are in place all the time.
7	Ensure smooth working of all the emergency respondents and make sure that all conflicts (if any) are resolved.
8	Withdraw the staff in case of the human life is in peril.
9	Authorize release of information to the media.
10	Ensure financial support for the disaster control activities and relief materials.
11	Keep contact with District Disaster Control Room.
12	Get the de-warning from District Control Room and announce the same
13	Give authorization for clearance signal to the Site Incident Controller and emergency coordinator when everything becomes normal.
14	Determine priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
1	On hearing of emergency alarm immediately proceed to site of incident (unless already present there) to take charge and give guidance over public address system.
2	Assume the additional responsibility of the Chief Site Controller till the arrival of the Chief Site Controller.
3	Assess the level of emergency and activate emergency services of Fire and security department, inform Fire brigade, Police, Site Chief Controller and Site Emergency Co-Ordinator.
4	Identify the areas likely to be affected by the emergency. Give information as required by the Fire Brigade and Police.
5	Carry out the emergency operations.
6	Use PAS, megaphone, cell phones to keep two way communication with emergency teams and the affected persons in the building especially in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinery.

<b>II</b>	<b>SITE INCIDENT CONTROLLER</b>
9	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team.
10	Guide the search and rescue team with geographic information and persons trapped.
11	Get the de-warning authorization from the Chief Site Controller and communicate the same to security head for giving all clear alarm.
12	Update the Record and documentation.

13	Perform such other duties as assigned by Chief Site Controller.
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<b>III</b>	<b>EMERGENCY CO-ORDINATOR</b>
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1	On receiving emergency information Proceed to Emergency Control Centre.
2	Call Police, Fire brigade and Mobilizing site emergency services.
3	Give immediate assessment to the authority on damage, massive casualty etc.
4	Inform Police, Fire brigade and Mobilizing site emergency services.
5	Mobilizing resources required for emergency response teams working.
6	Release of authorized information to the media and take steps to reduce/ eliminate panic. Set up of help desk and information centers to provide response information to the public, relatives of victims and media.
7	Assure occupants of continuous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinery.
9	Call for participating in the emergency response and Coordinate between all emergency respondents such as various line departments, representatives of Govt. authorities/ IRT's/ NGO's and ULB's etc.
10	Perform such other duties as assigned by Chief Site Controller.
11	Follow up of injured at hospital.
12	Setting up help desk and information centers will be set up to provide response information to the public, relatives of victims and media.
13	Mobilizing Emergency Respondent teams, IRT's, NGO's.
15	Communication with district disaster control cell and declaring off site emergency (if situation escalates).
16	Release of authorized information to the media.
17	Emergency under control report to Chief Site Controller.
18	Termination of emergency and 'All Clear Alarm'.
19	Analyze the disaster and improve the DMP in the light of experience.
20	Contact insurers.
21	Disseminate precautionary information on post disaster health hazards and remedies, Test drinking water for portability; wells should be pumped out and the water tested before drinking.
22	Replenish depleted resources such as fire fighting materials, rescue materials.
23	Establish a program to restore both the disaster site and the damaged materials to a stable and usable condition.
24	Maintain the DMP resources.
25	Organize Fire Drill, Safety Audits, Mock Drills and periodic training and DMP awareness program.

<b>IV</b>	<b>SUPERVISOR</b>
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1	On receiving signal, information of the incident Security person to confirm and raise the site emergency alarm, inform the Site Incident Controller.
2	On receiving emergency alert supervisor of the affected area to proceed to site (if not already at incident spot) as directed from ECC.
3	Supervisor of the non affected area to keep attention to announcements and follow Emergency Co-Ordinator instructions.
4	Watch and ward & security persons carry out Traffic control, law and order situation and crowd control at Assembly point. Keep the fire tender routes free from obstruction
5	Guide and assist to carry out fire fighting operations.
6	Supervise and assist the search and rescue team for evacuation, search of the trapped persons and rescue of the same to assembly area.
7	Alert all occupants without further compromising life and assist those which are persons with

	special needs.
8	If people are trapped in flood, call for help of the rescue teams and render your help.
9	Assist in head count at assembly point and give feed back to Site Incident Controller.
10	Maintain an updated list of emergency telephone numbers at ECC.
11	Clean and rehabilitate the disaster site.
12	Perform such other duties as assigned by Chief Site Controller.
13	Ensure occupants do not attempt to re-enter the building until it is safe to do so.

<b>V EMERGENCY RESPONDENT TEAMS – (SAR) TEAM</b>	
1	On receiving emergency alert SAR team members to proceed to ECC, get equipped with required PPE and proceed to incident site or as directed from ECC.
2	Carry out rescue operation of the flood affected persons. On arrival of fire brigade; assist and provide required information.
3	Search for the trapped persons and rescue of the same to assembly area.
4	Provide first aid trained persons to provide first aid to injured where ever necessary and shift to first aid room for further action.
5	Carry out evacuation of the building as per directions from ECC. Ensure the safe evacuation of all occupants from the building.
6	Secure their (evacuated person's) homes/ establishments. Close and lock doors and windows.
7	Perform such other duties as assigned by Chief Site Controller.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Restore power supply in case affected to emergency equipments (Loss of power will mean loss of fire systems if prolonged).
3	Restore Power supply to emergency lighting.

<b>VI EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM</b>	
4	Restore and maintain communication network such as PAS system, siren, phones, TV, radio systems.
5	Attend Lift failures.
6	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts, bring the lifts to safe position.
7	Ensure working of drainage, de watering pumps.
8	Assist the search and rescue team in case of any metal cutting operation, vehicle failures etc.
9	Perform such other duties as assigned by Chief Site Controller.

<b>VII EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM</b>	
1	When informed of the disaster/ potential disastrous event at site, proceed to ECC or keep available for communication.
2	Assess the relevant data received at ECC.
3	Assist the Chief Site Controller in decision making process.
4	Collect relevant information and Take stock of situation time to time and advise the Site Chief Controller.
5	Give feed back on revision of the DMP in view of the lessons learnt from the incident.

<b>VIII</b>	<b>ALL OTHER AT SITE</b>
1	On receiving emergency evacuation evacuation proceed to Assembly point.
2	Persons of non affected building/ area keep attention to announcements and and follow Emergency Co-Ordinator instructions.
3	Co-operate in evacuation head count procedure at Assembly Point.
4	Keep calm, switch on the transistor radio and obey any instructions you receive on the TV, radio, public address system, siren alarm or verbal mode of communication.

## DO'S & DON'T

### FIRE /EXPLOSION

DO'S	DON'TS
<ul style="list-style-type: none"> <li>▪ On noticing fire emergency actuate nearest fire alarm button and/ or inform the Supervisor and follow further instructions and proceed to assembly point.</li> <li>▪ Supervisor to inform fire brigade and mobilize firefighting trained persons,</li> <li>▪ Cordon off the area, move upwind and evacuate the area.</li> <li>▪ Keep the gas cylinder cool with water spray.</li> <li>▪ Use AFFF (Aq. Film Forming Foam) to blanket the oil ,diesel spill area.</li> <li>▪ If there's a lot of smoke, crawl along the floor where the air will be cleanest.</li> <li>▪ In case cloth on fire lie on ground and cover in blanket.</li> <li>▪ In case of burn injury ,pour water on burn for at least for 10 minutes. Remove tight items such as watch before swelling occurs. Avoid breaking the burn blisters on skin and removing pieces of burnt cloth.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Do not enter the site unless instructed if you are outside and disaster alarm is heard.</li> <li>▪ No smoking</li> <li>▪ Avoid use of lift during fire at building.</li> <li>▪ Do not panic. Avoid running all over the place prevent others from doing so.</li> </ul>

### BOMB THREAT

DO'S	DON'TS
<ul style="list-style-type: none"> <li>▪ Cordon off the area.</li> <li>▪ Evacuate the area</li> <li>▪ Be careful about entering into a room in which or seat which an explosion has occurred to bring you there. It may be used to trap you.</li> <li>▪ Examine carefully without moving or tilting the suspected object, its shape, size construction, finish, marking and special features, if any. Note these particulars down. Try to identify it ascertain whether the object has been moved or handled before you saw it.</li> <li>▪ Consideration should be given to suspicious vehicles/packages at the ECC and Assembly points also.</li> <li>▪ Follow the rule "DO NOT TAKE THE BOMB AWAY FROM THE PUBLIC. TAKE THE PEOPLE AWAY FROM THE BOMB".</li> </ul>	<ul style="list-style-type: none"> <li>▪ Do not panic.</li> <li>▪ Do not open a closed room/ door/ window/ cupboard/ box in the normal way tap wood cover and open with a ling pole or in any other improvised manner.</li> <li>▪ Do not switch on any electric line, if the room is dark. Use hand torch for illumination.</li> <li>▪ Do not touch, lift, drag kick, hit or move the suspected object, examine room or place quickly to see, if there is any wire or string held taut, any loose pair of insulated wires connected door/ window/ cupboard/ box or any lighted fuse or lighted rope if so.</li> </ul>

### LETTERS/ PACKET/ PARCELS/ BOOKS BOMB

**Do follow those instructions intelligently and closely. Don't bend or press hard.**

<b>Do examine all closed covers, thin or bulky, against a source of a strong light, if cover is not uniformly translucent, suspect.</b>	<b>Don't open a closed cover which is more than 3 mm thick until you have examined it according to the instructions.</b>
<b>Do handle object gently, carefully and cautiously.</b>	<b>Don't hastily pull out content of closed cover until you have examined them.</b>
<b>Do be particularly careful about letter over 3 mm in thickness and closed packets/parcels which are marked, "Personal and Confidential" or are dispatched from Post offices in the European continent.</b>	<b>Don't pull out contents of a closed cover if it does not come out smoothly.</b>

<b>EVACUATION</b>	
<b>DO'S</b>	<b>DON'TS</b>
<ul style="list-style-type: none"> <li>• <b>Remain calm.</b></li> <li>• <b>Walk out of the building quietly and orderly manner.</b></li> <li>• <b>Follow the evacuation route only.</b></li> <li>• <b>Follow instruction from guides on any confusion about the route and assembly area.</b></li> <li>• <b>Switch off the machinery and power supply before leaving the area.</b></li> <li>• <b>Help ladies and old people to safe area.</b></li> <li>• <b>Remain in the assembly area until further instructions are given.</b></li> <li>• <b>Check for all the employees at the assembly area. If anybody is missing, the matter should be immediately reported to the co-coordinator of Bomb Threat Committee.</b></li> <li>• <b>Use staircase during evacuation</b></li> <li>• <b>While Evacuation keep clear of buildings and glass in particular</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Do not run. Walk calmly.</b></li> <li>• <b>Do not argue or try to obtain details about the bomb from anybody leading to time loss.</b></li> <li>• <b>Do not obstruct the flow of evacuation.</b></li> <li>• <b>Do not leave any personal belongings.</b></li> <li>• <b>Do not obstruct passage to anybody.</b></li> <li>• <b>Do not make noise at the assembly area.</b></li> <li>• <b>Do not spread rumors.</b></li> <li>• <b>Do not use lift during evacuation .</b></li> </ul>

<b>Cyclone</b>	
<b>DO'S</b>	<b>DON'TS</b>
<p><b>BEFORE THE CYCLONE SEASON</b></p> <ul style="list-style-type: none"> <li>• <b>Check your building and roof are in good condition.</b></li> <li>• <b>Trim tree branches well clear of your house.</b></li> <li>• <b>Clear property of loose material that could cause injury and damage during extreme winds.</b></li> </ul> <p><b>UPON A CYCLONE WARNING</b></p> <ul style="list-style-type: none"> <li>• <b>Listen to local radio/TV for further information</b></li> </ul>	<p><b>UPON A CYCLONE WARNING</b></p> <ul style="list-style-type: none"> <li>• <b>Don't ignore warnings and don't go sightseeing.</b></li> </ul> <p><b>WHEN THE CYCLONE STRIKES</b></p> <ul style="list-style-type: none"> <li>• <b>Beware the calm 'eye'. Don't assume the cyclone is over if a calm period is due to the 'eye', violent winds will soon resume from the opposite direction.</b></li> <li>• <b>If driving, stop - clear of trees, power lines</b></li> </ul>

#### **ON WARNING OF LOCAL EVACUATION**

- **Heed warnings and follow advice given.**

#### **WHEN THE CYCLONE STRIKES**

- **Disconnect all electrical appliances.**
- **Stay inside and shelter well-clear of windows.**
- **Listen to your radio for cyclone updates.**
- **If driving, stop - clear of trees, power lines and streams.**
- **If in a public building, get away from glass.**

#### **AFTER THE CYCLONE**

- **Listen to local radio for official warnings and advice.**
- **Beware of fallen power lines, damaged buildings and trees, and flooded water courses.**

and streams.

- **If in a public building, get away from glass.**

#### **AFTER THE CYCLONE**

- **Don't go outside until advised officially that it is safe.**
- **If you had to evacuate, don't go home until advised. Use route recommended and stay calm.**
- **Don't make unnecessary telephone calls.**

### **EARTHQUAKE**

#### **DO'S**

##### **DURING AN EARTHQUAKE**

- **Keep calm and keep others calm Practice Drop, Cover, protect head with both hands and Hold on to it so that it do not move away from you Wait there until the shaking stops.**
- **Keep away from buildings, especially old, tall buildings or detached buildings, electricity wires and poles, slopes and walls. They are liable to collapse.**
- **Keep the roads clear for the movement of relief and rescue teams.**

##### **INDOORS**

- **Take cover under a sturdy desk, table, or bench or against an inside wall, and hold on. If there isn't a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building.**
- **Stay away from glass, windows, outside doors and walls, and anything that could fall, such as lighting fixtures or furniture.**
- **Stay in bed—if you are there when the earthquake strikes—hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall.**
- **In that case, move to the nearest safe place.**

#### **DON'TS**

##### **DURING AN EARTHQUAKE**

- **Do not panic. Remain calm and self assured and help others who are distressed.**
- **DO NOT use the elevators.**
- **Do not turn on switches if you have electric connection in your place. Use your torch**

- **Do not touch any metal object in contact with loose, hanging electric wires.**
- **Do not go near damaged structures or ender badly damaged buildings**
- **Do not go sightseeing or wandering in the streets aimlessly to see what is happening around.**
- **Do not spread rumors.**

##### **INDOORS**



- **Do not rush to the doors or the exits and keep well away from windows, mirrors and furniture.**



<ul style="list-style-type: none"> <li>• Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load bearing doorway.</li> <li>• Stay inside until the shaking stops and it is safe to go outside. Most injuries during earthquakes occur when people are hit by falling objects when entering into or exiting from buildings.</li> <li>• Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.</li> <li>• Let younger children, elderly and disabled people leave first.</li> </ul>	
<b>OUTDOORS</b> <ul style="list-style-type: none"> <li>• Stay there if safe.</li> <li>• Move away from buildings, streetlights, and utility wires.</li> <li>• You must keep the roads free for movement of rescue and relief teams</li> </ul>	<b>OUTDOORS</b> <ul style="list-style-type: none"> <li>• Do not run and do not wander in the street or on the roads for sightseeing. Walk towards an open place, in a calm and composed manner.</li> </ul>
<b>IN A MOVING VEHICLE</b> <ul style="list-style-type: none"> <li>• Move to side of the road and stop. Stop as quickly as safety permits and stay in the vehicle.</li> <li>• Proceed cautiously once the earthquake has stopped, watching for road and bridge damage.</li> </ul>	<b>IN A MOVING VEHICLE</b> <ul style="list-style-type: none"> <li>• Avoid stopping near or under buildings, trees, overpasses, and utility wires.</li> </ul>
<b>TRAPPED UNDER DEBRIS</b> <ul style="list-style-type: none"> <li>• Cover your mouth with a handkerchief or clothing.</li> <li>• Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout only as a last resort—shouting can cause you to inhale dangerous amounts of dust.</li> <li>• Rescue operation - Let the unconscious person lie on side position. Check for injuries and first treat yourself, then help others.</li> </ul>	<b>TRAPPED UNDER DEBRIS</b> <ul style="list-style-type: none"> <li>• Do not light a match.</li> <li>• Do not move about or kick up dust.</li> </ul>

1. During earthquake







2. **Escape. When your are inside building.**

	
<p>If you are in structurally sound building stay there.</p>	<p>If you are inside an old weak structurally take the fastest and safest way out.</p>




	
<p>Do not use elevators.</p>	<p>After the shaking stops, take the staircase to reach open space.</p>

3. **When your are outside building.**

	
<p>If you are not next to an exit and situated in high rise building/ upstairs stay inside, do not panic, keep calm and take necessary action.</p>	<p>If you are near an exit, leave the building as soon as possible, do not rush to the exit point, get out calmly and orderly manner.</p>

	
<p>Move away from power lines, posts, walls, false ceiling, parapet, falling flower pots and other elements that may fall or collapse.</p>	<p>Stay away from building with glass panes.</p>

4. **When on the road.**

		
<p>If you are near hillside, move away –in case land slide or falling rocks.</p>	<p>While driving vehicle pull to the side of the road and stop.</p>	<p>Do not attempt to cross bridges / flyovers which may have been damaged.</p>

## FLOOD

### DO'S

- **Stay away from downed power lines.**
- **In high flood-prone areas, keep materials on hand like sandbags, plywood, plastic sheeting, and plastic garbage bags.**
- **Be aware of drainage channels and areas known to flood, so that you or your evacuation routes are not cut off.**
- **Follow recommended evacuation routes. Not to take shortcuts. They may be dangerous.**
- **If you choose or are told to evacuate, move to a safe area before access is cut off by flood water.**
- **Monitor local radio/ television broadcasts.**
- **Eat something to make you feel better and more capable of helping others. When you can move out of the place carry with you essential food, water container, torch, transistor radio and medicines you normally use.**
- **Turn off the main water valve and electricity.**
- **Leave early enough to avoid being trapped.**

### DON'TS

- **Do not panic.**
- **Avoid driving into water of unknown depth. Moving water can quickly sweep your vehicle away.**
- **Do not allow children to play in flooded areas.**
- **Do not drink water from open sources/containers without filtering or purification.**
- **Do not use fresh food that has come in contact with floodwaters.**
- **Do not to move into flooded areas because the authorities may have removed the manholes for efficient drainage and the indicators may get shifted due to water currents.**
- **Do not walk on footpath covers may have been dislocated due to current**
- **Do not enter damaged buildings or structures**
- **Do not touch electric poles, utility wires/cables**
- **Do not use telephones except in life-threatening situations**

## ANNEXURE 2 : GLOSSARY

<b>Aftershock</b>	<b>An earthquake of similar or lesser intensity that follows the main earthquake.</b>
<b>Bomb</b>	A device or any size or shape, which can look obvious or be camouflaged, may vary in its sophistication, and may not necessarily explode (i.e incendiaries, toxic/noxious substances, sharps, animals/reptiles). May be referred to as an Improvised Explosive Device (IED).
<b>Bomb Threat</b>	A threat, written or verbal, delivered by electronic, oral or other medium, threatening to place or uses an explosive, chemical, biological or radiological device at a time, date, and place or against a specific person or organization. It is not necessary for any other action to be taken by the offender.
<b>Cyclone</b>	A weather system consisting of an area of low pressure, in which winds circulate at speeds exceeding 61 km/hr, also known as ‘Cyclone’ or Tropical Storm. These are non-frontal synoptic scale weather systems originating over tropical waters with organized convection and definite cyclonic surface wind circulation. Winds rotate around the low pressure centre in an anti-clockwise direction in the Northern Hemisphere and in a clockwise direction in the Southern Hemisphere.
<b>Depression (low pressure area)</b>	Region where the barometric pressure is lower relative to that in the surrounding regions at the same level and wind speed in circulation is between 17 and 27 knot (31 and 49 kmph).
<b>Disaster</b>	As per Disaster Management Act, 2005 “Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, or degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected areas.”
<b>Doppler Radar</b>	Radar capable of measuring the change in frequency of a radar wave caused by the relative motion of an object in the atmosphere within the area of radar coverage.
<b>Earthquake</b>	A sudden slipping or movement of a portion of the earth’s crust, accompanied and followed by a series of vibrations.
<b>Emergency</b>	An emergency is a dangerous event or circumstance that normally can be managed at the local level.
<b>EMERGENCY RESPONSE TEAM (ERT)</b>	Specialist or specially trained personnel to attend to specific incidents to contain control or eliminate the emergency using emergency response equipment. The ERT may be in place longer than the ECO which is primarily focused around evacuation.
<b>Epicenter</b>	The place on the earth’s surface directly above the point on the fault where the earthquake ruptures began. Once fault slippage begins, it expands along the fault during the earthquake and can extend hundreds of miles before stopping.
<b>Evacuation</b>	The orderly movement of people from a place of danger.
<b>Evacuation</b>	Organized, phased and supervised dispersal of people from dangerous or potentially dangerous areas.
<b>Explosion</b>	A sudden release of energy characterized by accompaniment of a blast wave.
<b>Eye of the Cyclone</b>	A term used for the centre of a cyclone. It is the point where the wind rotates in a counter-clockwise direction. In the centre of eye the wind is calm or slight and rainfall and cloudiness is nil or light.
<b>Fault</b>	The fracture across which displacement has occurred during an earthquake. The slippage may range from less than an inch to more than 10 yards in a severe earthquake.

<b>Fire</b>	<b>A process of combustion characterized by heat or smoke or flame or any combination of these. Hazard - any situation that has fire potential.</b>
<b>Gale</b>	Wind with a speed between 34 and 40 knots (Beaufort scale wind force 8).
<b>Hazard</b>	A hazard is a dangerous event or circumstance that has the potential to lead to an emergency or disaster.
<b>Knot</b>	A knot is a unit of speed and used around the world for maritime and aviation purposes. 1 international knot = 1 nautical mile per hour = 1.852 kilometers per hour.
<b>Landfall</b>	A point on the land where a cyclone just crosses the coast.
<b>Magnitude</b>	The amount of energy released during an earthquake, which is computed from the amplitude of the seismic waves. A magnitude of 7.0 on the Richter scale indicates an extremely strong earthquake. Each whole number on the scale represents an increase of about 30 times more energy released than the previous whole number represents. Therefore, an earthquake measuring 6.0 is about 30 times more powerful than one measuring 5.0.
<b>Mitigation</b>	Activities taken to reduce the severity or consequences of an emergency.
<b>Mitigation</b>	Mitigation means measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation.
<b>Personal Emergency Evacuation Plan (Peep)</b>	An individualized emergency plan designed for an occupant with a disability who may need assistance during an emergency.
<b>Physically Challenged Person</b>	The official definition of a disabled person, while helpful in determining who should have a PEEP, may not cover the full range of personnel for whom effective evacuation may be compromised. Obese personnel and those with an illness or injury that is not chronic or permanent may also need assistance in the event of an emergency. Consideration must be given in times of emergency as to the additional resource required to handle both known PEEP holders and persons for whom effective evacuation may prove problematic.
<b>Preparedness</b>	Activities, tasks, programs, and systems developed and implemented prior to an emergency that are used to support the prevention of, mitigation of, response to and recovery from emergencies. It is the state of readiness to deal with a threatening disaster situation or disaster and effects thereof.
<b>Probability (P)</b>	The expression for the likelihood of an occurrence of an event or an event sequence or the likelihood of the success or failure of an event on test or demand.
<b>Recovery</b>	Efforts to return to normal life and protect against future hazards.
<b>Refuge</b>	An area on a floor or area that is specifically designed to protect people from heat, smoke and toxic gases and which provides direct access to an exit.
<b>Response</b>	Immediate and ongoing activities, tasks, programs, and systems to manage the effects of an incident that threatens life, property, operations, or the environment.
<b>Response</b>	Conducting emergency operations to save lives and properties by positioning emergency equipments and supplies, evacuating potential victims, providing food, water, shelter and medical care to those in need and restoring critical services.
<b>Seismic Waves</b>	Vibrations that travel outward from the earthquake fault at speeds of several miles per second. Although fault slippage directly under a structure can cause considerable damage, the vibrations of seismic waves cause most of the destruction during earthquakes.
<b>Severity (S)</b>	The expression for the consequence seriousness associated with each deviation.

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<b>Smoke</b>	<b>Smoke is defined as a mixture of hot vapors and gases produced by the combustion process along with unburned decomposition, condensation matter and the quantity of air that is entrained or otherwise mixed in to the air</b>
<b>VISITOR</b>	A person who is within a facility who is temporarily visiting the facility and is not employed at or for the facility, either on a permanent, casual, temporary, contracting basis, a resident or inmate or studying at the facility. Visitor implies that the person has not received an induction to the Precinct.
<b>Vulnerability</b>	Vulnerability is a concept which describes constraints of an economic, social, ethnic, physical or geographic nature which reduce the ability to cope with the impact of hazards.

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# *Enclosure 16*

## METHODOLOGY

### 1. Methodology of soil sample monitoring

Parameter	Analytical equipment	Standard Method	Methodology	Sensitivity/ Detection limit	Units	Remarks
Colour	--	--	Visual Observation	--	--	--
Bulk Density	Hot Air Oven; Density Bottle; Weighing Balance	UT/LQMS/SOP/S03; Issue No. 2; Issue Date: 14.11.2016	Based on Laboratory Test Procedure For Soil & Water Sample Analysis, Water Resource Department, Directorate of Irrigation Research & Development, Pune, 2009, Page No. 14-15	1	kg/m <sup>3</sup>	--
pH	pH meter	IS : 2720 (Part 26) -1987	Electrometric method	0.1	--	1:2.5 (Soil :Water)
Electrical Conductivity	Conductivity meter	IS 14767:2000, Reaffirmed:2016	Conductometry	0.001	mS/cm	1:2 (Soil :Water)
Moisture content	i. Hot Air Oven; ii. Crucible; iii. Desiccator; iv. Weighing Balance	IS : 2720 (Part 02):1973, Reaffirmed:2015	Oven Drying Method	0.1	%	Analysis as per Standard Methods specified
Organic matter	i. Electric Hot Plate; ii. Volumetric Apparatus; iii. Weighing Balance	IS : 2720 (Part 22):1972, Reaffirmed:2015	Titrimetric method	0.1	%	
Total Organic Carbon	i. Electric Hot Plate; ii. Volumetric Apparatus; iii. Weighing Balance	IS : 2720 (Part 22):1972, Reaffirmed:2015	Titrimetric method	0.1	%	
Water Holding Capacity	i. Hot Air Oven; ii. Gooch Crucible; iii. Weighing Balance	UT/LQMS/SOP/S12; Issue No. 2; Issue Date: 14.11.2016	Based on Methods Manual for Soil Testing, DAC-MOA, GOI, New Delhi, Ed.2011, Page No. 76-77	0.1	%	
Ammonical Nitrogen as NH <sub>3</sub> -N	i. Macro-kjeldahl distillation apparatus;	Is 14684:1999, reaffirmed:2014	Titrimetric method	2	mg/kg	

Parameter	Analytical equipment	Standard Method	Methodology	Sensitivity/ Detection limit	Units	Remarks	
Nitrate & Nitrite as $\text{NO}_3^- + \text{NO}_2^-$	ii. Vacuum pump; iii. Mechanical shaker; iv. Hot air oven	IS 14684:1999, Reaffirmed:2014	Titrimetric method	2	mg/kg		
Total Nitrogen		IS 14684:1999, Reaffirmed:2014	Titrimetric method	2	mg/kg		
Cation Exchange Capacity	i. Mechanical shaker; ii. Distillation assembly; iii. Weighing balance	Ut/lqms/sop/s18; issue no. 2; issue date: 14.11.2016	Based on usepa sw-846, update v, july 2014 method 9080	1	meq/100 g		
<b>Dissolved Analytes</b>	i)Oven ii)Mechanical Shaker iii)Weighing balance iv) Volumetric apparatus	1:10 water extract for water extractable analytes					
Calcium as Ca	i. Volumetric Apparatus; ii. Mechanical Shaker; iii. Weighing Balance	UT/LQMS/SOP/S21; Issue No. 2; Issue Date: 14.11.2016	EDTA Titration Method based on APHA 22nd Ed. 2012, 3500 Ca B	1	mg/kg	1:10 Water Extract to be made and analyzed as per Standard Methods specified.	
Magnesium as Mg		UT/LQMS/SOP/S22; Issue No. 2; Issue Date: 14.11.2016	EDTA Titration Method based on APHA 22nd Ed. 2012, 3500 Mg B	1	mg/kg		
Chlorides as Cl		UT/LQMS/SOP/S23; Issue No. 2; Issue Date: 14.11.2016	Argentometric Method based on APHA 22nd Ed. 2012, 4500 Cl-B	1	mg/kg		
Sodium as Na		i. AAS; ii. Mechanical Shaker; iii. Weighing Balance	UT/LQMS/SOP/S19; Issue No. 2; Issue Date: 14.11.2016	Flame Emission Spectrometry based on APHA 22nd Ed. 2012, 3500 Na B	1		mg/kg
Potassium as K		UT/LQMS/SOP/S20; Issue No. 2; Issue Date: 14.11.2016	Flame Emission Spectrometry based on APHA 22nd Ed. 2012, 3500 K B	1	mg/kg		
Phosphates as $\text{PO}_4^{3-}$		i. UV-VIS Spectrophotometer; ii. Mechanical Shaker; iii. Weighing Balance	UT/LQMS/SOP/S24; Issue No. 2; Issue Date: 14.11.2016	Ascorbic Acid Method based on APHA 22nd Ed. 2012, 4500 P E	1		mg/kg
Sulphates as $\text{SO}_4^{2-}$		UT/LQMS/SOP/S24; Issue No. 2; Issue Date: 14.11.2016	Turbidimetric Method based on APHA 22nd Ed. 2012, 4500	1	mg/kg		

Parameter	Analytical equipment	Standard Method	Methodology	Sensitivity/ Detection limit	Units	Remarks
			SO42- E			
<b>Exchangeable Cations</b>	i)Oven ii)Mechanical Shaker iii)Weighing balance iv)Volumetric apparatus	Soil is extracted using 1N Ammonium acetate solution in ratio 1:25 (Soil: Ammonium acetate)				
Calcium as Ca	i. Volumetric Apparatus;	UT/LQMS/SOP/S15; Issue No. 2; Issue Date: 14.11.2016	EDTA Titration Method based on Methods Manual for Soil Testing, DAC-MOA, GOI, New Delhi, Ed.2011, Page No. 102-105	1	mg/kg	Ammonium Acetate Extract to be made as per USEPA SW846 9080 and exchangeable cations are analyzed as per Standard Methods specified.
Magnesium as Mg	ii. Mechanical Shaker; iii. Weighing Balance	UT/LQMS/SOP/S16; Issue No. 2; Issue Date: 14.11.2016		1	mg/kg	
Sodium as Na	i. AAS; ii. Mechanical Shaker; iii. Weighing Balance	UT/LQMS/SOP/S13; Issue No. 2; Issue Date: 14.11.2016	Based on Laboratory Test Procedure For Soil & Water Sample Analysis, Water Resource Department, Directorate of Irrigation Research & Development, Pune, 2009, Page No. 61-70	1	mg/kg	
Potassium as K		UT/LQMS/SOP/S14; Issue No. 2; Issue Date: 14.11.2016		1	mg/kg	
<b>Available Micro-Nutrients</b>	ii)Mechanical Shaker iii)Weighing balance iv)Volumetric apparatus	-				
Available Nitrogen	i. Macro-Kjeldahl ii. Distillation Apparatus iii. Volumetric Apparatus	UT/LQMS/SOP/S30; Issue No. 2; Issue Date: 14.11.2016	Alkaline KMnO4 Oxidation Method based on Methods Manual for Soil Testing, DAC-MOA, GOI, New Delhi, Ed.2011, Page No. 89-91	2	mg/kg	Alkaline KMnO4 oxidative hydrolysis process

Parameter	Analytical equipment	Standard Method	Methodology	Sensitivity/ Detection limit	Units	Remarks
Available Potassium as K <sub>2</sub> O	i. Weighing Balance; ii. Mechanical Shaker; iii. AAS	UT/LQMS/SOP/S29; Issue No. 2; Issue Date: 14.11.2016	Flame Emission Spectrometry based on Methods Manual for Soil Testing, DAC-MOA, GOI, New Delhi, Ed.2011, Page No. 99-100 & APHA 22nd Ed. 2012,3500 K B	1	mg/kg	20% Ammonium Acetate Extract
Available Phosphorous as P <sub>2</sub> O <sub>5</sub>	i. Weighing Balance; ii. Mechanical Shaker; iii. UV-VIS Spectrophotometer	UT/LQMS/SOP/S28; Issue No. 2; Issue Date: 14.11.2016	Ascorbic Acid Method based on Methods Manual for Soil Testing, DAC-MOA, GOI, New Delhi, Ed.2011, Page No. 95-99 & APHA 22nd Ed. 2012, 4500 P E	5	mg/kg	10% Bray's Extract for acidic soil OR 5% Sodium Bicarbonate Extract for neutral or alkaline soil
<b>Total Metals</b>	i) Oven ii) Weighing balance iii) Hot plate iv) Volumetric apparatus	USEPA SW846 7000	1:100 nitric acid extract and estimation made on AAS			
Copper as Cu	i. Hot Air Oven; ii. Weighing Balance; iii. Autoclave to Achieve 1210 C, 15 lb; iv. Volumetric Apparatus; v. Atomic Absorption Spectrophotometer	UT/LQMS/SOP/S35 & S37; Issue No. 2; Issue Date: 14.11.2016	Based on USEPA SW-846, Update V, July 2014 Method 3050B & 7000B (FLAA)	5	mg/kg	1% acid digested sample used for metal analysis. Analysis has been carried out as per USEPA SW 846
Total Chromium as Cr				5	mg/kg	
Cobalt as Co				5	mg/kg	
Cadmium as Cd				2	mg/kg	
Lead as Pb				5	mg/kg	
Iron as Fe				10	mg/kg	
Manganese as Mn				10	mg/kg	
Zinc as Zn				Based on USEPA SW-846,	2	

Parameter	Analytical equipment	Standard Method	Methodology	Sensitivity/ Detection limit	Units	Remarks
Nickel as Ni			Update V, July 2014 Method 3050B & 7000B (FLAA)	5	mg/kg	methods.
Copper as Cu	i)Oven ii)Weighing balance iii)TCLP Extraction Assembly iv) Filtration Assembly v)Volumetric apparatus	USEPA SW846 1311	1:20 selective buffer extraction and measurement of extracted sample on AAS			
Total Chromium as Cr	TCLP Agitation Apparatus; pH Meter; Hot Air Oven; Weighing Balance; Volumetric Apparatus; Atomic Absorption Spectrophotometer	UT/LQMS/SOP/S36 & S37; Issue No. 2; Issue Date: 14.11.2016	Based on USEPA SW-846, Update V, July 2014 Method 1311 & 7000B (FLAA)	0.06	mg/l	Buffer extracted sample used for metal analysis. Analysis has been carried out as per USEPA SW 846 methods.
Cobalt as Co				0.06	mg/l	
Cadmium as Cd				0.06	mg/l	
Lead as Pb				0.018	mg/l	
Iron as Fe				0.06	mg/l	
Manganese as Mn				0.09	mg/l	
Nickel as Ni				0.12	mg/l	
Zinc as Zn				0.06	mg/l	
Copper as Cu			Based on USEPA SW-846, Update V, July 2014 Method 3050B & 7000B (FLAA)	0.018	mg/l	

## 2. Monitoring methodology of surface water

No.	Parameter	Method Details	Standard Method	Method Detection Limit
<b>A. General</b>				
1	Colour	Pt-Co (Visual Comparison) Method	IS 3025 (Part 04):1983, Reaffirmed:2012	5
2	Odour	Manual	IS 3025 (Part 05):1983, Reaffirmed:2012	-
3	Temperature	Thermometer	IS 3025 (Part 09):1984, Reaffirmed:2012	0.1
4	pH	Electrometric Method	IS 3025 (Part 11):1983, Reaffirmed:2012	0.1
5	Electrical Conductivity	Conductometry Method	IS 3025 (Part 14):1984, Reaffirmed:2013	2
6	Dissolved Oxygen	Azide Modification Method	IS 3025 (Part 38):1989, Reaffirmed:2014	0.1
7	Turbidity	Nephelometry Method	IS 3025 (Part 10):1984, Reaffirmed:2012	0.1
8	Total Dissolved Solids	Gravimetry Method	IS 3025 (Part 16):1984, Reaffirmed:2012	1
<b>B. Nutrients</b>				
9	Ammonical Nitrogen as NH <sub>3</sub> -N	Titrimetric Method	IS 3025 (Part 34):1988, Reaffirmed:2014	0.1
10	Nitrite Nitrogen as NO <sub>2</sub> -N	Spectrophotometric Method	IS 3025 (Part 34):1988, Reaffirmed:2014	0.001
11	Nitrate Nitrogen as NO <sub>3</sub> -N	Chromotropic Acid Method	IS 3025 (Part 34):1988, Reaffirmed:2014	0.1
12	Total Phosphate as PO <sub>4</sub> <sup>-3</sup>	Stannous Chloride Method, Ascorbic Acid Method	APHA, 22nd Ed, 2012, 4500-P D,E	0.01
<b>C. Organic Matter</b>				
13	Biochemical Oxygen Demand @ 27 °C, 3 days	DO Consumption in 3 days at 27 °C	IS 3025 (Part 44):1993, Reaffirmed:2014	2
14	Chemical Oxygen Demand	Open Reflux Method	IS 3025 (Part 58):2006, Reaffirmed:2012	2
<b>D. Major Ions</b>				
15	Potassium as K	AAS on Emission mode	IS 3025 (Part 45):1993, Reaffirmed:2014	0.1
16	Sodium as Na	AAS on Emission mode	IS 3025 (Part 45):1993, Reaffirmed:2014	0.1
17	Calcium as Ca	EDTA Titrimetric Method	IS 3025 (Part 40):1991, Reaffirmed:2014	1
18	Magnesium as Mg	EDTA Titrimetric Method	IS 3025 (Part 46):1994, Reaffirmed:2014	1
19	Carbonates as CO <sub>3</sub> <sup>-2</sup>	Titrimetric Method	IS 3025 (Part 51):2001, Reaffirmed:2012	1
20	Bicarbonates as HCO <sub>3</sub> <sup>-</sup>	Titrimetric Method	IS 3025 (Part 51):2001, Reaffirmed:2012	1
21	Chlorides as Cl <sup>-</sup>	Argentometric Method	IS 3025 (Part 32):1988, Reaffirmed:2014	1

No.	Parameter	Method Details	Standard Method	Method Detection Limit
22	Sulphates as SO <sub>4</sub> <sup>-2</sup>	Turbidimetric Method	APHA, 22 <sup>nd</sup> Ed, 2012, 4500-SO42--E	1
<b>E. Other Inorganics</b>				
20	Fluoride as F <sup>-</sup>	SPADNS Method	APHA, 22 <sup>nd</sup> Ed, 2012, 4500-F B,D	0.2
21	Boron as B	Colorimetric Curcumin Method	APHA, 22 <sup>nd</sup> Ed, 2012, 4500-B B	0.1
<b>F. Microbiological</b>				
22	Total <i>coliform</i>	Multiple Tube Fermentation technique	IS 1622:1981, Reaffirmed:2014	2
23	<i>Fecal coliform</i>	Multiple Tube Fermentation technique	IS 1622:1981, Reaffirmed:2014	2

### 3. Methodology of Ambient Air Monitoring

Sampling Parameters	Sampling Frequency	Sample collection		Sample Analysis		Methodology
		Sampling equipment	Sensitivity/ Detection Limit	Analytical Equipment	Sensitivity/ Detection Limit	
RSPM (PM <sub>10</sub> , PM <sub>2.5</sub> ), SO <sub>2</sub> , NO <sub>x</sub>	24 hrs twice a week at each station	RSPM (PM <sub>10</sub> ), Respirable Dust Sampler	10 µg/m <sup>3</sup>	RSPM (PM <sub>10</sub> ), Monopan Balance	0.0001 mg	Gravimetric (HVS) IS : 5182 (Part 23) : 2006 (through Cyclonic flow Technique)
		RSPM (PM <sub>2.5</sub> ), Fine Dust Sampler	2.5 µg/m <sup>3</sup>	Monopan Balance	0.0001 g	Gravimetric Method – NAAQS Monitoring & Analysis Guidelines Volume 1 By CPCB
		SO <sub>2</sub> : Rotameter for measurement of air flow	05 µg/m <sup>3</sup>	SO <sub>2</sub> : Spectrophotometer	-	IS : 5182 (Part 2) : 2001
		NO <sub>x</sub> : Rotameter for measurement of air flow	05 µg/m <sup>3</sup>	NO <sub>x</sub> : Spectrophotometer	-	IS : 5182 (Part 6) : 2006
CO	1hrs twice a month at each station	Gas Bladder	--	NDIR Spectroscopy	< 0.05 ppm	IS : 5182 (Part 10) : 1999 Non Dispersive Infra Red (NDIR) Spectroscopy

### 4. Monitoring Methodology of Noise

Env. Component	Sampling location	Sampling Parameter	Sampling Frequency	Sampling equipment
Ambient Noise levels	5 locations	Decibels – dB (A)	Hourly reading for 24 hours at each location	Noise Level Meter

***Enclosure 17***

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
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## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED  
 Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
 Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
 Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/001/01-2018  
 ISSUE DATE : 31/01/2018  
 YOUR REF. : WOJKSER/00566/17-18  
 REF. DATE : 12/05/2017

### SAMPLE PARTICULARS

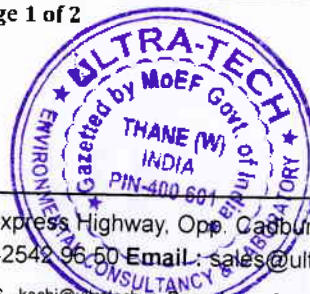
Sampling Plan Ref. No. : EREPL-05/2017  
 Sample Registration Date : 26/05/2017  
 Date & Time of Sampling : 26/05/2017 at 10:40 Hrs  
 Analysis Starting Date : 26/05/2017  
 Analysis Completion Date : 20/06/2017  
 Sample Collected By : ULTRA-TECH  
 Sample Lab Code : UT/ELS/EREPL/001/05-2017

### SOIL QUALITY MONITORING

Sample Type : Surface Soil - S1 @ Depth 0.15 m  
 Sample Location : Project Site  
 [N-19°8'1.12"; E-72°56'5.80"]  
 Sample Quantity & Packing Details : 1kg In Plastic Bag Contained in Zip Lock Bag

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Color*	-	Brown	-
2.	pH(1:2.5 Soil: Water)	IS 2720 (Part 26) 1987	7.8	-
3.	Electrical Conductivity (1:2 Soil: Water Extract)	IS:14767-2000	0.121	ms/cm
4.	Bulk Density	UT/LQMS/SOP/S03	1156	kg/m <sup>3</sup>
5.	Organic Matter	IS 2720 (Part 22) : 1972	0.8	%
6.	Total Organic Carbon	IS 2720 (Part 22) : 1972	0.4	%
7.	Moisture Content*	IS 2720 (Part 02) 1973	4.0	%
8.	Water Holding Capacity	UT/LQMS/SOP/S12	57.0	%
9.	Cation Exchange Capacity	UT/LQMS/SOP/S18	15.2	meq/100g
10.	Sodium as Na (Exchangeable)	UT/LQMS/SOP/S13	0.6	meq/100g
11.	Potassium as K (Exchangeable)	UT/LQMS/SOP/S14	0.2	meq/100g
12.	Calcium as Ca (Exchangeable)	UT/LQMS/SOP/S15	6.9	meq/100g
13.	Magnesium as Mg (Exchangeable)	UT/LQMS/SOP/S16	5.9	meq/100g
14.	Sodium as Na (water Extractable)*	UT/LQMS/SOP/S19	69	mg/kg
15.	Potassium as K (water Extractable)*	UT/LQMS/SOP/S20	4	mg/kg
16.	Calcium as Ca (water Extractable)*	UT/LQMS/SOP/S21	48	mg/kg
17.	Magnesium as Mg (water Extractable)*	UT/LQMS/SOP/S22	38	mg/kg
18.	Chloride as Cl <sup>-</sup> (water Extractable)*	UT/LQMS/SOP/S23	58	mg/kg
19.	Sulfate as SO <sub>4</sub> <sup>2-</sup> (water Extractable)*	UT/LQMS/SOP/S24	51	mg/kg
20.	Available Phosphorus as P <sub>2</sub> O <sub>5</sub>	UT/LQMS/SOP/S28	79	kg/ha
21.	Available Potassium as K <sub>2</sub> O	UT/LQMS/SOP/S29	283	kg/ha
22.	Available Nitrogen as N	UT/LQMS/SOP/S30	129	kg/ha
<b>Total Metals</b>				
1.	Cadmium as Cd	UT/LQMS/SOP/S35 & S37	BDL[DL=2]	mg/kg
2.	Chromium as Cr	UT/LQMS/SOP/S35 & S37	19	mg/kg
3.	Cobalt as Co	UT/LQMS/SOP/S35 & S37	31	mg/kg
4.	Copper as Cu	UT/LQMS/SOP/S35 & S37	155	mg/kg
5.	Iron as Fe	UT/LQMS/SOP/S35 & S37	65540	mg/kg

Page 1 of 2



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## TEST REPORT

**ISSUED TO:** M/s. EVIE REAL ESTATE PRIVATE LIMITED  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
**Project Site:** "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/001/01-2018  
**ISSUE DATE :** 31/01/2018  
**YOUR REF. :** WOJKSER/00566/17-18  
**REF. DATE :** 12/05/2017

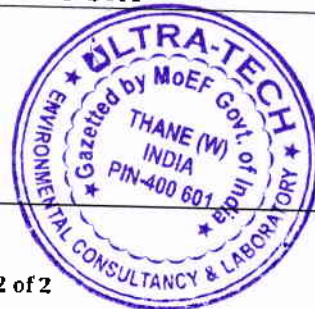
<b>SAMPLE PARTICULARS :</b>	<b>SOIL QUALITY MONITORING</b>
<b>Sampling Plan Ref. No. :</b> EREPL-05/2017	<b>Sample Type :</b> Surface Soil - S1 @ Depth 0.15 m
<b>Sample Registration Date :</b> 26/05/2017	<b>Sample Location :</b> Project Site
<b>Date &amp; Time of Sampling :</b> 26/05/2017 at 10:40 Hrs	[N-19°8'1.12"; E-72°56'S.80"]
<b>Analysis Starting Date :</b> 26/05/2017	
<b>Analysis Completion Date :</b> 20/06/2017	
<b>Sample Collected By :</b> ULTRA-TECH	<b>Sample Quantity &amp; Packing Details :</b> 1kg In Plastic Bag Contained in Zip Lock Bag
<b>Sample Lab Code :</b> UT/ELS/EREPL/001/05-2017	

Sr. No.	Test Parameter	Test Method	Test Result	Unit
6.	Lead as Pb	UT/LQMS/SOP/S35 & S37	BDL[DL=5]	mg/kg
7.	Manganese as Mn	UT/LQMS/SOP/S35 & S37	713	mg/kg
8.	Nickel as Ni	UT/LQMS/SOP/S35 & S37	193	mg/kg
9.	Zinc as Zn	UT/LQMS/SOP/S35 & S37	105	mg/kg
<b>TCLP Metals</b>				
10.	Cadmium as Cd	UT/LQMS/SOP/S36 & S37	BDL[DL=0.018]	mg/L
11.	Total Chromium as Cr	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
12.	Cobalt as Co	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
13.	Copper as Cu	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
14.	Iron as Fe	UT/LQMS/SOP/S36 & S37	BDL[DL=0.09]	mg/L
15.	Lead as Pb	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
16.	Manganese as Mn	UT/LQMS/SOP/S36 & S37	BDL[DL=0.12]	mg/L
17.	Nickel as Ni	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
18.	Zinc as Zn	UT/LQMS/SOP/S36 & S37	BDL[DL=0.018]	mg/L
<b>BDL-Below Detection Limit</b>				<b>DL-Detection Limit</b>

**Opinions / Interpretations:** NIL

- Note:**
1. This test report refers only to the sample tested.
  2. This test report may not be reproduced in part, without the permission of this laboratory.
  3. Any correction invalidates this test report.
  4. \*: Parameters not covered under NABL scope.

**- END OF REPORT -**



For ULTRA-TECH,

*(Signature)*  
**Dr. Rahul Kolhapurkar**  
(AUTHORIZED SIGNATORY)

Page 2 of 2

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## TEST REPORT

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### SAMPLE PARTICULARS

Sampling Plan Ref. No. : EREPL-05/2017  
Sample Registration Date : 26/05/2017  
Date & Time of Sampling : 26/05/2017 at 11:40 Hrs  
Analysis Starting Date : 26/05/2017  
Analysis Completion Date : 20/06/2017  
Sample Collected By : ULTRA-TECH  
Sample Lab Code : UT/ELS/EREPL/002/05-2017

### SOIL QUALITY MONITORING

Sample Type : Surface Soil - S2 @ Depth 0.15 m  
Sample Location : Project Site -Phase II  
[N-19°7'50.22"; E-72°56'51.18"]  
Sample Quantity & Packing Details : 1kg In Plastic Bag Contained in Zip Lock Bag

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Color*		Brown	-
2.	pH(1:2.5 Soil: Water)	IS 2720 (Part 26) 1987	8.5	-
3.	Electrical Conductivity (1:2 Soil: Water Extract)	IS :14767-2000	0.176	ms/cm
4.	Bulk Density	UT/LQMS/SOP/S03	1133	kg/m <sup>3</sup>
5.	Organic Matter	IS 2720 (Part 22) : 1972	0.4	%
6.	Total Organic Carbon	IS 2720 (Part 22) : 1972	0.2	%
7.	Moisture Content*	IS 2720 (Part 02) 1973	11.2	%
8.	Water Holding Capacity	UT/LQMS/SOP/S12	53.0	%
9.	Cation Exchange Capacity	UT/LQMS/SOP/S18	17.3	meq/100g
10.	Sodium as Na (Exchangeable)	UT/LQMS/SOP/S13	0.7	meq/100g
11.	Potassium as K (Exchangeable)	UT/LQMS/SOP/S14	0.5	meq/100g
12.	Calcium as Ca (Exchangeable)	UT/LQMS/SOP/S15	7.1	meq/100g
13.	Magnesium as Mg (Exchangeable)	UT/LQMS/SOP/S16	4.1	meq/100g
14.	Sodium as Na (water Extractable)*	UT/LQMS/SOP/S19	43	mg/kg
15.	Potassium as K (water Extractable)*	UT/LQMS/SOP/S20	7	mg/kg
16.	Calcium as Ca (water Extractable)*	UT/LQMS/SOP/S21	49	mg/kg
17.	Magnesium as Mg (water Extractable)*	UT/LQMS/SOP/S22	59	mg/kg
18.	Chloride as Cl <sup>-</sup> (water Extractable)*	UT/LQMS/SOP/S23	86	mg/kg
19.	Sulfate as SO <sub>4</sub> <sup>-2</sup> (water Extractable)*	UT/LQMS/SOP/S24	95	mg/kg
20.	Available Phosphorus as P <sub>2</sub> O <sub>5</sub>	UT/LQMS/SOP/S28	41	kg/ha
21.	Available Potassium as K <sub>2</sub> O	UT/LQMS/SOP/S29	255	kg/ha
22.	Available Nitrogen as N	UT/LQMS/SOP/S30	99	kg/ha
<b>Total Metals</b>				
1.	Cadmium as Cd	UT/LQMS/SOP/S35 & S37	BDL[DL=2]	mg/kg
2.	Chromium as Cr	UT/LQMS/SOP/S35 & S37	18	mg/kg
3.	Cobalt as Co	UT/LQMS/SOP/S35 & S37	22	mg/kg
4.	Copper as Cu	UT/LQMS/SOP/S35 & S37	104	mg/kg
5.	Iron as Fe	UT/LQMS/SOP/S35 & S37	54175	mg/kg



### TEST REPORT

**ISSUED TO:** M/s. EVIE REAL ESTATE PRIVATE LIMITED  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
**Project Site:** "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/002/01-2018  
**ISSUE DATE :** 31/01/2018  
**YOUR REF. :** WOJKSER/00566/17-18  
**REF. DATE :** 12/05/2017

**SAMPLE PARTICULARS :**

**Sampling Plan Ref. No. :** EREPL-05/2017  
**Sample Registration Date :** 26/05/2017  
**Date & Time of Sampling :** 26/05/2017 at 11:40 Hrs  
**Analysis Starting Date :** 26/05/2017  
**Analysis Completion Date :** 20/06/2017  
**Sample Collected By :** ULTRA-TECH  
**Sample Lab Code :** UT/ELS/EREPL/002/05-2017

**SOIL QUALITY MONITORING**

**Sample Type :** Surface Soil - S2 @ Depth 0.15 m  
**Sample Location :** Project Site -Phase II  
(N-19°7'50.22"; E-72°56'51.18")  
**Sample Quantity & Packing Details :** 1kg In Plastic Bag Contained in Zip Lock Bag

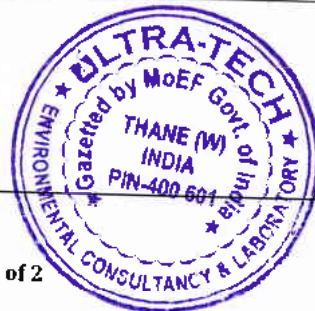
Sr. No.	Test Parameter	Test Method	Test Result	Unit
6.	Lead as Pb	UT/LQMS/SOP/S35 & S37	36	mg/kg
7.	Manganese as Mn	UT/LQMS/SOP/S35 & S37	749	mg/kg
8.	Nickel as Ni	UT/LQMS/SOP/S35 & S37	161	mg/kg
9.	Zinc as Zn	UT/LQMS/SOP/S35 & S37	119	mg/kg
<b>TCLP Metals</b>				
10.	Cadmium as Cd	UT/LQMS/SOP/S36 & S37	BDL[DL=0.018]	mg/L
11.	Total Chromium as Cr	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
12.	Cobalt as Co	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
13.	Copper as Cu	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
14.	Iron as Fe	UT/LQMS/SOP/S36 & S37	BDL[DL=0.09]	mg/L
15.	Lead as Pb	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
16.	Manganese as Mn	UT/LQMS/SOP/S36 & S37	BDL[DL=0.12]	mg/L
17.	Nickel as Ni	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
18.	Zinc as Zn	UT/LQMS/SOP/S36 & S37	BDL[DL=0.018]	mg/L
<b>BDL-Below Detection Limit</b>				<b>DL-Detection Limit</b>

**Opinions / Interpretations:** NTL

**Note:**

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3. Any correction invalidates this test report.
4. Parameters not covered under NABL scope.

- END OF REPORT -



For ULTRA-TECH,

*Rajul*  
Dr. Rahul Kolhapurkar  
(AUTHORIZED SIGNATORY)

Page 2 of 2

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
Telefax : +91 22 2547 49 07 / +91 22 2547 62 17 Email : lab@ultratech.in Visit us at : www.ultratech.in

## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED REPORT NO. : UT/ELS/REPORT/EREPL/003/01-2018  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway ISSUE DATE : 31/01/2018  
Kanjur Village, Kanjurmarg - East, Mumbai -400042 YOUR REF. : WOJKSER/00566/17-18  
Project Site: "Residential Development at Kanjurmarg" REF. DATE : 12/05/2017

**SAMPLE PARTICULARS** : **SOIL QUALITY MONITORING**  
Sampling Plan Ref. No. : EREPL-05/2017 Sample Type : Surface Soil - S3@ Depth 0.15 m  
Sample Registration Date : 26/05/2017 Sample Location : Project Site -Phase II  
Date & Time of Sampling : 26/05/2017 at 12:30 Hrs [N-19°7'57.13"; E-72°55'57.69"]  
Analysis Starting Date : 26/05/2017  
Analysis Completion Date : 20/06/2017 Sample Quantity : 1kg In Plastic Bag Contained  
Sample Collected By : ULTRA-TECH & Packing Details in Zip Lock Bag  
Sample Lab Code : UT/ELS/EREPL/003/05-2017

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Color*	-	Brown	-
2.	pH(1:2.5 Soil: Water)	IS 2720 (Part 26) 1987	8.8	-
3.	Electrical Conductivity (1:2 Soil: Water Extract)	IS :14767-2000	0.132	ms/cm
4.	Bulk Density	UT/LQMS/SOP/S03	1110	kg/m <sup>3</sup>
5.	Organic Matter	IS 2720 (Part 22) : 1972	0.6	%
6.	Total Organic Carbon	IS 2720 (Part 22) : 1972	0.3	%
7.	Moisture Content*	IS 2720 (Part 02) 1973	11.9	%
8.	Water Holding Capacity	UT/LQMS/SOP/S12	55.6	%
9.	Cation Exchange Capacity	UT/LQMS/SOP/S18	16.3	meq/100g
10.	Sodium as Na (Exchangeable)	UT/LQMS/SOP/S13	0.9	meq/100g
11.	Potassium as K (Exchangeable)	UT/LQMS/SOP/S14	0.6	meq/100g
12.	Calcium as Ca (Exchangeable)	UT/LQMS/SOP/S15	8.1	meq/100g
13.	Magnesium as Mg (Exchangeable)	UT/LQMS/SOP/S16	5.1	meq/100g
14.	Sodium as Na (water Extractable)*	UT/LQMS/SOP/S19	52	mg/kg
15.	Potassium as K (water Extractable)*	UT/LQMS/SOP/S20	8	mg/kg
16.	Calcium as Ca (water Extractable)*	UT/LQMS/SOP/S21	16	mg/kg
17.	Magnesium as Mg (water Extractable)*	UT/LQMS/SOP/S22	50	mg/kg
18.	Chloride as Cl <sup>-</sup> (water Extractable)*	UT/LQMS/SOP/S23	152	mg/kg
19.	Sulfate as SO <sub>4</sub> <sup>-</sup> (water Extractable)*	UT/LQMS/SOP/S24	81	mg/kg
20.	Available Phosphorus as P <sub>2</sub> O <sub>5</sub>	UT/LQMS/SOP/S28	56	kg/ha
21.	Available Potassium as K <sub>2</sub> O	UT/LQMS/SOP/S29	357	kg/ha
22.	Available Nitrogen as N	UT/LQMS/SOP/S30	113	kg/ha
<b>Total Metals</b>				
1.	Cadmium as Cd	UT/LQMS/SOP/S35 & S37	BDL[DL=2]	mg/kg
2.	Chromium as Cr	UT/LQMS/SOP/S35 & S37	15	mg/kg
3.	Cobalt as Co	UT/LQMS/SOP/S35 & S37	35	mg/kg
4.	Copper as Cu	UT/LQMS/SOP/S35 & S37	119	mg/kg
5.	Iron as Fe	UT/LQMS/SOP/S35 & S37	71310	mg/kg

Page 1 of 2



Handwritten signature in blue ink.

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## TEST REPORT

**ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED**  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai -400042  
Project Site: "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/003/01-2018  
**ISSUE DATE :** 31/01/2018  
**YOUR REF. :** WOJKSER/00566/17-18  
**REF. DATE :** 12/05/2017

**SAMPLE PARTICULARS :**

**SOIL QUALITY MONITORING**

**Sampling Plan Ref. No. :** EREPL-05/2017  
**Sample Registration Date :** 26/05/2017  
**Date & Time of Sampling :** 26/05/2017 at 12:30 Hrs  
**Analysis Starting Date :** 26/05/2017  
**Analysis Completion Date :** 20/06/2017  
**Sample Collected By :** ULTRA-TECH  
**Sample Lab Code :** UT/ELS/EREPL/003/05-2017

**Sample Type :** Surface Soil - S3@ Depth 0.15 m  
**Sample Location :** Project Site -Phase II  
[N-19°7'57.13"; E-72°55'57.69"]

**Sample Quantity & Packing Details :** 1kg In Plastic Bag Contained in Zip Lock Bag

Sr. No.	Test Parameter	Test Method	Test Result	Unit
6.	Lead as Pb	UT/LQMS/SOP/S35 & S37	BDL[DL=5]	mg/kg
7.	Manganese as Mn	UT/LQMS/SOP/S35 & S37	680	mg/kg
8.	Nickel as Ni	UT/LQMS/SOP/S35 & S37	298	mg/kg
9.	Zinc as Zn	UT/LQMS/SOP/S35 & S37	116	mg/kg
<b>TCLP Metals</b>				
10.	Cadmium as Cd	UT/LQMS/SOP/S36 & S37	BDL[DL=0.018]	mg/L
11.	Total Chromium as Cr	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
12.	Cobalt as Co	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
13.	Copper as Cu	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
14.	Iron as Fe	UT/LQMS/SOP/S36 & S37	BDL[DL=0.09]	mg/L
15.	Lead as Pb	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
16.	Manganese as Mn	UT/LQMS/SOP/S36 & S37	BDL[DL=0.12]	mg/L
17.	Nickel as Ni	UT/LQMS/SOP/S36 & S37	BDL[DL=0.06]	mg/L
18.	Zinc as Zn	UT/LQMS/SOP/S36 & S37	BDL[DL=0.018]	mg/L
<b>BDL-Below Detection Limit</b>			<b>DL-Detection Limit</b>	

**Opinions / Interpretations:** NIL

**Note:**

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3. Any correction invalidates this test report.
4. \* Parameters not covered under NABL scope.

**- END OF REPORT -**



For ULTRA-TECH,

*(Signature)*  
Dr. Rahul Kolhapurkar  
(AUTHORIZED SIGNATORY)

Page 2 of 2

Lab : Survey No. 93/A, Conformity Hissa No.2 G V. Brothers Bldg., Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
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## TEST REPORT

**ISSUED TO:** M/s. EVIE REAL ESTATE PRIVATE LIMITED  
Runwal & Omarkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
Project Site: "Residential Development at Kanjurmarg"

**REPORT NO.** : UT/ELS/REPORT/EREPL/004/01-2018  
**ISSUE DATE** : 31/01/2018  
**YOUR REF.** : WOJKSER/00566/17-18  
**REF. DATE** : 12/05/2017

**SAMPLE PARTICULARS :**

**AMBIENT NOISE LEVEL MONITORING**

**Sampling Plan Ref. No.** : EREPL-10/2017

**Sample Lab Code** : UT/ELS/EREPL/004/12-2017

**Date of Monitoring** : 29/12/2017 to 30/12/2017

**Survey Done By** : ULTRA-TECH

Sr. No.	Location	Noise Level Reading in dB(A) Leq								
		Time (Hrs)	Day dB(A)			Time (Hrs)	Night dB(A)			
			Leq	L <sub>min</sub>	L <sub>max</sub>		Leq	L <sub>min</sub>	L <sub>max</sub>	
01.	ANQM1 On Project Site Co-ordinates: N-19°8'4.15"; E-72°56'4.48"	06:00 to 07:00	47.9	41.6	54.6	22:00 to 23:00	48.6	42.3	56.6	
		07:00 to 08:00	49.2	42.7	55.7	23:00 to 00:00	46.7	42.7	55.7	
		08:00 to 09:00	53.4	46.3	60.2	00:00 to 01:00	46.5	40.3	51.8	
		09:00 to 10:00	55.9	49.4	62.4	01:00 to 02:00	45.3	39.6	50.3	
		10:00 to 11:00	56.4	51.1	63.6	02:00 to 03:00	43.2	36.7	49.7	
		11:00 to 12:00	57.8	52.6	64.3	03:00 to 04:00	44.6	39.3	50.8	
		12:00 to 13:00	58.2	53.1	65.4	04:00 to 05:00	45.8	40.1	51.7	
		13:00 to 14:00	59.6	54.6	66.9	05:00 to 06:00	46.2	40.9	52.3	
		14:00 to 15:00	57.6	50.2	63.7	--	--	--	--	
		15:00 to 16:00	56.4	48.9	62.4	--	--	--	--	
		16:00 to 17:00	55.4	49.6	61.3	--	--	--	--	
		17:00 to 18:00	53.8	47.3	60.3	--	--	--	--	
		18:00 to 19:00	52.7	46.7	57.2	--	--	--	--	
		19:00 to 20:00	51.6	45.6	58.4	--	--	--	--	
		20:00 to 21:00	53.5	47.4	59.7	--	--	--	--	
		21:00 to 22:00	52.1	46.3	57.3	--	--	--	--	
			L <sub>10</sub>	57.7			Limits in dB(A) Leq as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (See rule 3(1) and 4(1)) Ambient Air Quality Standards in respect of Noise			
			L <sub>50</sub>	52.4						
			L <sub>90</sub>	45.5						
			Day Leq	55.5						
			Night Leq	46.5			45			

**Opinions / Interpretations:** The observed values for Leq dB(A) for Day Time & Night Time are Exceeding the standard limits as per Ambient Air Quality Standards in respect of Noise prescribed in The Noise Pollution (Regulation and Control) Rules, 2000 for Residential Zone.

**Note:** 1. Monitoring area coming under Residential Zone.  
2. Day Time - 06:00 Hrs to 22:00 Hrs and Night Time - 22:00 Hrs to 06:00 Hrs.

Sampling Equipment Details	Instrument Used	Make & Model	Calibration Status
	Sound Level Meter	Make - ENVIROTECH; Model - SLM100, Sr. No. 192-DTK-2012	Valid up to - 31/07/2018

**Note:** 1. This test report refers only to the monitoring conducted.  
2. This test report may not be reproduced in part, without the permission of this laboratory.  
3. Any correction invalidates this test report.

**- END OF REPORT -**



For ULTRA-TECH,

**DR. RAHUL KOLHAPURKAR**  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
Telefax : +91 22 2547 49 07 / +91 22 2547 62 17 Email : lab@ultratech.in Visit us at : www.ultratech.in

## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED

Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042

Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/005/01-2018

ISSUE DATE : 31/01/2018

YOUR REF. : WOJKSER/00566/17-18

REF. DATE : 12/05/2017

SAMPLE PARTICULARS :

AMBIENT NOISE LEVEL MONITORING

Sampling Plan Ref. No. : EREPL-10/2017

Sample Lab Code : UT/ELS/EREPL/005/12-2017

Date of Monitoring : 30/12/2017 to 31/12/2017

Survey Done By : ULTRA-TECH

Sr. No.	Location	Noise Level Reading in dB(A) Leq								
		Time (Hrs)	Day dB(A)			Time (Hrs)	Night dB(A)			
			L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>		L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	
01.	ANQM2 Damle Colony, Kanjur Village Co-ordinates: N-19°7'59.60"; E-72°56'12.65"	06:00 to 07:00	56.9	49.3	63.8	22:00 to 23:00	59.8	53.7	64.9	
		07:00 to 08:00	59.2	52.6	66.9	23:00 to 00:00	56.1	50.4	60.3	
		08:00 to 09:00	62.3	55.7	70.2	00:00 to 01:00	56.5	51.3	60.7	
		09:00 to 10:00	65.8	60.3	73.6	01:00 to 02:00	54.6	48.6	59.7	
		10:00 to 11:00	68.9	61.3	75.7	02:00 to 03:00	53.5	49.7	60.4	
		11:00 to 12:00	69.3	63.6	76.9	03:00 to 04:00	52.8	46.3	59.6	
		12:00 to 13:00	70.5	65.4	78.4	04:00 to 05:00	53.6	46.9	60.3	
		13:00 to 14:00	71.2	64.9	80.6	05:00 to 06:00	54.8	49.7	61.7	
		14:00 to 15:00	72.3	67.1	81.9	--	--	--	--	
		15:00 to 16:00	71.5	66.3	81.3	--	--	--	--	
		16:00 to 17:00	70.2	65.9	79.4	--	--	--	--	
		17:00 to 18:00	69.5	62.4	74.9	--	--	--	--	
		18:00 to 19:00	68.4	63.6	75.3	--	--	--	--	
		19:00 to 20:00	66.7	60.3	70.4	--	--	--	--	
		20:00 to 21:00	65.2	59.6	73.6	--	--	--	--	
		21:00 to 22:00	60.5	55.3	66.9	--	--	--	--	
		L <sub>10</sub>		71.0			Limits in dB(A) Leq as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (See rule 3(1) and 4(1)) Ambient Air Quality Standards in respect of Noise			
		L <sub>50</sub>		63.8						
		L <sub>90</sub>		53.9						
		Day Leq		68.5						
Night Leq		55.8								
					55					
					45					

Opinions / Interpretations: The observed values for Leq dB(A) for Day Time & Night Time are Exceeding the standard limits as per Ambient Air Quality Standards in respect of Noise prescribed in The Noise Pollution (Regulation and Control) Rules, 2000 for Residential Zone.

Note: 1. Monitoring area coming under Residential Zone.  
2. Day Time - 06:00 Hrs to 22:00 Hrs and Night Time - 22:00 Hrs to 06:00 Hrs.

Sampling Equipment Details	Instrument Used	Make & Model	Calibration Status
	Sound Level Meter	Make - ENVIROTECH; Model - SLM100, Sr. No. 192-DTK-2012	Valid up to - 31/07/2018

Note: 1. This test report refers only to the monitoring conducted.  
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- END OF REPORT -



For ULTRA-TECH,

DR. RAHUL KOLIAPURKAR  
(Authorized Signatory)

**Laboratory :** G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
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## TEST REPORT

**ISSUED TO:** M/s. EVIE REAL ESTATE PRIVATE LIMITED  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
**Project Site:** "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/006/01-2018  
**ISSUE DATE :** 31/01/2018  
**YOUR REF. :** WOJKSER/00566/17-18  
**REF. DATE :** 12/05/2017

**SAMPLE PARTICULARS :**

**AMBIENT NOISE LEVEL MONITORING**

**Sampling Plan Ref. No. :** EREPL-10/2017

**Sample Lab Code :** UT/ELS/EREPL/006/01-2018

**Date of Monitoring :** 31/12/2017 to 01/01/2018

**Survey Done By :** ULTRA-TECH

Sr. No.	Location	Noise Level Reading in dB(A) Leq								
		Time (Hrs)	Day dB(A)			Time (Hrs)	Night dB(A)			
			Leq	L <sub>min</sub>	L <sub>max</sub>		Leq	L <sub>min</sub>	L <sub>max</sub>	
01.	ANQM3 Junction of Kanjur Village Road & Shah Colony Road Co-ordinates: N-19°7'53.95"; E-72°56'9.24"	06:00 to 07:00	57.6	51.3	64.3	22:00 to 23:00	63.1	58.6	68.9	
		07:00 to 08:00	61.2	55.7	66.9	23:00 to 00:00	59.4	53.7	66.3	
		08:00 to 09:00	63.4	56.9	70.2	00:00 to 01:00	58.6	51.8	68.7	
		09:00 to 10:00	66.7	60.3	73.4	01:00 to 02:00	57.6	52.4	64.5	
		10:00 to 11:00	71.6	65.4	76.3	02:00 to 03:00	56.2	50.9	61.9	
		11:00 to 12:00	72.8	66.9	78.9	03:00 to 04:00	55.2	49.6	61.4	
		12:00 to 13:00	73.9	68.3	79.4	04:00 to 05:00	53.5	48.3	66.6	
		13:00 to 14:00	75.4	69.7	80.6	05:00 to 06:00	52.1	47.1	59.3	
		14:00 to 15:00	74.3	68.4	79.7	--	--	--	--	
		15:00 to 16:00	73.8	68.9	78.6	--	--	--	--	
		16:00 to 17:00	72.1	65.7	79.7	--	--	--	--	
		17:00 to 18:00	70.6	64.3	74.9	--	--	--	--	
		18:00 to 19:00	69.3	61.7	76.4	--	--	--	--	
		19:00 to 20:00	68.7	62.4	75.6	--	--	--	--	
		20:00 to 21:00	65.4	60.4	71.7	--	--	--	--	
		21:00 to 22:00	64.2	59.7	70.6	--	--	--	--	
		L <sub>10</sub>		73.9			Limits in dB(A) Leq as per <b>THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000</b> (See rule 3(1) and 4(1)) Ambient Air Quality Standards in respect of Noise			
		L <sub>50</sub>		64.8						
		L <sub>90</sub>		55.5						
		Day Leq		71.0						
		Night Leq		58.2			55			
					45					

**Opinions / Interpretations:** The observed values for Leq dB(A) for Day Time & Night Time are Exceeding the standard limits as per Ambient Air Quality Standards in respect of Noise prescribed in The Noise Pollution (Regulation and Control) Rules, 2000 for Residential Zone.

**Note:** 1. Monitoring area coming under Residential Zone.  
2. Day Time - 06:00 Hrs to 22:00 Hrs and Night Time - 22:00 Hrs to 06:00 Hrs.

Sampling Equipment Details	Instrument Used	Make & Model	Calibration Status
	Sound Level Meter	Make - ENVIROTECH; Model - SLM100, Sr. No. 192-DTK-2012	Valid up to - 31/07/2018

**Note:** 1. This test report refers only to the monitoring conducted.  
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3. Any correction invalidates this test report.

**- END OF REPORT -**



For ULTRA-TECH,

*(Signature)*  
**DR. RAHUL KOLHAPURKAR**  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
Telefax : +91 22 2547 49 07 / +91 22 2547 62 17 Email : lab@ultratech.in Visit us at : www.ultratech.in

## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/007/01-2018  
ISSUE DATE : 31/01/2018  
YOUR REF. : WOJKSER/00566/17-18  
REF. DATE : 12/05/2017

### SAMPLE PARTICULARS :

Sampling Plan Ref. No. : EREPL-10/2017  
Date of Monitoring : 01/01/2018 to 02/01/2018

### AMBIENT NOISE LEVEL MONITORING

Sample Lab Code : UT/ELS/EREPL/007/01-2018  
Survey Done By : ULTRA-TECH

Sr. No.	Location	Noise Level Reading in dB(A) Leq								
		Time (Hrs)	Day dB(A)			Time (Hrs)	Night dB(A)			
			Leq	L <sub>min</sub>	L <sub>max</sub>		Leq	L <sub>min</sub>	L <sub>max</sub>	
01.	ANQM4 Backside of Crompton Greaves Ltd, Co-ordinates: N-19°7'51.68"; E-72°55'55.38"	06:00 to 07:00	59.5	51.6	65.3	22:00 to 23:00	56.4	50.3	63.9	
		07:00 to 08:00	61.6	56.3	66.7	23:00 to 00:00	55.6	49.7	62.2	
		08:00 to 09:00	62.3	55.4	68.7	00:00 to 01:00	54.3	48.6	61.3	
		09:00 to 10:00	64.5	59.3	70.2	01:00 to 02:00	52.3	47.4	60.4	
		10:00 to 11:00	65.8	60.4	71.4	02:00 to 03:00	49.5	43.6	56.3	
		11:00 to 12:00	67.9	61.3	74.3	03:00 to 04:00	47.6	42.7	54.6	
		12:00 to 13:00	70.1	64.9	76.4	04:00 to 05:00	47.4	41.6	54.9	
		13:00 to 14:00	72.3	66.3	78.9	05:00 to 06:00	46.5	40.3	53.7	
		14:00 to 15:00	71.6	65.9	77.4	--	--	--	--	
		15:00 to 16:00	70.6	64.3	78.9	--	--	--	--	
		16:00 to 17:00	69.8	61.9	75.1	--	--	--	--	
		17:00 to 18:00	68.4	62.1	74.9	--	--	--	--	
		18:00 to 19:00	67.6	60.7	76.2	--	--	--	--	
		19:00 to 20:00	65.4	59.4	70.4	--	--	--	--	
		20:00 to 21:00	59.8	52.6	65.3	--	--	--	--	
		21:00 to 22:00	57.6	51.3	63.6	--	--	--	--	
		L <sub>10</sub>		70.5			Limits in dB(A) Leq as per <b>THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000</b> (See rule 3(1) and 4(1)) Ambient Air Quality Standards in respect of Noise			
		L <sub>50</sub>		62.0						
		L <sub>90</sub>		48.2						
		Day Leq		67.8						
Night Leq		52.7								
					55					
					45					

**Opinions / Interpretations:** The observed values for Leq dB(A) for Day Time & Night Time are Exceeding the standard limits as per Ambient Air Quality Standards in respect of Noise prescribed in The Noise Pollution (Regulation and Control) Rules, 2000 for Residential Zone.

Note: 1. Monitoring area coming under Residential Zone.  
2. Day Time - 06:00 Hrs to 22:00 Hrs and Night Time - 22:00 Hrs to 06:00 Hrs.

Sampling Equipment Details	Instrument Used	Make & Model	Calibration Status
		Sound Level Meter	Make - ENVIROTECH; Model - SLM100, Sr. No. 192-DTK-2012

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**- END OF REPORT**



For ULTRA-TECH,

*(Signature)*  
DR. RAHUL KOLHAPURKAR  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
 Telefax : +91 22 2547 49 07 / +91 22 2547 62 17 Email : lab@ultratech.in Visit us at : www.ultratech.in

## TEST REPORT

**ISSUED TO:** M/s. EVIE REAL ESTATE PRIVATE LIMITED  
 Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
 Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
 Project Site: "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/008/01-2018  
**ISSUE DATE :** 31/01/2018  
**YOUR REF. :** W0JKSER/00566/17-18  
**REF. DATE :** 12/05/2017

**SAMPLE PARTICULARS :** AMBIENT NOISE LEVEL MONITORING

**Sampling Plan Ref. No. :** EREPL-10/2017  
**Date of Monitoring :** 02/01/2018 to 03/01/2018

**Sample Lab Code :** UT/ELS/EREPL/008/01-2018  
**Survey Done By :** ULTRA-TECH

Sr. No.	Location	Noise Level Reading in dB(A) Leq											
		Time (Hrs)	Day dB(A)			Time (Hrs)	Night dB(A)						
			Leq	L <sub>max</sub>	L <sub>min</sub>		Leq	L <sub>min</sub>	L <sub>max</sub>				
01.	ANQMS Near IES School, Kanjur Village Co-ordinates: N-19°8'9.52", E-72°56'4.97"	06:00 to 07:00	48.9	42.1	54.6	22:00 to 23:00	53.2	46.2	60.4				
		07:00 to 08:00	53.9	46.3	58.4	23:00 to 00:00	49.8	43.4	54.6				
		08:00 to 09:00	54.8	49.3	60.7	00:00 to 01:00	46.5	40.1	57.3				
		09:00 to 10:00	56.9	50.4	61.3	01:00 to 02:00	45.4	40.9	51.6				
		10:00 to 11:00	58.6	51.7	64.6	02:00 to 03:00	44.3	38.6	50.7				
		11:00 to 12:00	59.4	52.3	65.3	03:00 to 04:00	44.5	37.9	48.9				
		12:00 to 13:00	60.1	54.7	66.9	04:00 to 05:00	44.5	37.2	49.6				
		13:00 to 14:00	59.4	52.6	65.2	05:00 to 06:00	45.8	38.7	50.2				
		14:00 to 15:00	58.4	53.2	64.6	--	--	--	--				
		15:00 to 16:00	57.9	51.6	63.7	--	--	--	--				
		16:00 to 17:00	59.4	53.7	65.6	--	--	--	--				
		17:00 to 18:00	60.1	55.6	66.7	--	--	--	--				
		18:00 to 19:00	58.9	51.9	64.7	--	--	--	--				
		19:00 to 20:00	57.6	51.2	63.9	--	--	--	--				
		20:00 to 21:00	56.4	50.6	62.4	--	--	--	--				
		21:00 to 22:00	55.4	49.7	61.9	--	--	--	--				
		L <sub>10</sub>		59.4			Limits in dB(A) Leq as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (See rule 3(1) and 4(1)) Ambient Air Quality Standards in respect of Noise						
		L <sub>50</sub>		55.9									
		L <sub>90</sub>		44.8									
		Day Leq		57.9							55		
		Night Leq		48.0							45		

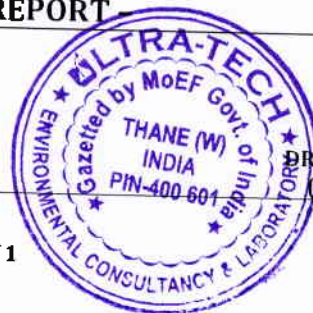
**Opinions / Interpretations:** The observed values for Leq dB(A) for Day Time & Night Time are Exceeding the standard limits as per Ambient Air Quality Standards in respect of Noise prescribed in The Noise Pollution (Regulation and Control) Rules, 2000 for Residential Zone.

**Note:** 1. Monitoring area coming under Residential Zone.  
 2. Day Time - 06:00 Hrs to 22:00 Hrs and Night Time - 22:00 Hrs to 06:00 Hrs.

Sampling Equipment Details	Instrument Used	Make & Model	Calibration Status
	Sound Level Meter	Make - ENVIROTECH; Model - SLM100, Sr. No. 192-DTK-2012	Valid up to - 31/07/2018

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- END OF REPORT



For ULTRA-TECH,

DR. RAHUL KOLHAPURKAR  
 (Authorized Signatory)

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## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042  
Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/009/01-2018  
ISSUE DATE : 31/01/2018  
YOUR REF. : WOJKSER/00566/17-18  
REF. DATE : 12/05/2017

**SAMPLE PARTICULARS**

Sampling Plan Ref. No. : EREPL-10/2017  
Sample Registration Date : 02/01/2018  
Date & Time of Sampling : 02/01/2018 at 11:30 Hrs  
Analysis Starting Date : 03/01/2018  
Analysis Completion Date : 19/01/2018  
Sample Collected By : ULTRA-TECH  
Sample Lab Code : UT/ELS/ EREPL /009/01-2018

### WATER QUALITY MONITORING

Sample Type : Ground Water - Bore Well  
Sample : Project Site  
Location : [N-19° 7'58.74"E-72°56'3.88"]  
Sample : 2L in Plastic Container for other parameters.  
Quantity & Packing Details

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Colour*	IS 3025 (Part 04) : 1983	BDL(DL=5)	Hazen
2.	Odor*	IS 3025 (Part 05) : 1983	Agreeable	-
3.	Temperature	IS 3025 (Part 09) : 1984	26.0	°C
4.	pH	IS 3025 (Part 11) : 1983	7.5	-
5.	Electrical Conductivity	IS 3025 (Part 14) : 1984	520	µS/cm
6.	Total Dissolved Solids	IS 3025 (Part 16) : 1984	334	mg/L
7.	Nitrates as NO <sub>3</sub> -N	IS 3025 (Part 34) : 1988	0.2	mg/L
8.	Nitrite as NO <sub>2</sub> -N	IS 3025 (Part 34) : 1988	0.03	mg/L
9.	Phosphates as PO <sub>4</sub> <sup>3-</sup>	APHA 4500 P E, 22 <sup>nd</sup> Ed.	0.3	mg/L
10.	Chemical Oxygen Demand	IS 3025 (Part 58) : 2006	8	mg/L
11.	Potassium as K <sup>+</sup>	IS 3025 (Part 45) : 1993	1	mg/L
12.	Sodium as Na <sup>+</sup>	IS 3025 (Part 45) : 1993	30	mg/L
13.	Calcium as Ca	IS 3025 (Part 40) : 1991	49	mg/L
14.	Magnesium as Mg	IS 3025 (Part 46) : 1994	19	mg/L
15.	Carbonates (CO <sub>3</sub> <sup>2-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	BDL(DL=1)	mg/L
16.	Bicarbonates as (HCO <sub>3</sub> <sup>-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	230	mg/L
17.	Chlorides as Cl <sup>-</sup>	IS 3025 (Part 32) : 1988	48	mg/L
18.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	APHA 4500-SO <sub>4</sub> <sup>2-</sup> E, 22 <sup>nd</sup> Ed.	15	mg/L
19.	Fluoride as F <sup>-</sup>	APHA 4500-F B-D, 22 <sup>nd</sup> Ed.	0.1	mg/L
20.	Boron as B	APHA 4500-B B, 22 <sup>nd</sup> Ed.	0.4	mg/L
DL-Detection Limit				BDL=Below Detection Limit

Opinions / Interpretations: Nil

Note: 1. This test report refers only to the sample tested.  
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4. \*: Parameters are not covered under NABL Scope.

- END OF REPORT -



For ULTRA-TECH,

Dr. Rahul Kolhapurkar  
(Authorized Signatory)

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## TEST REPORT

**ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED**

Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway

Kanjur Village, Kanjurmarg - East, Mumbai -400042

Project Site: "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/010/01-2018

**ISSUE DATE :** 31/01/2018

**YOUR REF. :** WOJKSER/00566/17-18

**REF. DATE :** 12/05/2017

### SAMPLE PARTICULARS :

**Sampling Plan Ref. No. :** EREPL-10/2017

**Sample Registration Date :** 02/01/2018

**Date & Time of Sampling :** 02/01/2018 at 11:30 Hrs

**Analysis Starting Date :** 03/01/2018

**Analysis Completion Date :** 19/01/2018

**Sample Collected By :** ULTRA-TECH

**Sample Lab Code :** UT/ELS/EREPL/010/01-2018

### WATER QUALITY MONITORING

**Sample Type :** Surface Water

**Sample :** Mithi River, Behind

**Location :** MTNL Office BKC  
(N-19° 4'14.16"E-72°52'24.46")

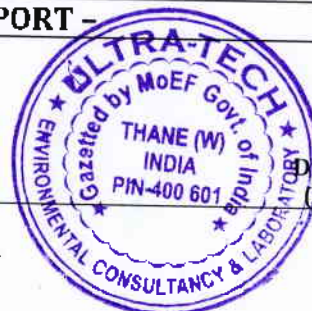
**Sample :** Sterilized Bottle For Microbial  
**Quantity & Packing Details :** parameter, 300 ml in BOD Bottle for DO & 2L in Plastic Container for other parameters.

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Colour*	IS 3025 (Part 04) : 1983	5	Hazen
2.	Odor*	IS 3025 (Part 05) : 1983	Agreeable	-
3.	Temperature	IS 3025 (Part 09) : 1984	27.1	°C
4.	Turbidity*	IS 3025 (Part 10) : 1984	15.9	NTU
5.	pH	IS 3025 (Part 11) : 1983	7.5	-
6.	Electrical Conductivity	IS 3025 (Part 14) : 1984	14000	µS/cm
7.	Total Dissolved Solids	IS 3025 (Part 16) : 1984	9170	mg/L
8.	Ammonical Nitrogen as NH <sub>3</sub> -N	IS 3025 (Part 34) : 1988	4.9	mg/L
9.	Nitrates as NO <sub>3</sub> -N	IS 3025 (Part 34) : 1988	2.8	mg/L
10.	Nitrite as NO <sub>2</sub> -N	IS 3025 (Part 34) : 1988	BDL[DL=0.001]	mg/L
11.	Phosphates as PO <sub>4</sub> <sup>3-</sup>	APHA 4500 P-E, 22 <sup>nd</sup> Ed.	15.6	mg/L
12.	Biochemical Oxygen Demand (27°C, 3Days)	IS 3025 (Part 44) : 1993	190	mg/L
13.	Chemical Oxygen Demand	IS 3025 (Part 58) : 2006	572	mg/L
14.	Dissolved Oxygen	IS 3025 (Part 38) : 1989	4.8	mg/L
15.	Potassium as K <sup>+</sup>	IS 3025 (Part 45) : 1993	155	mg/L
16.	Sodium as Na <sup>+</sup>	IS 3025 (Part 45) : 1993	2642	mg/L
17.	Calcium as Ca	IS 3025 (Part 40) : 1991	176	mg/L
18.	Magnesium as Mg	IS 3025 (Part 46) : 1994	241	mg/L
19.	Carbonates (CO <sub>3</sub> <sup>2-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	BDL[DL=1]	mg/L
20.	Bicarbonates as (HCO <sub>3</sub> <sup>-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	236	mg/L
21.	Chlorides as Cl <sup>-</sup>	IS 3025 (Part 32) : 1988	4354	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	APHA 4500-SO <sub>4</sub> <sup>2-</sup> -E, 22 <sup>nd</sup> Ed.	1450	mg/L
23.	Fluoride as F <sup>-</sup>	APHA 4500-F-B-D, 22 <sup>nd</sup> Ed.	1.0	mg/L
24.	Boron as B	APHA 4500-B-B, 22 <sup>nd</sup> Ed.	0.9	mg/L
25.	Iron as Fe	IS 3025 (Part 53) : 2003	BDL[DL=0.06]	mg/L
26.	Zinc as Zn	IS 3025 (Part 49) : 1994	BDL[DL=0.02]	mg/L
27.	Total Coliform Bacteria*	IS 1622 : 1981	1600	MPN/100 ml
28.	Fecal coliform*	IS 1622 : 1981	90	MPN/100 ml
29.	E. Coli*	IS 1622 : 1981	Present	-

**Opinions / Interpretations:** Nil

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  4. \* Parameters are not covered under NABL Scope.

**- END OF REPORT -**



For ULTRA-TECH,

*R. K.*  
Dr. Rahul Kolhapurkar  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
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## TEST REPORT

**ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED**  
Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai -400042  
Project Site: "Residential Development at Kanjurmarg"

**REPORT NO.** : UT/ELS/REPORT/EREPL/011/01-2018  
**ISSUE DATE** : 31/01/2018  
**YOUR REF.** : WOJKSER/00566/17-18  
**REF. DATE** : 12/05/2017

### SAMPLE PARTICULARS

**Sampling Plan Ref. No.** : EREPL-10/2017  
**Sample Registration Date** : 02/01/2018  
**Date & Time of Sampling** : 02/01/2018 at 13:40 Hrs  
**Analysis Starting Date** : 03/01/2018  
**Analysis Completion Date** : 19/01/2018  
**Sample Collected By** : ULTRA-TECH  
**Sample Lab Code** : UT/ELS/EREPL/011/01-2018

### WATER QUALITY MONITORING

**Sample Type** : Surface Water  
**Sample Location** : Thane Creek Near kalva Bridge  
(N-19° 7' 24.26" E-72° 53' 14.60")  
**Sample Quantity & Packing Details** : Sterilized Bottle For Microbial parameter, 300 ml in BOD Bottle for DO & 2L in Plastic Container for other parameters.

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Colour*	IS 3025 (Part 04) : 1983	BDL[DL=5]	Hazen
2.	Odor*	IS 3025 (Part 05) : 1983	Agreeable	-
3.	Temperature	IS 3025 (Part 09) : 1984	27.5	°C
4.	Turbidity*	IS 3025 (Part 10) : 1984	16.2	NTU
5.	pH	IS 3025 (Part 11) : 1983	7.3	-
6.	Electrical Conductivity	IS 3025 (Part 14) : 1984	39500	µS/cm
7.	Total Dissolved Solids	IS 3025 (Part 16) : 1984	25680	mg/L
8.	Ammonical Nitrogen as NH <sub>3</sub> -N	IS 3025 (Part 34) : 1988	BDL[DL=0.1]	mg/L
9.	Nitrates as NO <sub>3</sub> -N	IS 3025 (Part 34) : 1988	0.8	mg/L
10.	Nitrite as NO <sub>2</sub> -N	IS 3025 (Part 34) : 1988	BDL[DL=0.001]	mg/L
11.	Phosphates as PO <sub>4</sub> <sup>3-</sup>	APHA 4500 P E, 22 <sup>nd</sup> Ed.	12.6	mg/L
12.	Biochemical Oxygen Demand (27°C, 3Days)	IS 3025 (Part 44) : 1993	20	mg/L
13.	Chemical Oxygen Demand	IS 3025 (Part 58) : 2006	120	mg/L
14.	Dissolved Oxygen	IS 3025 (Part 38) : 1989	5.1	mg/L
15.	Potassium as K <sup>+</sup>	IS 3025 (Part 45) : 1993	115	mg/L
16.	Sodium as Na <sup>+</sup>	IS 3025 (Part 45) : 1993	8952	mg/L
17.	Calcium as Ca	IS 3025 (Part 40) : 1991	180	mg/L
18.	Magnesium as Mg	IS 3025 (Part 46) : 1994	309	mg/L
19.	Carbonates (CO <sub>3</sub> <sup>2-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	BDL[DL=1]	mg/L
20.	Bicarbonates as (HCO <sub>3</sub> <sup>-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	522	mg/L
21.	Chlorides as Cl <sup>-</sup>	IS 3025 (Part 32) : 1988	14921	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	APHA 4500-SO <sub>4</sub> <sup>2-</sup> E, 22 <sup>nd</sup> Ed.	880	mg/L
23.	Fluoride as F <sup>-</sup>	APHA 4500-F B-D, 22 <sup>nd</sup> Ed.	1.0	mg/L
24.	Boron as B	APHA 4500-B B, 22 <sup>nd</sup> Ed.	0.9	mg/L
25.	Iron as Fe	IS 3025 (Part 53) : 2003	BDL[DL=0.06]	mg/L
26.	Zinc as Zn	IS 3025 (Part 49) : 1994	BDL[DL=0.02]	mg/L
27.	Total Coliform Bacteria*	IS 1622 : 1981	1600	MPN/100 ml
28.	Fecal coliform*	IS 1622 : 1981	40	MPN/100 ml
29.	E. Coli*	IS 1622 : 1981	Present	-

Opinions / Interpretations: Nil

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  4. \* Parameters are not covered under NABL Scope.

- END OF REPORT -



For ULTRA-TECH,

Dr. Rahul Kolhapurkar  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
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## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED

Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway

Kanjur Village, Kanjurmarg - East, Mumbai - 400042

Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/012/01-2018

ISSUE DATE : 31/01/2018

YOUR REF. : WOJKSER/00566/17-18

REF. DATE : 12/05/2017

### SAMPLE PARTICULARS

Sampling Plan Ref. No. : EREPL-10/2017

Sample Registration Date : 02/01/2018

Date & Time of Sampling : 02/01/2018 at 09:20 Hrs

Analysis Starting Date : 03/01/2018

Analysis Completion Date : 19/01/2018

Sample Collected By : ULTRA-TECH

Sample Lab Code : UT/ELS/EREPL/012/01-2018

### WATER QUALITY MONITORING

Sample Type : Surface Water

Sample : Yeoor Lake Near Satellite Station  
Location : [N-19°13'24.27"E-72°56'58.43"]

Sample : Sterilized Bottle For Microbial parameter, 300 ml in BOD Bottle for DO & 2L in Plastic Container for other parameters.

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Colour*	IS 3025 (Part 04) : 1983	BDL(DL=5)	Hazen
2.	Odor*	IS 3025 (Part 05) : 1983	Agreeable	-
3.	Temperature	IS 3025 (Part 09) : 1984	26.9	°C
4.	Turbidity*	IS 3025 (Part 10) : 1984	3.2	NTU
5.	pH	IS 3025 (Part 11) : 1983	7.3	-
6.	Electrical Conductivity	IS 3025 (Part 14) : 1984	375	µS/cm
7.	Total Dissolved Solids	IS 3025 (Part 16) : 1984	240	mg/L
8.	Ammonical Nitrogen as NH <sub>3</sub> -N	IS 3025 (Part 34) : 1988	BDL(DL=0.1)	mg/L
9.	Nitrates as NO <sub>3</sub> -N	IS 3025 (Part 34) : 1988	3.3	mg/L
10.	Nitrite as NO <sub>2</sub> -N	IS 3025 (Part 34) : 1988	0.71	mg/L
11.	Phosphates as PO <sub>4</sub> <sup>3-</sup>	APHA 4500 P E, 22 <sup>nd</sup> Ed.	0.4	mg/L
12.	Biochemical Oxygen Demand (27°C, 3Days)	IS 3025 (Part 14) : 1993	BDL(DL=2)	mg/L
13.	Chemical Oxygen Demand	IS 3025 (Part 58) : 2006	12	mg/L
14.	Dissolved Oxygen	IS 3025 (Part 38) : 1989	6.1	mg/L
15.	Potassium as K*	IS 3025 (Part 45) : 1993	1.1	mg/L
16.	Sodium as Na*	IS 3025 (Part 45) : 1993	20.1	mg/L
17.	Calcium as Ca	IS 3025 (Part 40) : 1991	36	mg/L
18.	Magnesium as Mg	IS 3025 (Part 46) : 1994	19	mg/L
19.	Carbonates (CO <sub>3</sub> <sup>2-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	BDL(DL=1)	mg/L
20.	Bicarbonates (HCO <sub>3</sub> <sup>-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	150	mg/L
21.	Chlorides as Cl <sup>-</sup>	IS 3025 (Part 32) : 1988	40	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	APHA 4500-SO <sub>4</sub> <sup>2-</sup> E, 22 <sup>nd</sup> Ed.	19	mg/L
23.	Fluoride as F <sup>-</sup>	APHA 4500-F B-D, 22 <sup>nd</sup> Ed.	0.7	mg/L
24.	Boron as B	APHA 4500-B B, 22 <sup>nd</sup> Ed.	0.1	mg/L
25.	Iron as Fe	IS 3025 (Part 53) : 2003	BDL(DL=0.06)	mg/L
26.	Zinc as Zn	IS 3025 (Part 49) : 1994	BDL(DL=0.02)	mg/L
27.	Total Coliform Bacteria*	IS 1622 : 1981	900	MPN/100 ml
28.	Fecal coliform*	IS 1622 : 1981	21	MPN/100 ml
29.	E. Coli*	IS 1622 : 1981	Present	-

Opinions / Interpretations: Nil

BDL-Below Detection Limit

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- END OF REPORT



For ULTRA-TECH,

Dr. Rahul Kolhapurkar  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
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## TEST REPORT

ISSUED TO: M/s. EVIE REAL ESTATE PRIVATE LIMITED

Runwal & Omkar, 4<sup>th</sup> Floor, Off. Eastern Express Highway  
Kanjur Village, Kanjurmarg - East, Mumbai - 400042

Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/013/01-2018

ISSUE DATE : 31/01/2018

YOUR REF. : WOKSER/00566/17-18

REF. DATE : 12/05/2017

### SAMPLE PARTICULARS

Sampling Plan Ref. No. : EREPL-10/2017  
Sample Registration Date : 02/01/2018  
Date & Time of Sampling : 02/01/2018 at 10:40 Hrs  
Analysis Starting Date : 03/01/2018  
Analysis Completion Date : 19/01/2018  
Sample Collected By : ULTRA-TECH  
Sample Lab Code : UT/ELS/EREPL/013/01-2018

### WATER QUALITY MONITORING

Sample Type : Surface Water  
Sample : Powai Lake  
Location : [N-19° 7'25.28"; E-72°53'53.50"]  
Sample : Sterilized Bottle For Microbial parameter, 300 ml in BOD Bottle for DO & 2L in Plastic Container for other parameters.  
Packing Details

Sr. No.	Test Parameter	Test Method	Test Result	Unit
1.	Colour*	IS 3025 (Part 04) : 1983	BDL[DL=5]	Hazen
2.	Odor*	IS 3025 (Part 05) : 1983	Agreeable	-
3.	Temperature	IS 3025 (Part 09) : 1984	27.2	°C
4.	Turbidity*	IS 3025 (Part 10) : 1984	4.3	NTU
5.	pH	IS 3025 (Part 11) : 1983	7.1	-
6.	Electrical Conductivity	IS 3025 (Part 14) : 1984	450	µS/cm
7.	Total Dissolved Solids	IS 3025 (Part 16) : 1984	298	mg/L
8.	Ammonical Nitrogen as NH <sub>3</sub> -N	IS 3025 (Part 34) : 1988	BDL[DL=0.1]	mg/L
9.	Nitrates as NO <sub>3</sub> -N	IS 3025 (Part 34) : 1988	0.8	mg/L
10.	Nitrite as NO <sub>2</sub> -N	IS 3025 (Part 34) : 1988	0.24	mg/L
11.	Phosphates as PO <sub>4</sub> <sup>3-</sup>	APHA 4500 P E, 22 <sup>nd</sup> Ed.	0.4	mg/L
12.	Biochemical Oxygen Demand (27°C, 3Days)	IS 3025 (Part 44) : 1993	9	mg/L
13.	Chemical Oxygen Demand	IS 3025 (Part 58) : 2006	60	mg/L
14.	Dissolved Oxygen	IS 3025 (Part 38) : 1989	4.8	mg/L
15.	Potassium as K <sup>+</sup>	IS 3025 (Part 45) : 1993	3.2	mg/L
16.	Sodium as Na <sup>+</sup>	IS 3025 (Part 45) : 1993	26.4	mg/L
17.	Calcium as Ca	IS 3025 (Part 40) : 1991	44	mg/L
18.	Magnesium as Mg	IS 3025 (Part 46) : 1994	23	mg/L
19.	Carbonates (CO <sub>3</sub> <sup>2-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	BDL[DL=1]	mg/L
20.	Bicarbonates as (HCO <sub>3</sub> <sup>-</sup> ) as CaCO <sub>3</sub> *	IS 3025 (Part 51) : 2001	194	mg/L
21.	Chlorides as Cl <sup>-</sup>	IS 3025 (Part 32) : 1988	44	mg/L
22.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	APHA 4500-SO <sub>4</sub> <sup>2-</sup> E, 22 <sup>nd</sup> Ed.	35	mg/L
23.	Fluoride as F <sup>-</sup>	APHA 4500-F B-D, 22 <sup>nd</sup> Ed.	BDL[DL=0.2]	mg/L
24.	Boron as B	APHA 4500-B B, 22 <sup>nd</sup> Ed.	BDL[DL=0.1]	mg/L
25.	Iron as Fe	IS 3025 (Part 53) : 2003	BDL[DL=0.06]	mg/L
26.	Zinc as Zn	IS 3025 (Part 49) : 1994	BDL[DL=0.02]	mg/L
27.	Total Coliform Bacteria*	IS 1622 : 1981	600	MPN/100 ml
28.	Fecal coliform*	IS 1622 : 1981	34	MPN/100 ml
29.	E. Coli*	IS 1622 : 1981	Present	-

Opinions / Interpretations: Nil

BDL-Below Detection Limit

### Note:

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- END OF REPORT -



For ULTRA-TECH,

Dr. Rahul Kolhapurkar  
Authorized Signatory

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
Telefax : +91 22 2547 49 07 / +91 22 2547 62 17 Email : lab@ultratech.in Visit us at : www.ultratech.in

## TEST REPORT

ISSUED TO: M/s.EVIE REAL ESTATE PRIVATE LIMITED. REPORT NO. : UT/ELS/REPORT/EREPL/014/01-2018  
Runwal & Omkar, 4th Floor, Off. Eastern Express Highway ISSUE DATE : 31/01/2018  
Kanjur Village, Kanjurmarg - East, Mumbai -400042 YOUR REF. : WOJKSER/00566/17-18  
Project Site: "Residential Development at Kanjurmarg" REF. DATE : 12/05/2017

**Sample Particulars :** **AMBIENT AIR QUALITY MONITORING**  
**Location Code :** AAQM01 **Sample Location :** On Project Site Near Site Office ;  
**Height of Sampler :** 1.5 Meter **Co-ordinates:** N-19°8'0.83", E-72°56'6.04"  
**Sampling Duration :** 24 Hours  
**Sample Collect By :** ULTRA-TECH Environmental Consultancy and Laboratory, Thane

Date of Sampling	Date of Sample Registration	Analysis Period		Sample Lab Code	Parameters				
		From	To		PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	CO
					µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>
16/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L1-01/24	85	45	18	22	--
18/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L1-02/24	87	47	19	25	--
23/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L1-03/24	89	46	18	24	0.9
25/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L1-04/24	80	45	16	23	--
06/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L1-05/24	81	44	17	28	--
08/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L1-06/24	88	45	18	25	--
13/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L1-07/24	82	48	19	26	1.1
15/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L1-08/24	85	46	20	24	--
20/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L1-09/24	89	45	19	24	--
22/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L1-10/24	86	49	18	26	0.8
26/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L1-11/24	85	46	19	23	--
28/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L1-12/24	84	47	15	22	--
04/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L1-13/24	83	46	16	21	--
06/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L1-14/24	79	44	16	20	1.1
11/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L1-15/24	82	46	19	28	--
13/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L1-16/24	85	43	17	26	--
18/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L1-17/24	84	42	16	24	--
20/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L1-18/24	83	44	15	25	0.9
25/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L1-19/24	80	47	18	22	--
27/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L1-20/24	82	50	17	21	--
01/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L1-21/24	78	45	19	28	--
03/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L1-22/24	79	46	18	24	0.7
08/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L1-23/24	80	47	16	23	--
10/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L1-24/24	81	49	19	20	--
<b>Average</b>					83	46	18	24	0.9
<b>Minimum</b>					78	42	15	20	0.7
<b>Maximum</b>					89	50	20	28	1.1
<b>98 Percentile</b>					89	50	20	28	1.1

\*Sampling Duration:01:00 Hr

**Opinions/Interpretations:** National Ambient Air Quality Monitoring Standard, Part III- Section IV is enclosed for your reference.

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**- END OF REPORT -**

For ULTRA-TECH,



Dr. Rahul Kolhapurkar  
(Authorized Signatory)

**Laboratory :** G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
**Telefax :** +91 22 2547 49 07 / +91 22 2547 62 17 **Email :** lab@ultratech.in **Visit us at :** www.ultratech.in

## TEST REPORT

**ISSUED TO:** M/s.EVIE REAL ESTATE PRIVATE LIMITED. **REPORT NO. :** UT/ELS/REPORT/EREPL/015/01-2018  
**Runwal & Omkar, 4th Floor, Off. Eastern Express Highway** **ISSUE DATE :** 31/01/2018  
**Kanjur Village, Kanjurmarg - East, Mumbai -400042** **YOUR REF. :** WOJKSER/00566/17-18  
**Project Site: "Residential Development at Kanjurmarg"** **REF. DATE :** 12/05/2017

**Sample Particulars :** **AMBIENT AIR QUALITY MONITORING**  
**Location Code :** AAQM02 **Sample Location :** Near Datar Colony, Bhandup (E);  
**Height of Sampler :** 1.5 Meter **Co-ordinates:** N-19°8'18.55", E-72°56'8.91"  
**Sampling Duration :** 24 Hours  
**Sample Collect By :** ULTRA-TECH Environmental Consultancy and Laboratory, Thane

Date of Sampling	Date of Sample Registration	Analysis Period		Sample Lab Code	Parameters				
		From	To		PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	CO mg/m <sup>3</sup>
16/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L2-01/24	82	52	28	35	--
19/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L2-02/24	86	54	29	36	1.6
23/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L2-03/24	84	56	30	34	--
26/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L2-04/24	87	55	34	35	--
06/11/2017	11/11/2017	11/11/2017	16/11/2017	EREPL/L2-05/24	89	54	31	38	--
09/11/2017	11/11/2017	11/11/2017	16/11/2017	EREPL/L2-06/24	91	50	29	39	--
13/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L2-07/24	86	53	28	34	1.8
16/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L2-08/24	85	51	32	36	--
20/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L2-09/24	82	56	27	38	--
23/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L2-10/24	84	55	28	37	1.5
26/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L2-11/24	86	53	29	39	--
29/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L2-12/24	88	52	29	40	--
04/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L2-13/24	86	58	30	39	--
07/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L2-14/24	89	56	29	38	1.4
11/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L2-15/24	86	54	28	37	--
14/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L2-16/24	84	52	27	36	--
18/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L2-17/24	85	51	28	38	--
21/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L2-18/24	86	58	29	39	1.3
25/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L2-19/24	81	56	29	38	--
28/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L2-20/24	83	53	30	37	--
01/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L2-21/24	91	54	27	36	--
04/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L2-22/24	85	55	28	37	1.2
08/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L2-23/24	88	52	26	38	--
11/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L2-24/24	82	53	29	36	--
<b>Average</b>					86	54	29	37	1.5
<b>Minimum</b>					81	50	26	34	1.2
<b>Maximum</b>					91	58	34	40	1.8
<b>98 Percentile</b>					91	58	33	40	1.8

\*Sampling Duration:01:00 Hr

**Opinions/Interpretations:** National Ambient Air Quality Monitoring Standard, Part III- Section IV is enclosed for your reference.

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**- END OF REPORT -**

For ULTRA-TECH,



Dr. Rahul Kolhapurkar  
(Authorized Signatory)

Page 1 of 1

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## TEST REPORT

ISSUED TO: M/s.EVIE REAL ESTATE PRIVATE LIMITED.

Runwal & Omkar, 4th Floor, Off. Eastern Express Highway

Kanjur Village, Kanjurmarg - East, Mumbai -400042

Project Site: "Residential Development at Kanjurmarg"

REPORT NO. : UT/ELS/REPORT/EREPL/016/01-2018

ISSUE DATE : 31/01/2018

YOUR REF. : WOJKSER/00566/17-18

REF. DATE : 12/05/2017

Sample Particulars :

### AMBIENT AIR QUALITY MONITORING

Location Code : AAQM03

Height of Sampler : 1.5 Meter

Sampling Duration : 24 Hours

Sample Collect By : ULTRA-TECH Environmental Consultancy and Laboratory, Thane

Sample Location : Near Yashwantrao Chavan Udyan, Kanjurmarg;  
Co-ordinates: N-19°7'49.35", E-72°56'23.28"

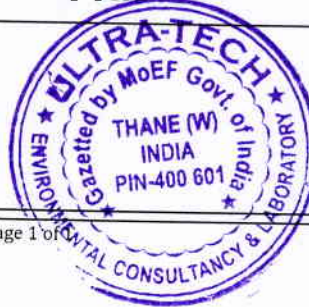
Date of Sampling	Date of Sample Registration	Analysis Period		Sample Lab Code	Parameters				
		From	To		PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	CO mg/m <sup>3</sup>
17/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L3-01/24	74	48	22	26	--
19/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L3-02/24	76	42	19	28	1.2
24/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L3-03/24	82	45	16	25	--
26/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L3-04/24	74	41	18	26	--
07/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L3-05/24	75	42	19	28	--
09/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L3-06/24	76	43	20	26	0.9
14/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L3-07/24	74	45	19	27	--
16/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L3-08/24	81	46	18	25	--
21/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L3-09/24	76	47	18	26	--
23/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L3-10/24	80	45	19	24	1.1
27/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L3-11/24	82	42	20	28	--
29/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L3-12/24	76	45	21	24	--
05/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L3-13/24	80	46	18	25	--
07/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L3-14/24	84	42	19	28	1.3
12/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L3-15/24	73	45	21	26	--
14/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L3-16/24	74	42	16	25	--
19/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L3-17/24	70	43	18	29	--
21/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L3-18/24	75	44	19	31	0.8
26/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L3-19/24	78	46	23	25	--
28/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L3-20/24	82	48	19	24	--
02/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L3-21/24	74	44	21	29	--
04/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L3-22/24	76	48	22	28	1.1
09/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L3-23/24	75	49	21	25	--
11/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L3-24/24	76	44	22	29	--
Average					77	45	20	27	1.1
Minimum					70	41	16	24	0.8
Maximum					84	49	23	31	1.3
98 Percentile					83	49	23	30	1.3

\*Sampling Duration:01:00 Hr

Opinions/Interpretations: National Ambient Air Quality Monitoring Standard, Part III- Section IV is enclosed for your reference.

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- END OF REPORT -



For ULTRA-TECH,

Dr. Rahul Kolhapurkar  
(Authorized Signatory)

Laboratory : G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
Telefax : +91 22 2547 49 07 / +91 22 2547 62 17 Email : lab@ultratech.in Visit us at : www.ultratech.in

## TEST REPORT

ISSUED TO: **M/s.EVIE REAL ESTATE PRIVATE LIMITED.** REPORT NO. : UT/ELS/REPORT/EREPL/017/01-2018  
Runwal & Omkar, 4th Floor, Off. Eastern Express Highway ISSUE DATE : 31/01/2018  
Kanjur Village, Kanjurmarg - East, Mumbai -400042 YOUR REF. : WOJKSER/00566/17-18  
Project Site: "Residential Development at Kanjurmarg" REF. DATE : 12/05/2017

**Sample Particulars** : **AMBIENT AIR QUALITY MONITORING**  
Location Code : AAQM04 Sample Location : Near Klick To Buy Ventures (P) Ltd., Kanjurmarg;  
Height of Sampler : 1.5 Meter Co-ordinates: N-19°7'41.32", E-72°56'8.31"  
Sampling Duration : 24 Hours  
Sample Collect By : ULTRA-TECH Environmental Consultancy and Laboratory, Thane

Date of Sampling	Date of Sample Registration	Analysis Period		Sample Lab Code	Parameters				
		From	To		PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	CO mg/m <sup>3</sup>
17/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L4-01/24	85	58	24	37	--
20/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L4-02/24	82	59	26	38	2.1
24/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L4-03/24	84	54	28	35	--
27/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L4-04/24	85	59	25	36	--
07/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L4-05/24	86	61	26	37	--
10/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L4-06/24	85	62	29	35	2.2
14/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L4-07/24	84	59	29	36	--
17/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L4-08/24	82	59	25	38	--
21/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L4-09/24	90	58	27	40	--
24/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L4-10/24	81	56	28	35	2.3
27/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L4-11/24	85	54	25	34	--
30/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L4-12/24	79	59	26	39	--
05/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L4-13/24	80	55	27	38	--
08/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L4-14/24	81	56	26	39	2.2
12/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L4-15/24	83	57	28	38	--
15/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L4-16/24	84	55	26	37	--
19/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L4-17/24	85	52	26	36	--
22/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L4-18/24	82	53	29	35	2.1
26/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L4-19/24	84	52	25	34	--
29/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L4-20/24	85	53	26	35	--
02/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L4-21/24	79	55	29	36	--
05/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L4-22/24	82	58	25	37	2.0
09/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L4-23/24	81	51	26	38	--
12/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L4-24/24	90	53	27	36	--
Average					84	56	27	37	2.2
Minimum					79	51	24	34	2.0
Maximum					90	62	29	40	2.3
98 Percentile					90	62	29	40	2.3

\*Sampling Duration:01:00 Hr

Opinions/Interpretations: National Ambient Air Quality Monitoring Standard, Part III- Section IV is enclosed for your reference.

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- END OF REPORT -



For ULTRA-TECH,

Dr. Rahul Kolhapurkar  
(Authorized Signatory)

**Laboratory :** G. V. Brothers Building, Bata Compound, Khopat, Near Flower Valley, Thane (West) - 400 601, Maharashtra, India  
**Telefax :** +91 22 2547 49 07 / +91 22 2547 62 17 **Email :** lab@ultratech.in **Visit us at :** www.ultratech.in

## TEST REPORT

**ISSUED TO:** M/s.EVIE REAL ESTATE PRIVATE LIMITED.

Runwal & Omkar, 4th Floor, Off. Eastern Express Highway

Kanjur Village, Kanjurmarg - East, Mumbai -400042

**Project Site:** "Residential Development at Kanjurmarg"

**REPORT NO. :** UT/ELS/REPORT/EREPL/018/01-2018

**ISSUE DATE :** 31/01/2018

**YOUR REF. :** WOJKSER/00566/17-18

**REF. DATE :** 12/05/2017

**Sample Particulars :**

### AMBIENT AIR QUALITY MONITORING

**Location Code :** AAQM05

**Sample Location :** At Ambedkar Nagar Nr. Gundecha Heights,

**Height of Sampler :** 1.5 Meter

Kanjurmarg ;

**Sampling Duration :** 24 Hours

Co-ordinates: N-19°8'2.99", E-72°55'47.45"

**Sample Collect By :** ULTRA-TECH Environmental Consultancy and Laboratory, Thane

Date of Sampling	Date of Sample Registration	Analysis Period		Sample Lab Code	Parameters				
		From	To		PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	CO mg/m <sup>3</sup>
18/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L5-01/24	79	48	22	32	--
20/10/2017	21/10/2017	21/10/2017	27/10/2017	EREPL/L5-02/24	82	47	25	34	1.3
25/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L5-03/24	85	48	25	38	--
27/10/2017	28/10/2017	28/10/2017	04/11/2017	EREPL/L5-04/24	84	49	26	36	--
08/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L5-05/24	83	50	24	35	--
10/11/2017	11/11/2017	11/11/2017	18/11/2017	EREPL/L5-06/24	84	48	26	34	1.2
15/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L5-07/24	75	52	28	36	--
17/11/2017	18/11/2017	18/11/2017	25/11/2017	EREPL/L5-08/24	76	45	24	38	--
22/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L5-09/24	78	46	26	34	--
24/11/2017	25/11/2017	25/11/2017	01/12/2017	EREPL/L5-10/24	79	48	26	35	1.1
28/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L5-11/24	79	45	27	39	--
30/11/2017	02/12/2017	02/12/2017	08/12/2017	EREPL/L5-12/24	72	49	24	38	--
06/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L5-13/24	75	46	26	39	--
08/12/2017	09/12/2017	09/12/2017	15/12/2017	EREPL/L5-14/24	76	44	28	35	0.9
13/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L5-15/24	80	55	29	34	--
15/12/2017	16/12/2017	16/12/2017	22/12/2017	EREPL/L5-16/24	74	56	23	36	--
20/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L5-17/24	79	58	24	37	--
22/12/2017	23/12/2017	23/12/2017	29/12/2017	EREPL/L5-18/24	72	49	26	38	0.8
27/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L5-19/24	79	50	28	36	--
29/12/2017	30/12/2017	30/12/2017	05/01/2018	EREPL/L5-20/24	75	51	26	38	--
03/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L5-21/24	82	52	24	37	--
05/01/2018	06/01/2018	06/01/2018	12/01/2018	EREPL/L5-22/24	81	49	26	36	1.3
10/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L5-23/24	79	51	24	37	--
12/01/2018	13/01/2018	13/01/2018	20/01/2018	EREPL/L5-24/24	82	54	27	38	--
<b>Average</b>					79	50	26	36	1.1
<b>Minimum</b>					72	44	22	32	0.8
<b>Maximum</b>					85	58	29	39	1.3
<b>98 Percentile</b>					85	57	29	39	1.3

\*Sampling Duration:01:00 Hr

**Opinions/Interpretations:** National Ambient Air Quality Monitoring Standard, Part III- Section IV is enclosed for your reference.

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**- END OF REPORT -**



For ULTRA-TECH,

*Rahul*  
Dr. Rahul Kolhapurkar  
(Authorized Signatory)

Page 1 of 1

H.O.: Unit No. 224,225,206, Jai Commercial Complex, Eaxstern Express Highway, Opp. Cadbury Factory, Khopat, Thane (W) 400 601  
Tel : +91-22+2534 27 76 / 2538 01 98 / 2533 14 38 Fax : +91-22-2542 96 50 Email : sales@ultratech.in

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*Enclosure 18*

**No.F.No. 21-226/2017-IA-III**  
Government of India  
Minister of Environment, Forest and Climate Change  
Impact Assessment Division

\*\*\*

Indira Paryavaran Bhavan,  
Vayu Wing, 3rd Floor, Aliganj,  
Jor Bagh Road, New Delhi-110003  
14 Aug 2017

To,

M/s M/S. EVIE REAL ESTATE PRIVATE LIMITED  
4th Floor, Runwal and Omkar Esquare, opp. Sion Chunnabhatti Signal, Off Eastern Express  
Highway, Sion East, Mumbai.,  
Mumbai (Suburban)-400022  
Maharashtra

**Tel.No.022-24033702; Email:shishir.tiwari@runwal.com**

Sir/Madam,

This has reference to the proposal submitted in the Ministry of Environment, Forest and Climate Change to prescribe the Terms of Reference (TOR) for undertaking detailed EIA study for the purpose of obtaining Environmental Clearance in accordance with the provisions of the EIA Notification, 2006. For this purpose, the proponent had submitted online information in the prescribed format (Form-1 ) along with a Pre-feasibility Report. The details of the proposal are given below:

- |   |   |
|---|---|
| <b>1. Proposal No.:</b>                 | IA/MH/NCP/65597/2017                                      |
| <b>2. Name of the Proposal:</b>         | Amendment and Expansion in EC for Residential Development |
| <b>3. Category of the Proposal:</b>     | New Construction Projects and Industrial Estates          |
| <b>4. Project/Activity applied for:</b> | 8(b) Townships and Area Development projects.             |
| <b>5. Date of submission for TOR:</b>   | 20 Jun 2017   |

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard TOR for the purpose of preparing environment impact assessment report and environment management plan for obtaining prior environment clearance is prescribed with public consultation as follows:

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

---

### **8(b):STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR TOWNSHIP/ AREA DEVELOPMENT PROJECTS INFORMATION TO BE INCLUDED IN EIA/EMP REPORT**

- 1) Examine details of land use as per Master Plan and land use around 10 km radius of the project site. Analysis should be made based on latest satellite imagery for land use with raw images.
- 2) Submit details of environmentally sensitive places, land acquisition status, rehabilitation of communities/ villages and present status of such activities.
- 3) Examine baseline environmental quality along with projected incremental load due to the project.
- 4) Environmental data to be considered in relation to the project development would be (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health.
- 5) Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area.
- 6) Submit the details of the trees to be felled for the project.
- 7) Submit the present land use and permission required for any conversion such as forest, agriculture etc.
- 8) Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.
- 9) Ground water classification as per the Central Ground Water Authority.
- 10) Examine the details of Source of water, water requirement, use of treated waste water and prepare a water balance chart.
- 11) Rain water harvesting proposals should be made with due safeguards for ground water quality. Maximize recycling of water and utilization of rain water. Examine details.
- 12) Examine soil characteristics and depth of ground water table for rainwater harvesting.
- 13) Examine details of solid waste generation treatment and its disposal.
- 14) Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption.
- 15) DG sets are likely to be used during construction and operational phase of the project. Emissions from DG sets must be taken into consideration while estimating the impacts on air environment. Examine and submit details.
- 16) Examine road/rail connectivity to the project site and impact on the traffic due to the proposed project. Present and future traffic and transport facilities for the region should be analysed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.

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

---

- 17) A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.
- 18) Examine the details of transport of materials for construction which should include source and availability.
- 19) Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.
- 20) Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.

\*\*\*\*\*