KOLTE • PATIL
Creation, not Construction

Date: 03.01.2017

To,
The Member Secretary
Expert Appraisal Committee (2) in the Infrastructure Sector
Ministry of Environment and Forests & Climate Change
Indira Paryavaran Bhavan,
Jor Bagh Road, New Delhi - 110003, India.

Subject : Submission of compliance report to the observations raised during 11th Expert Appraisal Committee -2 (EAC-2) meeting for the Proposed Redevelopment of "Sagar Vaibhav Co-op Housing Society Ltd." at Village Mandapeshwar, Opposite Mary Immaculate Girls School, Laxman Mhatre Road, Dahisar (West), Mumbai – 400068.

Reference :
- Minutes of meeting (MoM) of 11th EAC
- F.No.21-31/2016-IA-III

Respected Sir,

This is with reference to the above mentioned subject. We are submitting herewith the point wise compliance report to the observations raised by Honorable EAC during the meeting as follows:

No.	Observations and Compliances
1.	**Observation:** Status of application of the project proposal in SEIAA, Maharashtra **Compliance:** We have withdrawn the proposal from SEIAA, Maharashtra. Acceptance Letter for withdrawal of EC application from SEIAA is attached herewith as **Enclosure-1.**
2.	**Observation:** Copy of application submitted for clearance from NBWL **Compliance:** NOC from Wild Life Board is Not Applicable as per Notification reg. ESZ of SGNP published by MOEF & CC u/no. S.O. 3645 (E) dated 5/12/2016, as our project site is not affected by the ESZ belt as per Notification published.

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No.	Observations and Compliances
3.	**Observation:** Present land use of the proposed project site **Compliance:** Project site is in residential zone as per DP remarks. DP remarks and DP plan are attached herewith as **Enclosure -2.**
4.	**Observation:** Please confirm whether site is not located on the wet land. **Compliance:** The project site is not located on the wet land. Please refer the DP plan & remarks given in same Enclosure-2.
5.	**Observation:** Details of no. of floor along with built up area to be constructed in each block to be furnished **Compliance:** Details for number of floors along with built up area to be constructed in each block is attached herewith as **Enclosure-3.**
6.	**Observation:** Efforts shall be made to provide balconies in the flat **Compliance:** Due to planning constraints from local authority, we are not able to provide balconies in our building design. But we ensure that there is adequate light ventilation and a separate space for washing machine, drying cloths etc for individual flats.
7.	**Observation:** Cost of project as well as capital cost and recurring cost per annum for implementing EMP to be provided. **Compliance:** Cost of project is 99.67 Cr. Costing for Environmental Management Plan (EMP) is as follows: Capital Cost: Rs 145.89 Lacs Operation & Maintenance Cost: Rs.31.87 Lacs/annum Capital cost and recurring cost per annum for implementing EMP is attached herewith as **Enclosure-4.**

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No.	Observations and Compliances
8.	**Observation:** Layout plan indicating road, greenbelt, drainage, sewer line, STP, solid waste handling area, rain water harvesting structure, etc. in different colour to be furnished. **Compliance:** Layout plan indicating road, greenbelt, drainage, sewer line, STP, solid waste handling area, rain water harvesting structure, etc. in different colour is attached herewith as **Enclosure-5**
9.	**Observation:** Layout of parking plan indicating entry and exit points of vehicular movement as well as traffic management plan. Highlight the fire tender pathway. **Compliance:** Layout of parking plan indicating entry and exit points of vehicular movement as well as traffic management plan along with highlighted fire tender pathway is attached herewith as **Enclosure-6**
10.	**Observation:** Details of source of water supply along with permission to be submitted **Compliance:** The project is situated within the limit of Municipal Corporation of Greater Mumbai (MCGM) hence water supply is assured by MCGM for Domestic fresh water demand. The criterion for total water demand per person per day is 135 LPCD for residential (Domestic – 90 LPCD & Flushing – 45 LPCD). Out of which 90 LPCD shall be supplied by MCGM for entire Domestic requirement of project (Total 95 KLD for domestic). The rest of the demand 45 LPCD for flushing purpose shall be fulfilled by STP treated sewage (total 47 KLD for flushing).
11.	**Observation:** Excess treated sewage disposal plan/scheme to be submitted **Compliance:** Sewage generation will be 123 KLD. This sewage shall be treated in Sewage Treatment Plant of Capacity of 140 KL. All Secondary requirements like flushing (47 KLD) and gardening (3 KLD) would be fulfilled by treated sewage from STP. Excess treated sewage during non-monsoon (61 KLD) and monsoon (64 KLD) shall be disposed to existing sewer line. We have also received Sewerage remarks from Executive Engineer Mechanical (Main Sewer) Western Suburbs, MCGM are attached herewith as **Enclosure-7.**

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No.	Observations and Compliances
12.	**Observation:** Assessment of ground level concentration of pollutants due to DG set (500 KVA) **Compliance:** Generator set emissions was below model acceptable levels. Hence ground level concentrations cannot be generated. In turn the emissions were well within prescribed limits. Image showing model input is attached herewith as **Enclosure-8A.** However we have also carried out air quality modeling considering impact of Traffic and DG set emissions. All the predicted values of the pollutants in the operation scenario considering pollution due to Traffic and DG sets are within the National Ambient Air Quality Standards (NAAQS), issued by Central Pollution Control Board (CPCB) dated November 18, 2009. Detailed Air quality modeling report is attached herewith as **Enclosure-8B.**
13.	**Observation:** Effort shall be made to reduce capacity of DG set and remaining standby power shall be met from solar energy **Compliance:** We have crosschecked the calculation of DG set requirements. DG set requirement is calculated considering Fire Emergency Loads, Pump load, one lift for each wing, Sump pump, Ventilation load and Environment management facility like STP hence it is not possible to reduce the capacity of the DG set. A detailed calculation for requirement of DG set is attached herewith as **Enclosure-9.**
14.	**Observation:** Treatment scheme for sewage and its recycling mode **Compliance:** We shall ensure that sewage 123 KLD will be completely treated upto tertiary level with disinfection system (Ultra violet system) in Sewage Treatment Plant (STP) of capacity 140 KL. The technology used shall be **Moving Bed Bio-Reactor (MBBR) Technology**. Detailed Treatment scheme for sewage along with water balance showing recycling of treated sewage is attached as **Enclosure-10.**

No.	Observations and Compliances
15.	**Observation:** Ensure that in dual plumbing, there is no contact of treated water with humans. Prepare a distinct separate plan for plumbing lines for treated and raw water. A commitment shall be given that no line for treated effluents other than for flushing shall be provided. **Compliance:** Domestic water supply shall be supplied by M.C.G.M. The treated water from STP shall be used for flushing water supply. There will be two separate storage tank for domestic and flushing water supply at underground level and overhead level. Water from Underground level tanks to overhead tank shall be transferred with separate set of transfer pump for domestic and flushing water. Further it will be distributed from overhead tanks with separate down takes for flushing and domestic water. Color coding for dual plumbing system shall be done as per standard practices. We commit that no line for treated effluents other than for flushing shall be provided. The distribution scheme described in attached schematic and internal toilet layout. Please refer **Enclosure-11.**
16.	**Observation:** Details of rain water harvesting system to be furnished. Clarity on recharge pits, storage systems for rain water and use of appropriate filtration system for collected rain water to be detailed. **Compliance:** The ground water table at the project site is 1.50 to 1.70 mt below ground surface hence ground water recharging is not proposed as per guidelines mentioned for rainwater harvesting system in Manual on norms and standards for environment clearance of large construction projects by Ministry of Environment and Forests, Government of India Hence we have proposed 3 RWH tanks of total capacity 40 KL. Rain water shall be stored in these tanks. The rain water collected in tanks will be given treatment of filtration and disinfection and the treated rain water shall be used for the non-drinking domestic purpose. Layout plan showing Location of RWH Tanks and treatment facility for rain water is attached herewith as **Enclosure-12.**
17.	**Observation:** Calculation on sizing of solar water heating systems to be furnished. **Compliance:** As per suggestion of Hon. EAC we have given preference to use our available terrace area for 2 solar powered lights and one fan in each flat. Then on the balance available terrace area we have also proposed to provide solar water heating systems for few upper floors. Detailed calculation for solar heating system is attached herewith as **Enclosure-13.**

No.	Observations and Compliances
18.	**Observation:** At least 2 solar powered lights and one fan shall be provided in each flat. Solar generation shall be connected to the grid. **Compliance:** The Solar power generation capacity of the project is 28.4 KW/hr. The above capacity is more than the required capacity of 21.1 KW/hr required to run one fan and two solar lights in each flat. As recommended by the Hon. EAC, the capacity so generated would be connected to the grid. Detailed calculation is attached as **Enclosure-14.**
19.	**Observation:** Solid waste management plan along with area earmarked for solid waste management scheme. **Compliance:** Solid waste management plan along with area earmarked for solid waste management scheme is attached as **Enclosure-15.**
20.	**Observation:** Management of excavated soil. Pollution control measures to be taken to control fugitive emission during construction phase including marble /stone cutting. **Compliance:** The plot has a natural gradient From Laxman Mhatre road towards Wing A. The gradient absolves the need for large-scale cutting and filling for the construction of Lower Ground and basement. Only minimum cutting/ filling is required to match internal road level with level of adjacent road. Waste Management plan for excavated soil is given as below:

No.	Item	Quantity	Reuse/Recycle/Disposal (Details)
1	Top soil	600 Cum	Shall be preserved and used for gardening
2	Quantity of Cutting	6800 Cum	Quantity of Filling: 3000 Cum Remaining 3800 Cum shall be disposed to authorized landfill site as per permission from M.C.G.M.

Pollution control measures to be taken to control fugitive emission during construction phase are as follows:

- Dust suppression
- On site sensors shall be installed to monitor PM10 and PM 2.5
- Barricading site with tin sheets with height of 4.00 mt

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No.	Observations and Compliances
	• Use of covering sheets while transporting the material • Use of polymeric spray for dust suppression instead of water wherever possible • Curing water shall be sprayed on concrete structures, free flow of water should not be allowed for curing Use of wet jute cloth/gunny bags instead of water spray for curing activity
21.	**Observation:** The provisions of the fly ash notification as applicable to Maharashtra shall be strictly complied with. **Compliance:** Cement containing fly ash shall be used during construction.
22.	**Observation:** Details energy conservation measures to be taken (all points mentioned in the proposal such as orientation to support reduced heat gain, use of ASHRAE 90.1, use of ECBC compliant envelope measures to be supported through drawings and details in the proposal) **Compliance:** Details of energy conservation measures supported through drawings and details in the proposal is attached herewith as **Enclosure-16.**
23.	**Observation:** Layout plan indicating Greenbelt along with area earmarked to be provided. **Compliance:** Width of greenbelt is varying from 4 mt. to 14 mt. Layout plan indicating Greenbelt along with area earmarked is attached herewith as **Enclosure-17.**

We sincerely hope that our reply will satisfy the observations raised by the respected Committee.
Revised Form 1 & 1A (Revision 2) is also attached herewith.
Please do the needful and oblige.

Thanking you,

Yours faithfully,

For KOLTE-PATIL DEVELOPERS LTD.

KOLTE PATIL DEVELOPERS LTD. MUMBAI

AUTHORIZED SIGNATORY
Encl: As above

ENCLOSURE - 1

From: <monitoring-ec@nic.in>
Date: 25 November 2559 BE at 2:59:36 PM IST
To: <gopal.sarda@koltepatil.com>
Cc: <monitoring-ec@nic.in>
Subject: Withdraw of EC

Acceptance Letter for withdrawal of EC apllication

State Environment Impact Assessment Authority

Maharashtra

Member Address

Dated: 25 Nov 2016

To,

KOLTE PATIL DEVELOPERS LTD

, Mumbai (Suburban)

Maharashtra , 400051

Subject : Withdraw of EC

Sir,

This has reference to your proposal No. SIA/MH/NCP/58827/2016 dated 06 Sep 2016 regarding withdrawal of Environmental/CRZ Clearance for the above mentioned proposal.

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

Yours Sincerely

SEIAA, Maharashtra

ENCLOSURE - 2

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the Chief Engineer (Development Plan)
Municipal Head Office, 5th Floor, Extn. Building,
Mahapalika Marg, Fort,
Mumbai 400 001

To,
Mr./Mrs. : AAKAR ARCHITECTS CONSULTANTS
Gr. Floor, Satyanarayan Prasad Commercial Centre, Dayaldas Road, Vile parle

No CHE. : SRDP201608111123945

Report Date : 20/08/2016

Sub : Sanctioned Revised Development Plan remarks for the land bearing C.T.S. No(s)51 of MANDPESHWAR Village

Ref : Your Application u/no. DPR111123974 and payment of certifying charges made under Receipt no. 20160631460 dated 20/08/2016

Gentleman/Madam,

Sanctioned Revised Development Plan Remarks for the land shown bounded on the accompanying plan are as under:

Description of the land: C.T.S.No(s) 51 of MANDPESHWAR

Sanctioned Revised Development Plan referred to ward: R

Reservations affecting the land[as show on plan]: PUBLIC HOUSING/HIGH DENSITY HOUSING

Reservations abutting the land[as show on plan]: NO

Designations affecting the land[as show on plan]: NO

Designations abutting the land[as show on plan]: NO

D.P. Roads affecting the land[as show on plan]: EXISTING ROAD 18.30 M

Existing Road: Present

Widening of the existing road to be confirmed from the office of the Executive Engineer (Traffic and Co-ordination)/Assistant Engineer (Survey).

Zones [as shown on plan]: RESIDENTIAL ZONE

Remarks from other Departments/Offices:

Demarcation:

The boundaries of the reservations are subject to the actual Demarcation on site by this office staff along with the representative of A.E. Survey

Note:

If the land under reference is a part of amalgamation/sub division/layout, then specific remarks shall be obtained from the concerned Building Proposal office and development thereof shall be as per the terms and conditions of the approved amalgamation/sub division/layout.Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference.

Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference. Status of the existing road, if any, shall be confirmed from the concerned Ward Office.

The boundaries shown in the accompanying plan are as per the available records with this office. However the boundaries shown in the records of City Survey Office shall supersede those shown in the D. P. Remarks Plan.

The separate remarks as per Draft Development Plan (2034) shall be obtained from the office of Town Planning Officer, 5th Floor, Annexe Building, Municipal Head Office, Mahapalika Marg, Fort, MUMBAI - 400 001.

Validity of this Report is for One Year starting from the report generation date: 20/08/2016

No CHE. : SRDP201608111123945

Note: This is electronically generated report. Hence personal signature is not required. Development Plan,Department R Ward.

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the Chief Engineer (Development Plan)
Municipal Head Office, 5th Floor, Extn. Building,
Mahapalika Marg, Fort,
Mumbai 400 001

To,
Mr./Mrs. : AAKAR ARCHITECTS CONSULTANTS
Gr. Floor, Satyanarayan Prasad Commercial Centre, Dayaldas Road, Vile parle

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Ref : Your Application u/no. DPR111123974 and payment of certifying charges made under Receipt no. 20160631460 dated 20/08/2016

Gentleman/Madam,

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Description of the land: C.T.S.No(s) 51 of MANDPESHWAR

Sanctioned Revised Development Plan referred to ward: R

Reservations affecting the land[as show on plan]: PUBLIC HOUSING/HIGH DENSITY HOUSING

Reservations abutting the land[as show on plan]: NO

Designations affecting the land[as show on plan]: NO

Designations abutting the land[as show on plan]: NO

D.P. Roads affecting the land[as show on plan]: EXISTING ROAD 18.30 M

Existing Road: Present

Widening of the existing road to be confirmed from the office of the Executive Engineer (Traffic and Co-ordination)/Assistant Engineer (Survey).

Zones [as shown on plan]: RESIDENTIAL ZONE

Remarks from other Departments/Offices:

Demarcation:

The boundaries of the reservations are subject to the actual Demarcation on site by this office staff along with the representative of A.E. Survey

Note:

If the land under reference is a part of amalgamation/sub division/layout, then specific remarks shall be obtained from the concerned Building Proposal office and development thereof shall be as per the terms and conditions of the approved amalgamation/sub division/layout.Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference.

Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference. Status of the existing road, if any, shall be confirmed from the concerned Ward Office.

The boundaries shown in the accompanying plan are as per the available records with this office. However the boundaries shown in the records of City Survey Office shall supersede those shown in the D. P. Remarks Plan.

The separate remarks as per Draft Development Plan (2034) shall be obtained from the office of Town Planning Officer, 5th Floor, Annexe Building, Municipal Head Office, Mahapalika Marg, Fort, MUMBAI - 400 001.

Validity of this Report is for One Year starting from the report generation date: 20/08/2016

No CHE. : SRDP201608111123945

Note: This is electronically generated report. Hence personal signature is not required. Development Plan,Department R Ward.

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the
Chief Engineer (Development Plan)
Municipal Head Office
4th Floor, Extn. Building
Mahapalika Marg, Fort
Mumbai - 400 001

To
M/s. GEE ARCH,
34, ROSHAN APPSAR,
ROSHAN NAGAR,
BORIVALI (W),
MUMBAI-

No: CHE/800/DPWS/R/N

Date: 7 OCT 2013

Sub: Sanctioned Revised Development Plan Remarks for the land bearing C. T. S. No 51 of MANDPESHWAR-M Village

Ref: Your Application u/no. 0011076 and payment of certifying charges made under Receipt no. 1556673 dated 01/10/13

Sir/Madam,

Sanctioned Revised Development Plan Remarks for the land shown bounded blue on the accompanying plan are as under:-

Description of the Land	:	C. T. S. No 51 of MANDPESHWAR-M Village
Sanctioned Revised Development Plan referred to Ward	:	R
Reservations affecting the land [as shown on plan]	:	PUBLIC HOUSING/HIGH DENSITY HOUSING (part of larger reservation)
Reservations Abutting the land [as shown on plan]	:	NIL
Designations affecting the land [as shown on plan]	:	NIL
Designations Abutting the land [as shown on plan]	:	NIL
D.P. Roads affecting the land [as shown on plan]	:	D. P. ROAD (18.30 M)
Existing Roads [as shown on plan]	:	Present

The widening if any, of the existing Road shall be as per the regular lines prescribed by the office of the Executive Engineer (Traffic & Co-ordination)/Assistant Engineer (Survey).

Zone [as shown on plan]	:	RESIDENTIAL ZONE (R)

Remarks from other Departments/Offices:

Demarcation: The Alignment of the proposed road & the boundaries of the reservation is

Further, if there is existing well on the land u/r then specific remarks shall be obtained from Assistant Commisioner R/North ward before any development.

Further, if there is existing Nalla on the land u/r then specific remarks shall be obtained from E. E. (SWD) WS before any development.

Note:

If the land under reference is a part of amalgamation/sub-division/layout, then specific remarks shall be obtained from the concerned Building Proposal office and development thereof shall be as per the terms and conditions of the approved amalgamation/sub-division/layout.

Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference. Status of the existing road, if any, shall be confirmed from the concerned Ward Office.

The boundaries shown in the accompanying plan are as per the available records with this office. However the boundaries shown in the records of City Survey Office shall supercede those shown in the D. P. Remarks Plan.

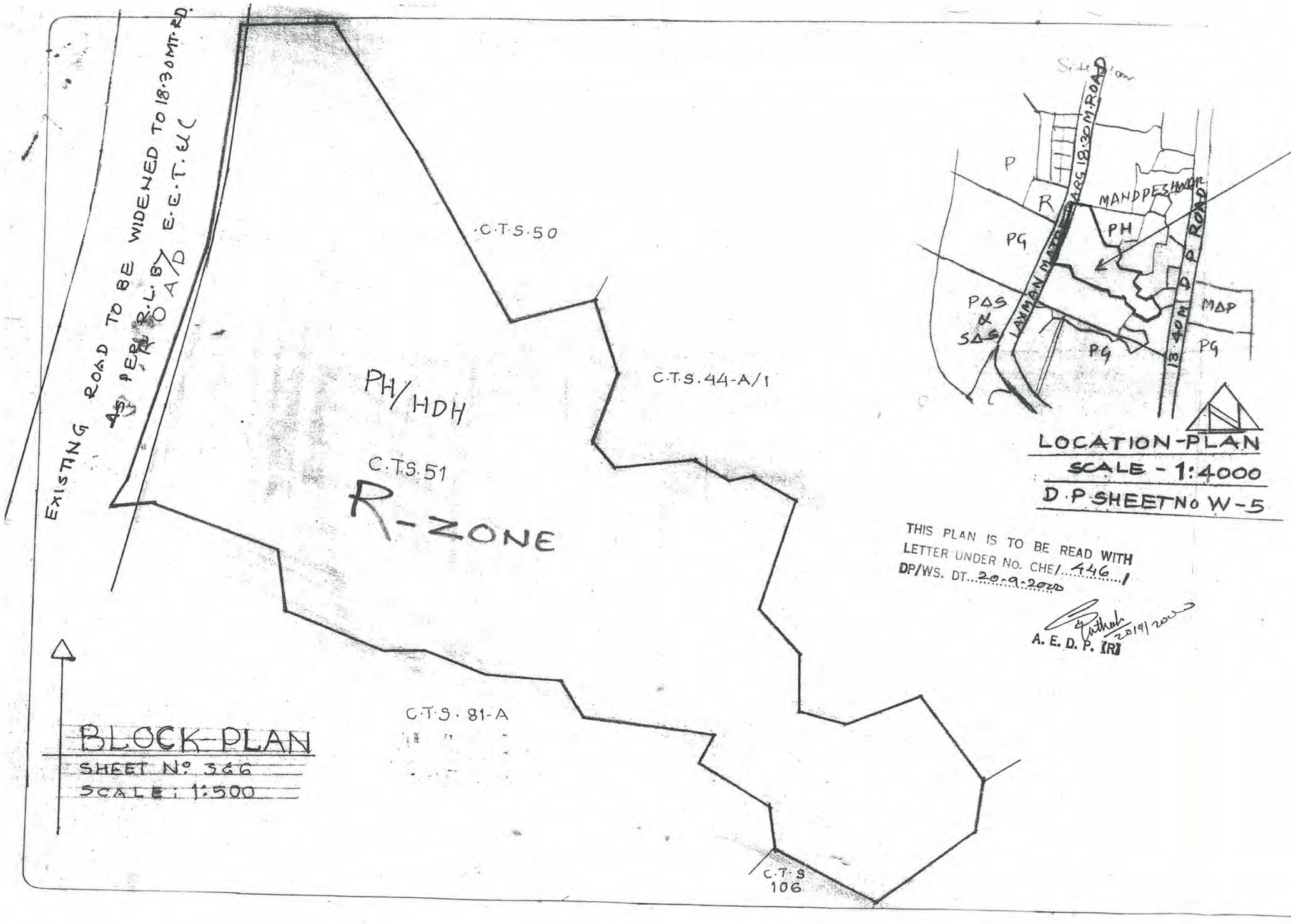
Yours Faithfully

05.10.2017

Acc~1 plan

Assistant Engineer,
Development Plan
(R/N Ward)

~~D.P.~~ Plan.
Block P



THIS PLAN IS TO BE READ WITH LETTER UNDER No. CHE/ 446 / DP/WS. DT. 20-9-2000

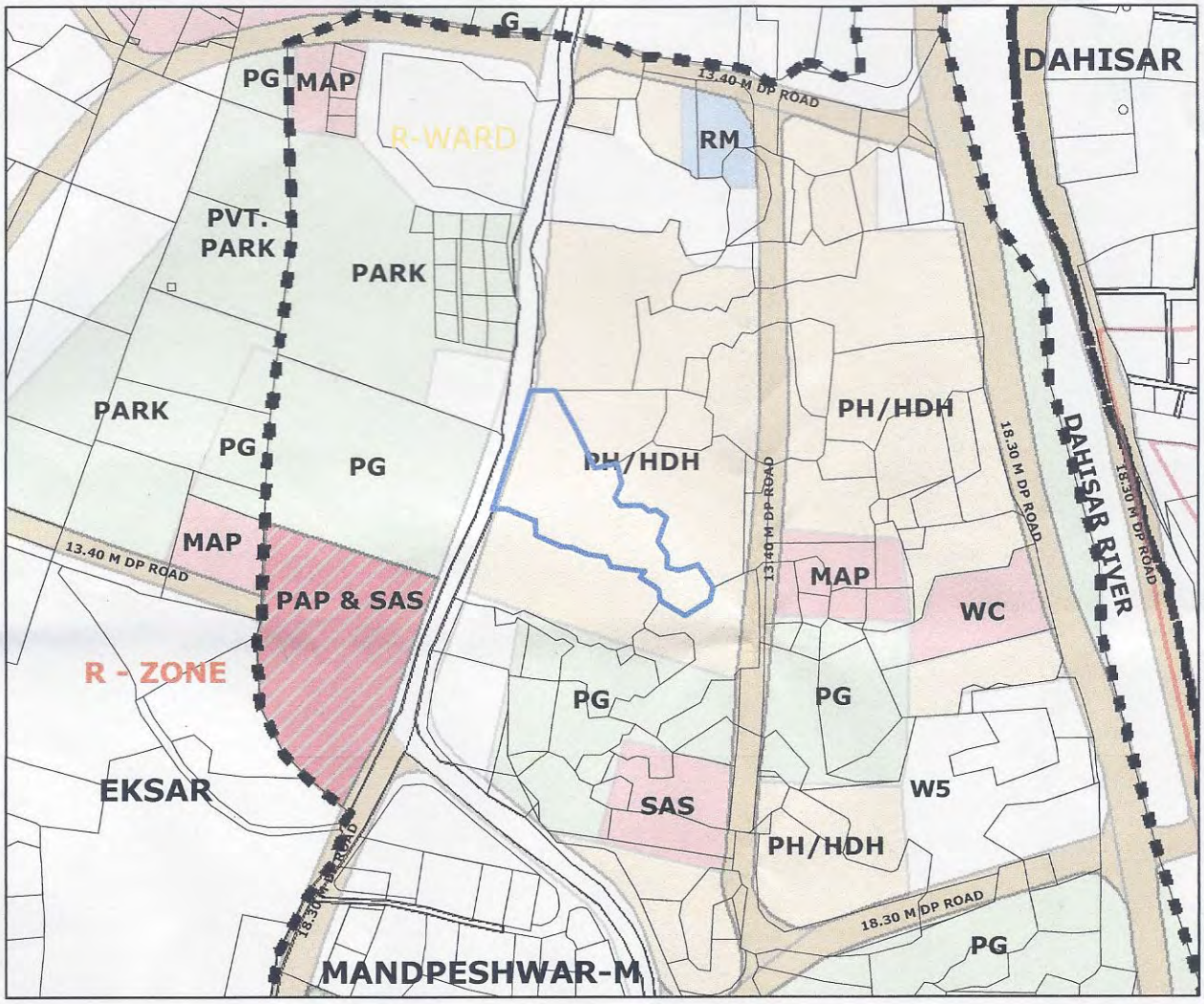
A. E. D. P. (R) 20/9/2000

DESCRIPTION OF PROP
PLAN SHOWING T
PROPERTY BEAR
C.T.S. No 51 OF VIL
MANDPESWAR BOR
MUMBAI 400068

NAME OF THE OWNE
M/S SAGAR VAIBHA CO
HOUSING SOCIETY L

NAME OF THE ARCHITE
Ar. sadanand mhaddalk
Reg. Architect & Regd.
12/3 Parul, Vishwa Bharti S Off. V. P. Road, Andheri (W Mumbai 400 058.

DRN BY	DRG



LOCATION PLAN

Scale 1:4000

ENCLOSURE - 3

FLOORWISE BUILT-UP AREA

FLOORS	Wing A	Wing B	Wing C	TOTAL
LOWER GROUND (For Wing A)	730.56	--		730.56
BASEMENT (Common for Wing B & C)	--	1461.11		1461.11
GROUND FLOOR (Common for all Wings)	2203.25			2203.25
PODIUM LVL (Common for all Wings)	2358.61			2358.61
1ST FLOOR	335.81	247.66	247.65	831.12
2ND FLOOR	335.81	247.66	247.65	831.12
3RD FLOOR	335.81	247.66	247.65	831.12
4TH FLOOR	335.81	247.66	247.65	831.12
5TH FLOOR	335.81	247.66	247.65	831.12
6TH FLOOR	342.21	260.13	260.12	862.46
7TH FLOOR	335.81	248.9	248.89	833.6
8TH FLOOR	335.81	251.9	251.9	839.61
9TH FLOOR	335.81	251.9	251.9	839.61
10TH FLOOR	335.81	251.9	251.9	839.61
11TH FLOOR	335.81	251.9	251.9	839.61
12TH FLOOR	335.81	251.9	251.9	839.61
13TH FLOOR	338.6	258.24	258.24	855.08
14TH FLOOR	335.81	251.9	251.9	839.61
15TH FLOOR	335.81	251.9	251.9	839.61
16TH FLOOR	335.81	251.9	251.9	839.61
17TH FLOOR	335.81	251.9	251.9	839.61
18TH FLOOR	335.81	251.9	251.9	839.61
19TH FLOOR	246.02	122.02	122.01	490.05
TOTAL				22346.42
TOTAL B/UP AREA PROPOSED (WING- A+ B + C) = 22346.42 SQMT				

ENCLOSURE - 4

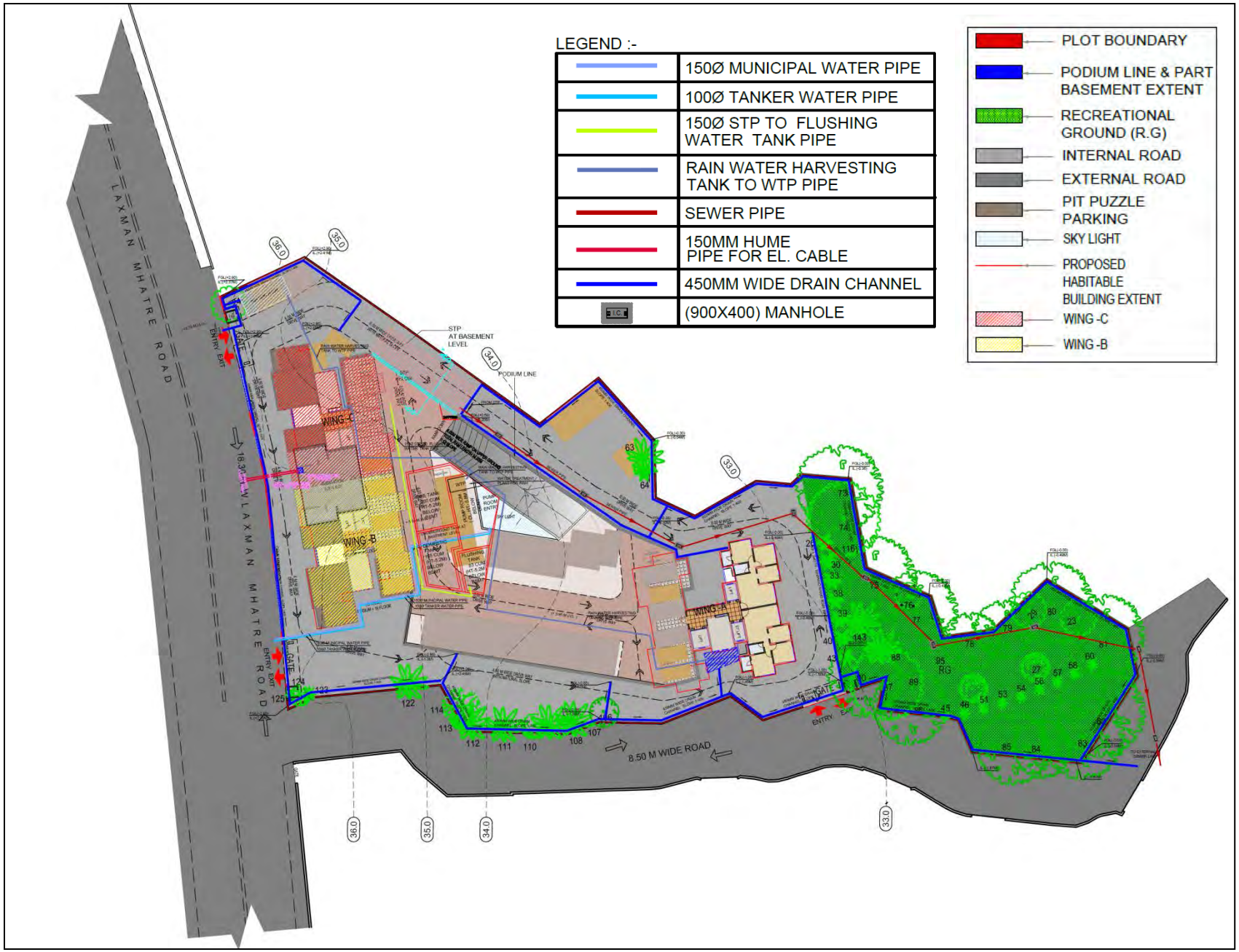
ENVIRONMENTAL MANAGEMENT PLAN – CONSTRUCTION PHASE

No.	Component	Description		Total Cost (Rs. in Lacs)
1	Air Environment	Dust Suppression		4.32
		Air & Noise Quality Monitoring	On site sensors	#10.00
			By outside MOEF Approved Laboratory	*0.88
2	Water Environment	Drinking water analysis		*0.72
3	Land Environment	Site Sanitation		5.00
4	Health & Hygiene	Disinfection at site		3.60
		Health Check-up of workers		13.50
			Total Cost	**38.02**

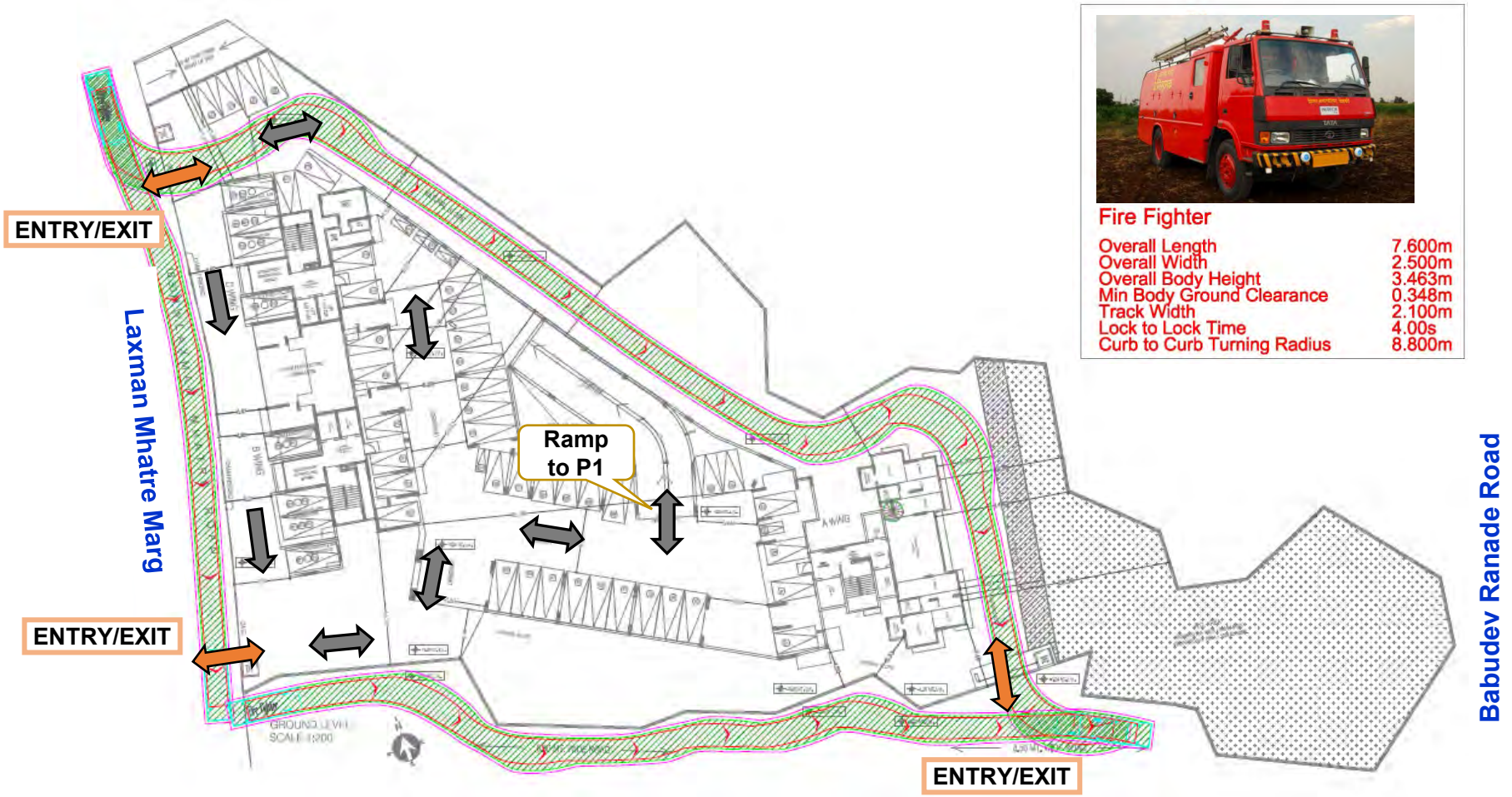
ENVIRONMENTAL MANAGEMENT PLAN – OPERATION PHASE

No.	Component		Description		Capital cost	Operational and Maintenance cost
					Rs. in Lac.	(Rs. in Lacs/yr)
1	Air Environment & Biological Environment		Cost for Gardening		5.54	1.20
			Cost for Ambient air & Noise Monitoring		*No set up cost is involved	0.22
			Cost for DG Stack Exhaust Monitoring		*No set up cost is involved	0.05
2	Water Environment	Waste water treatment	Cost for sewage Treatment Plant		34.95	23.78
			Cost for Waste water Monitoring	On site sensors	18.00	1.00
				By outside MOEF Approved Laboratory	*No set up cost is involved	0.03
		Water Conservation	Cost for RWH tank		4.00	0.20
		(Rain Water Harvesting System)	Cost for treatment unit for rain water tank		9.00	0.03
			Rain Water Quality Monitoring		*No set up cost is involved	0.14
3	Land Environment (Solid Waste Management)		Cost for Treatment of biodegradable garbage in OWC		9.00	1.90
			Cost for monitoring of OWC manure		*No set up cost is involved	0.08
4	Energy Conservation		Cost for Solar System		65.40	3.24
Total Cost					**145.89**	**31.87**

ENCLOSURE -5: COORDINATED LAYOUT PLAN



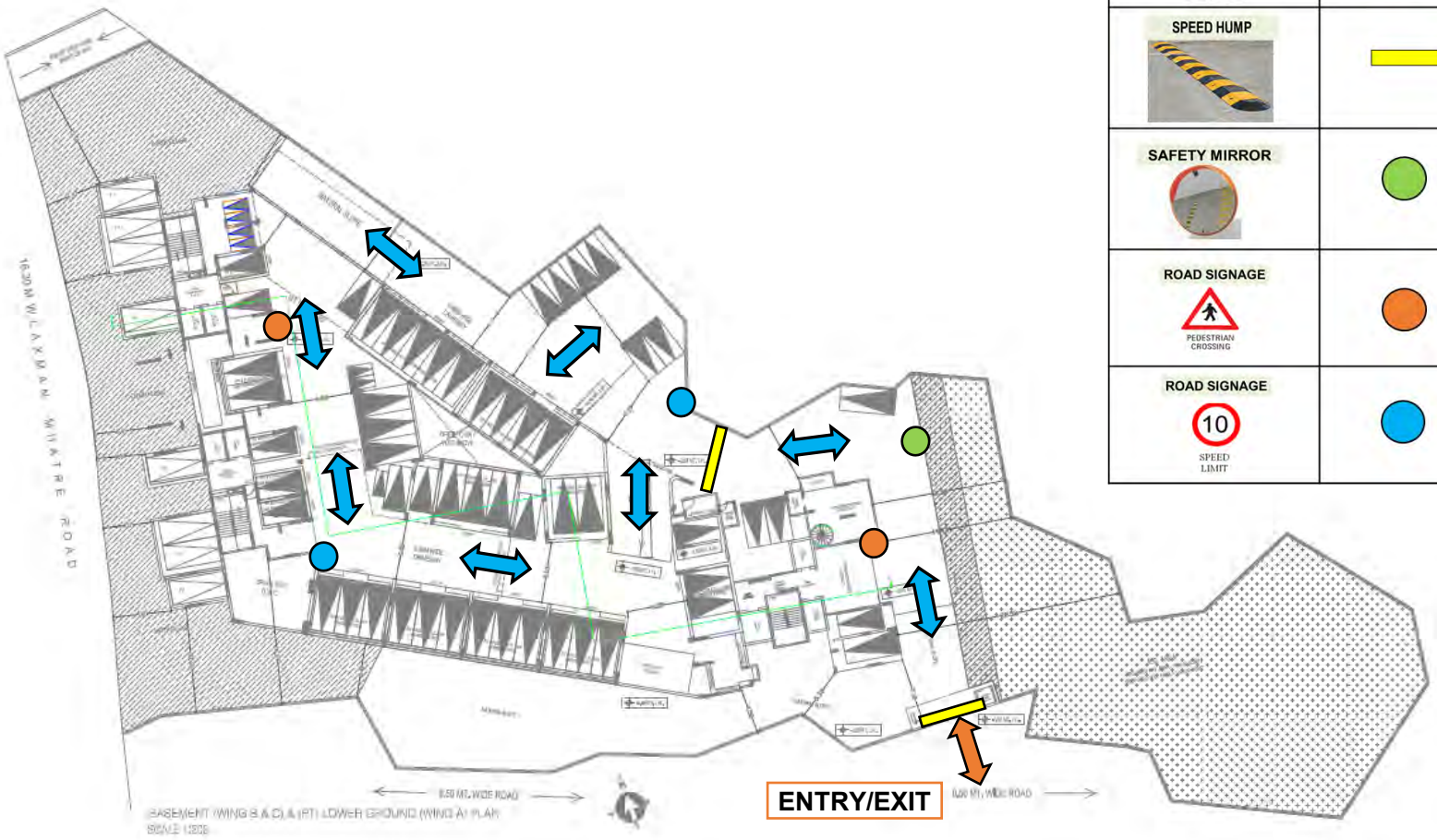
ENCLOSURE - 6


ENTRY/EXIT
Laxman Mhatre Marg
ENTRY/EXIT
Ramp
to P1
Babudev Ranade Road
ENTRY/EXIT
Cross Road
Fire Fighter
Overall Length 7.600m
Overall Width 2.500m
Overall Body Height 3.463m
Min Body Ground Clearance 0.348m
Track Width 2.100m
Lock to Lock Time 4.00s
Curb to Curb Turning Radius 8.800m
Vehicular Movement
Fire Tender Movement

VEHICULAR MOVEMENT & TRAFFIC MANAGEMENT PLAN – GROUND LEVEL

TRAFFIC CONTROL DEVICE	SIGN	NO'S
SPEED HUMP		3
SAFETY MIRROR		2
ROAD SIGNAGE PEDESTRIAN CROSSING		2
ROAD SIGNAGE SPEED LIMIT		3

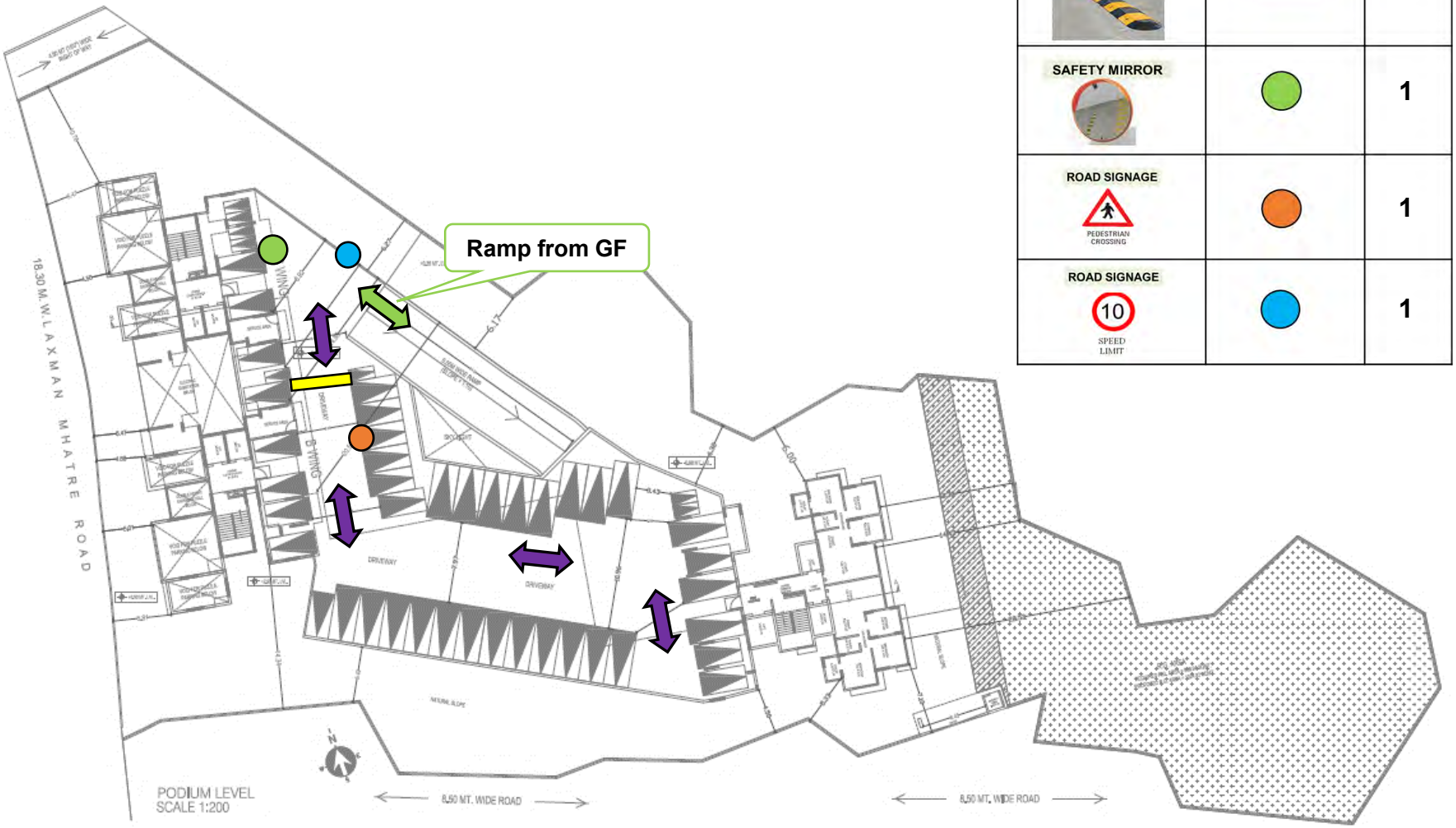
VEHICULAR MOVEMENT & TRAFFIC MANAGEMENT PLAN – LOWER GROUND LEVEL/BASEMENT LEVEL



TRAFFIC CONTROL DEVICE	SIGN	NO'S
SPEED HUMP		2
SAFETY MIRROR		1
ROAD SIGNAGE PEDESTRIAN CROSSING		2
ROAD SIGNAGE 10 SPEED LIMIT		2

VEHICULAR MOVEMENT & TRAFFIC MANAGEMENT PLAN – PODIUM LEVEL

TRAFFIC CONTROL DEVICE	SIGN	NO'S
SPEED HUMP		1
SAFETY MIRROR		1
ROAD SIGNAGE		1
ROAD SIGNAGE		1



ENCLOSURE - 7

MUNICIPAL CORPORATION OF GREATER MUMBAI

No. E.E. Mech / (M.S.) / 4231 /W.S. Dated 10 OCT 2016

Office of the:
Executive Engineer Mechanical,
(Main Sewer) Western Suburbs,
Relief Road Jn. J.P. Road
Opposite Indian Oil Nagar,
Andheri (W), Mumbai – 400 053.
Tel : 022-26368654.

Sub: Sewerage Remark for proposed building on plot bearing C.T.S. No. 51 of Village Mandpeswar at Laxman Mhatre Marg, Dahisar west, Mumbai.

Ref: 1) A letter of M/s Swati Consultancy Dated - 06/10/2016.

With reference to above cited subject matter, following remark are offered from this office.

1) The actual depth of nearest connecting manhole marked as 'A' on Babudev Ranade Road is 2.90 mtrs (approx) as shown in the sketch.
2) The actual depth of nearest connecting manhole marked as 'B' is 5.40 mtrs (approx) & marked as 'C' is 5.65 mtrs (approx)on Laxman Mhatre Road as shown in the sketch.
3) There exists 230 mm dia connecting sewer line and 150 mm dia existing street Connection is connected in the under reference manhole. 'A'
4) The depth of existing sewer trap chamber is 1.80 mtrs (approx).
5) The direction of flow leading towards Vallabh Nagar pumping station.
6) The existing sewer line and street connection are functioning smoothly at present.
7) The existing sewer line is in M.C.G.M. possession and maintained by M.C.G.M.
8) The additional load calculation may carried out at your end only.

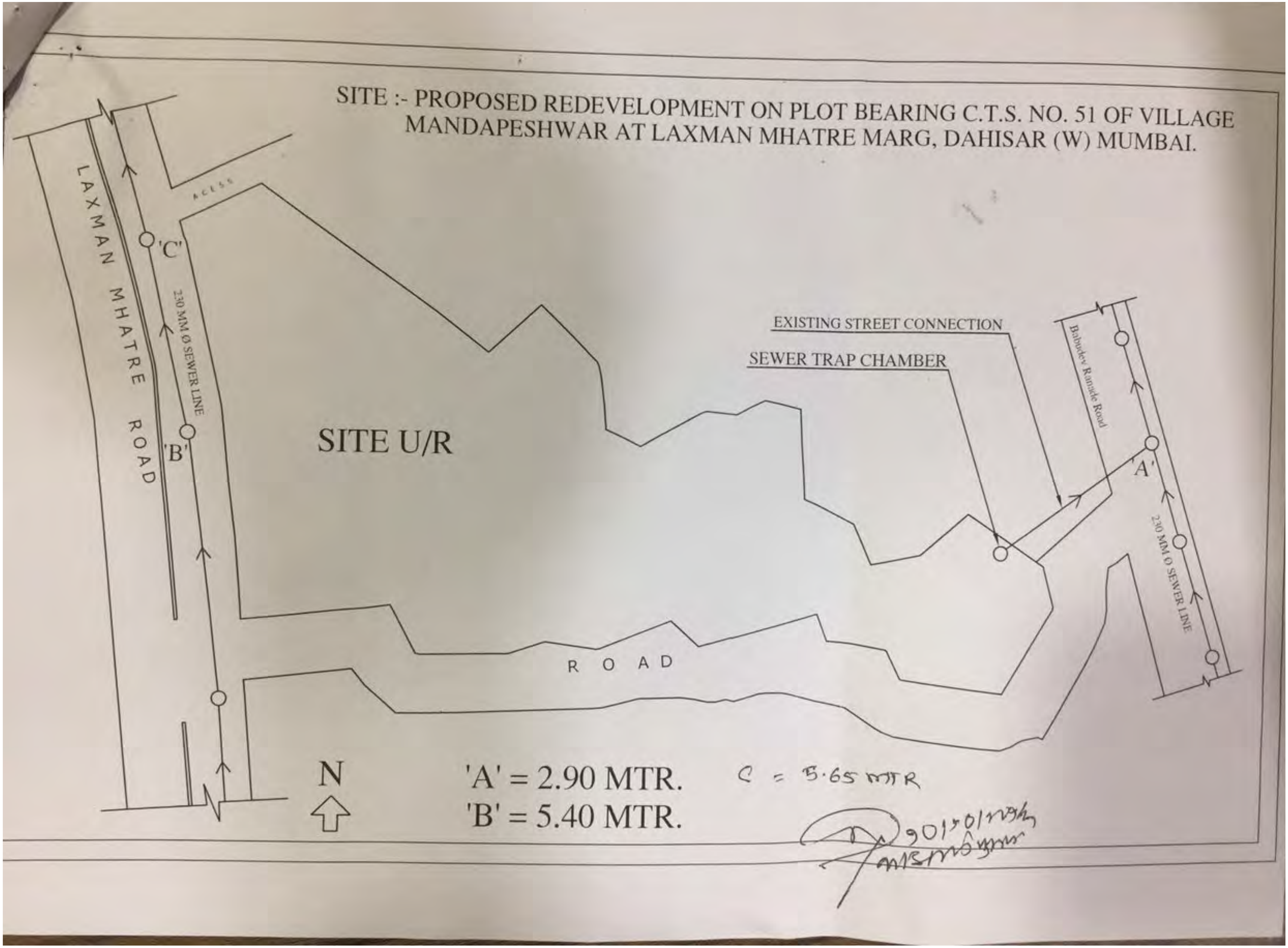
Forwarded for doing the further needful please.

Encl :- 1) Sketch.

E.E.(S.P.) P& D W.S.

E.E. Mech. (M.S.) W.S.

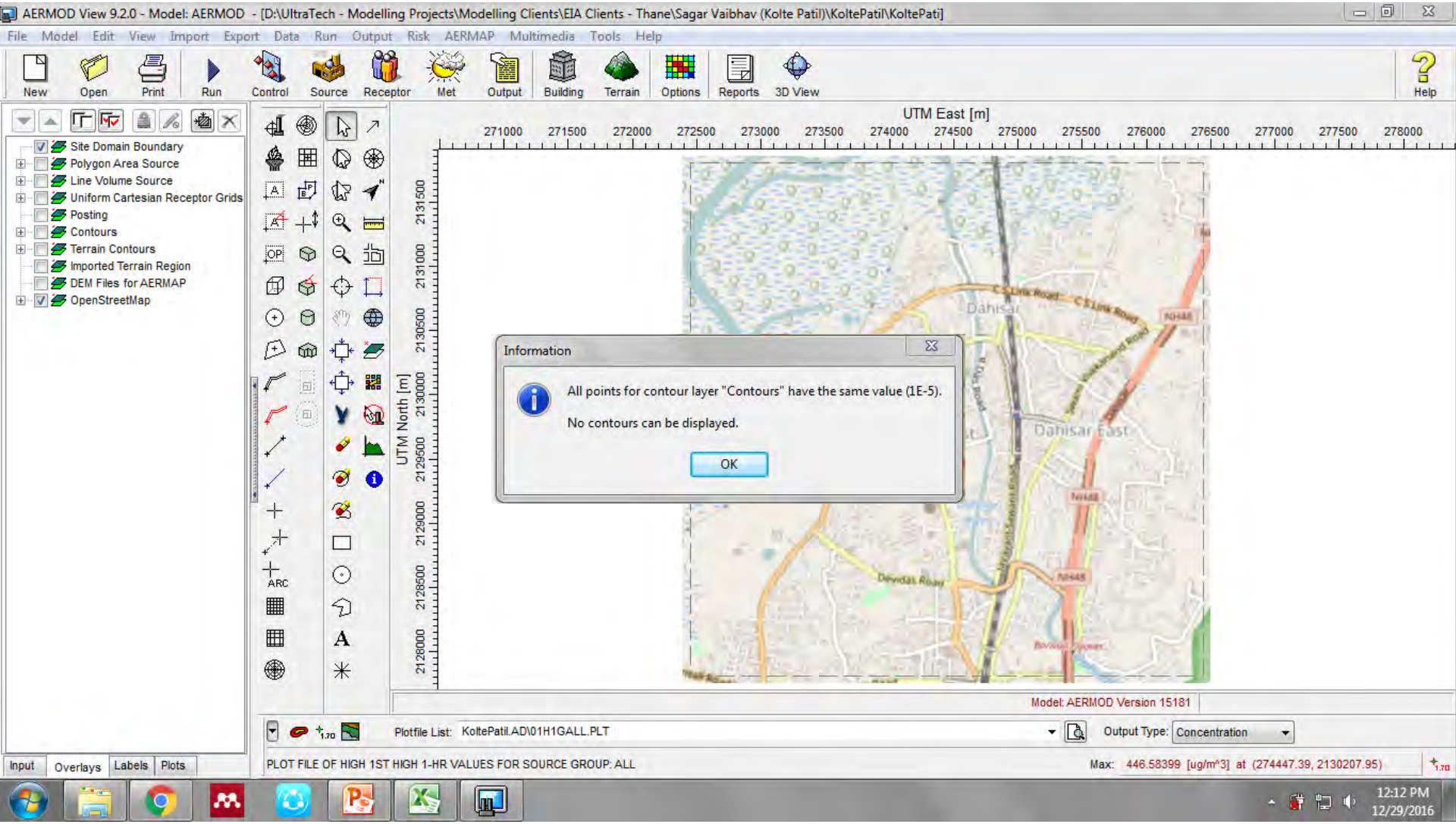
SITE :- PROPOSED REDEVELOPMENT ON PLOT BEARING C.T.S. NO. 51 OF VILLAGE MANDAPESHWAR AT LAXMAN MHATRE MARG, DAHISAR (W) MUMBAI.



ENCLOSURE - 8A

Assessment of ground level concentration of pollutants due to DG set

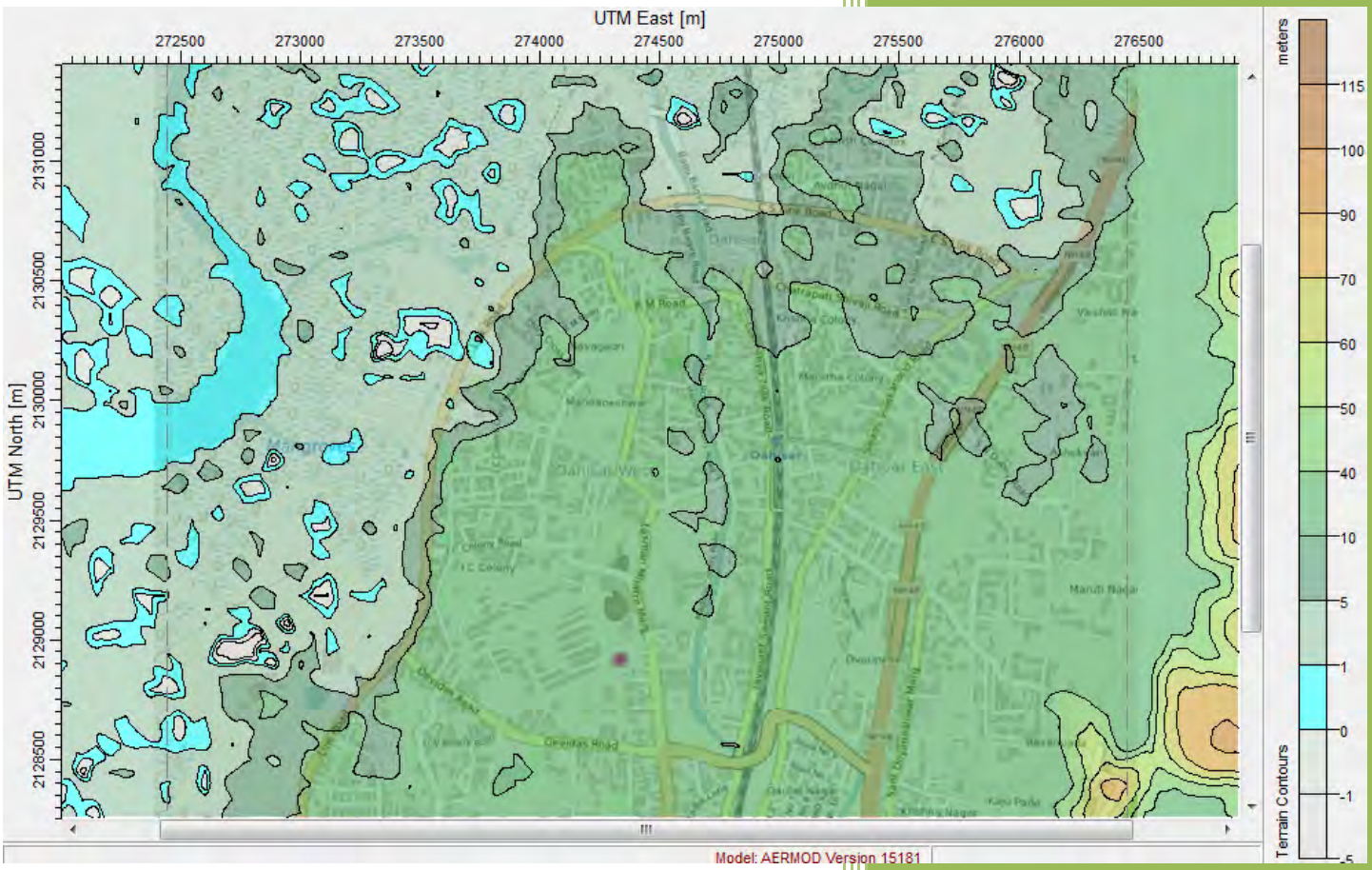
(500KVA)



Generator set emissions were below model acceptable levels. Hence ground level concentrations can not be generated. In turn the emissions were well within prescribed limits.

ENCLOSURE - 8

Air Dispersion Modeling Report M/s Kolte-Patil Developers Ltd. Dahisar



Ultra-Tech Environmental Consultancy & Laboratory

Saudamini Commercial Complex, Building C-3, 2nd Floor, Right to Bhusari colony, Paud Road, Kothrud, Pune-411038, Maharashtra.

AIR EMISSION AND DISPERSION MODELING

1.1. Introduction

M/s. Kolte-Patil Developers Ltd. is developing a residential complex at plot adjacent to Laxman Mhatre Road. The process of determining power backups along with future traffic levels generated and attracted to the whole development involves the identification of suitable assumptions. Proposed development will have 209 four wheeler parking. Approximate completion time will be three years. The impact on ambient air quality was assessed hereunder in view of the following activities:

- ✓ Analysis and plots as per present traffic
- ✓ Construction source emissions
- ✓ Vehicular re-suspended dust
- ✓ Wind erosion from stockpiling of earlier excavated material and back filling
- ✓ Future analysis considering 25yr traffic projection

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

1.2. Analysis details

1.2.1. 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™ model. This model enables analysis with respect to PM_{10}, $PM_{2.5}$, NOx and CO and gives results in easy to understand graphical format.

The following steps are involved in the analysis:

I. Inputs are entered into the software as per the general modeling parameters.

II. Information on the roadway network, traffic volume, excavated and stockpiled soil, construction activity, generator set and receptor is added to the software.

III. The analysis process is done by the model.

1.3. Input(s) needed and assumption

Table 1 illustrates series of input and some of assumptions gone into the model.

Table 1: Input and Assumptions

Sr. 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^2/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

1.4. 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 researches. 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).

Heavy construction activity and construction of haul road dust emissions were represented as gm/m^2/sec (Ref: USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.3.3). Emission factor for traffic on dusty ground referred from "USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.2". Fugitive dust emission calculations were done with wind erosion emission factor of activity was taken from "USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.5".

For the generators proposed on site details procured from Emission Regulations – Part IV, CPCB'86 was utilized for emissions estimation. Widespread method based on the data available was to use emission factor in terms of pollutant mass per second generator operated. The emission factors have been taken from "AP42 Ref Stationary Internal Combustion Engines Diesel Fired Ref 3.1" prepared by US – EPA.

1.4.1. Data collection

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 2**.

Table 2: Traffic count survey

Location	2W	3W	Car	LCV	Bus	Truck
PRESENT SCENARIO						
Babudev Ranade Road	1730	2006	809	297	0	68
Laxman Mhatre Marg	7791	11981	2553	473	541	126
FUTURE ESTIMATES						
Babudev Ranade Road	4143	4804	1938	711	0	163
Laxman Mhatre Marg	18660	28695	6115	1133	1296	302

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. Construction phase detailing was collected from client. For the generators proposed on site details procured from Emission Regulations – Part IV, CPCB'86 was utilized for emissions estimation.

1.4.2. 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 3**.

Table 3: Vehicular Emission Estimates

Location	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Babudev Ranade Road	0.0027	0.0019	0.0120	0.0372
Laxman Mhatre Marg	0.0241	0.0164	0.0991	0.3213

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 $g/m^2/sec$ and were represented as g/s. Construction vehicle plying on unpaved site road was represented as g/s. Construction phase pollutant emissions are given in **Table 4**. Construction phase pollutant emissions are given in **Table 5**.

Table 4: Emissions for Each Pollutant during construction phase

Location	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Babudev Ranade Road	0.0033	0.0022	0.0144	0.0446
Laxman Mhatre Marg	0.0282	0.0192	0.1161	0.3761
Construction Activity	0.0251	0.0173	--	--
Material trucks	0.0034	0.0023	0.0005	0.0004
Stockpiling	0.0004	0.0003	--	--

Table 5: Emissions for Each Pollutant in Operation Phase (25yrs)

Location	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Babudev Ranade Road	0.0066	0.0045	0.0287	0.0892
Laxman Mhatre Marg	0.0578	0.0393	0.2372	0.7695

Proposed project will have one generator set of 100KVA for construction phase; one DG set each of 500 KVA to cater need of project along. These generators were set up for domestic purpose. If used, DGs will run mostly during power cuts and it is most unlikely phenomenon. These generators use diesel as fuel thereby having minimal potential to cause particulate and gaseous pollution. Emissions estimated for the same are given in **Table 6**.

Table6: Generator Set Emission Estimates

Parameter	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Construction Phase				
100 KVA DG Set (1 No.)	$1.04x10^{-08}$	7.08×10^{-09}	$3.28x10^{-25}$	1.54×10^{-33}
Operations Phase				
500 KVADG Set (1 No.)	$5.21x10^{-08}$	$3.54x10^{-08}$	$4.10x10^{-23}$	$9.63x10^{-31}$

1.5. Model Inputs

AERMOD View™ has been used for evaluating the emission scenarios for proposed project. The inputs to the model are defined in 5 functional pathways as represented in the following sections. Each of these functional parameters include several options that may be user defined or set as default, the details of some of these essential elements of AERMOD View™ runs have been explained in the discussions.

A. Control pathway inputs

- ✓ Default option
- ✓ Calculate the concentration
- ✓ Averaging period of 24hr,1hr depending on the NAAQS and pollutant type

B. Source pathway inputs

- ✓ Includes definition of source, its locations
- ✓ Vehicle source parameter include emissions ($g/m^2/s$)
- ✓ Construction area source parameter include emissions ($g/m^2/s$)
- ✓ Soil stockpiling source parameter include emissions ($g/m^2/s$)
- ✓ Generator source parameter include emissions (g/s)

C. Receptors pathway inputs

- ✓ Cartesian grid starting at the SE corner of the ward with 400m increment over X & Y coordinates, thus forming a receptor output grid radius of 2km.
- ✓ Uniform grid is selected with 10x10 cell size.

D. Meteorology pathways inputs

- ✓ One hourly data from 1stMarch 2014 to 31stMay 2014 was used as an input in the meteorology processor to generate model ready one hourly input surface & profile meteorology files.

- ✓ Roughness length of 1m of measurement height, displacement height of 0.2m, Albedo of 0.2 &measurement height of 14m i.e. the height at which measurements of meteorology have been done.
- ✓ The minimum wind speed (0.5 m/s lower than 1m/s considered as calm by IMD), minimum mixed layer height (50m), and minimum heat flux 20 $W/M^2/s$).
- ✓ The Bowen ratio=Sensible Heat flux/Latent Heat Flux as a function of month to allow smaller Bowen Ratios during the Indian monsoon season when the ground is wet and latent heat fluxes become significant (from 2 in non-monsoon to 0.5 in monsoon).
- ✓ The potential temperature gradient above the mixed layer (0.008 degrees/m)
- ✓ The weather data for Mumbai base station provided by Indian Meteorological Department (IMD) have been used for the present project. The data was compiled in AERMET module of AERMODView™ and the results of this final analysis were used as input meteorological data.

E. Output Pathway

The model has been run for 24hr and1hr average as per the pollutant type and the NAAQS standards criteria. The contour for 1sthighest reading is shown for each pollutant based on present and future scenario.

Model outputs were obtained for emissions of each of the pollutants in each of the 400m x400m receptor grid spread across gridded impact zone. Contour map are plotted for each of the study pollutants and the impact by the line source i.e. future scenario including growth rate and additional vehicle assumed to be added due to project. This map is superimposed on the road tile map of the proposed location. The air quality results in the future are predicted including project traffic. The added percentage of vehicles by the project is negligible compared to the actual traffic in the future scenarios & the total traffic will be well within the capacity of the roads at present since the location of this site is primarily covering extensive network of roads distributing the traffic. To avoid redundancy, no separate analysis is included in the results differentiating present & future traffic as it shows no significant difference for future traffic with the project.

1.6. Results

The major road have been represented in the contour plots for concentration to understand the impact of individual roads on the overall area of influence, though combined influence have been already assessed and modeled for future scenario i.e. with generator sets and projected vehicular

traffic. Modeled pollutant concentrations for 24hr scenario were tabulated for present, construction and 25yrs down the line in operations phase scenario **Table 7**.

Table 7: Modeled 24 hour concentrations for all modeled scenarios

Parameters	Present	Construction	Operations
PM_{10} *(24hr average)*	1	50	5
$PM_{2.5}$ *(24hr average)*	1	40	3
NOx *(24hr average)*	6	10	20
CO *(1hr average)*	50	60	100

Comparative account of each pollutant concentration with respective National Ambient Air Quality Standards (NAAQS) is given. The emissions were compared as 24hr average. Both the results were presented in **Table 8(a, b)**. Particulate matter and gaseous pollutant levels account for no raise over future scenario break point.

Table 8(a): Comparative Account 24hr Emissions of Present and Construction Scenario *(µg/m³)*

Parameters	Concentrations			NAAQS*
	Baseline	Change	Resultant	
PM_{10} *(24hr average)*	68	49	117	**100**
$PM_{2.5}$ *(24hr average)*	30	39	69	**60**
NOx *(24hr average)*	20	4	24	**80**
CO *(1hr average)*	900	10	910	**4000**

***NAAQS** – National Ambient Air Quality Standards, 2009*

Table 8(b): Comparative Account 24hr Emissions of Present and Construction Scenario *(µg/m³)*

Parameters	Concentrations			NAAQS*
	Baseline	Change	Resultant	
PM_{10} *(24hr average)*	68	4	72	**100**
$PM_{2.5}$ *(24hr average)*	30	2	32	**60**
NOx *(24hr average)*	20	14	34	**80**
CO *(1hr average)*	900	50	950	**4000**

***NAAQS** – National Ambient Air Quality Standards, 2009*

The outputs for the modeled pollutant concentrations are done with regards to identified road as classified in earlier sections of the report for present year and future. Simulations for individual & combined activities on this road along with proposed generators were also done. Modeled predictions for pollutant concentrations due to combined activities on all the roads seems to be a much more valuable input to discussions and thereby have been used in further sections of this

report, though all the individual simulations for various permutation and combination of activities on roads are portrayed.

1.6.1. Scenario analysis for Particulate Matter (PM_{10})

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte-Patil Developers Ltd., Dahisar** are presented for 24hr in **Figure 1(a, b, c)**. Modeled 24hr average PM_{10} concentration was 1.0µg/m³ with present traffic scenario, 50µg/m³ with construction phase and 5.0µg/m³ for operation scenario.

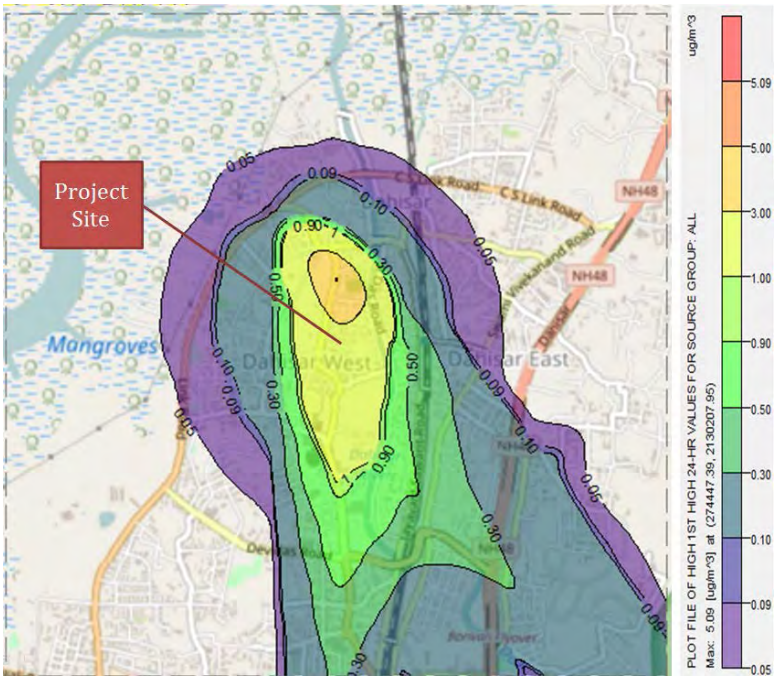


Figure 1(a): Present PM_{10} 24hr average emission dispersion contours

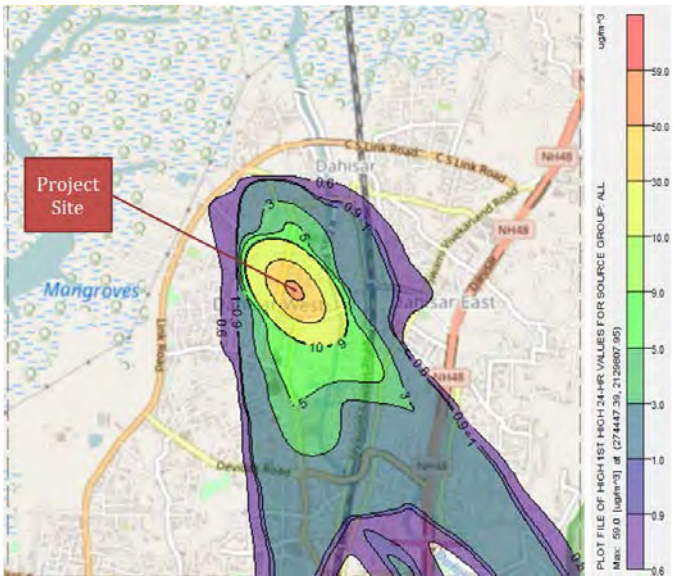


Figure 1(b): PM_{10} 24hr average emission dispersion contours – Construction Phase

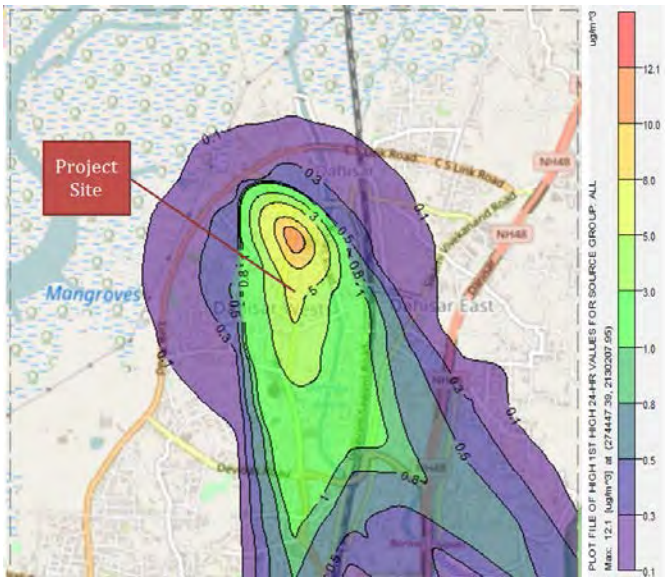


Figure 2(c): PM_{10} 24hr average emission dispersion contours – Operations Phase (25yrs)

1.6.2. Scenario analysis for Particulate Matter ($PM_{2.5}$)

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte Patil Developers Ltd., Dahisar** are presented for 24hr in **Figure 2(a, b, c)**. Modeled 24hr average $PM_{2.5}$ concentration was 1.0µg/m³ with present traffic scenario, 40µg/m³ with construction phase and 3.0µg/m³ for operation scenario.

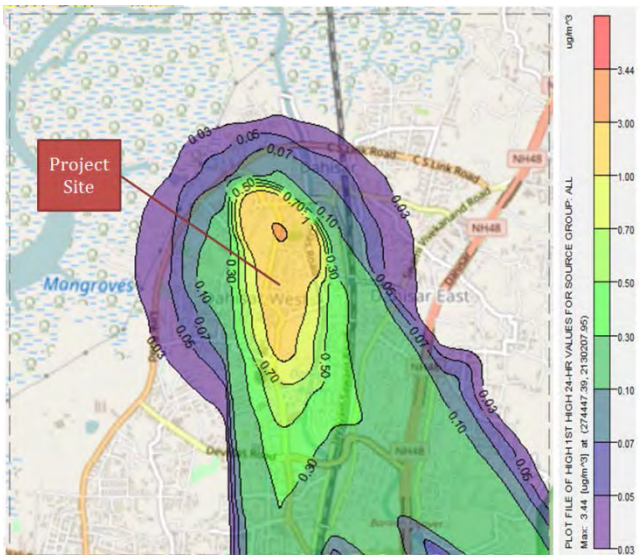


Figure 2(a): Present $PM_{2.5}$ 24hr average emission dispersion contours

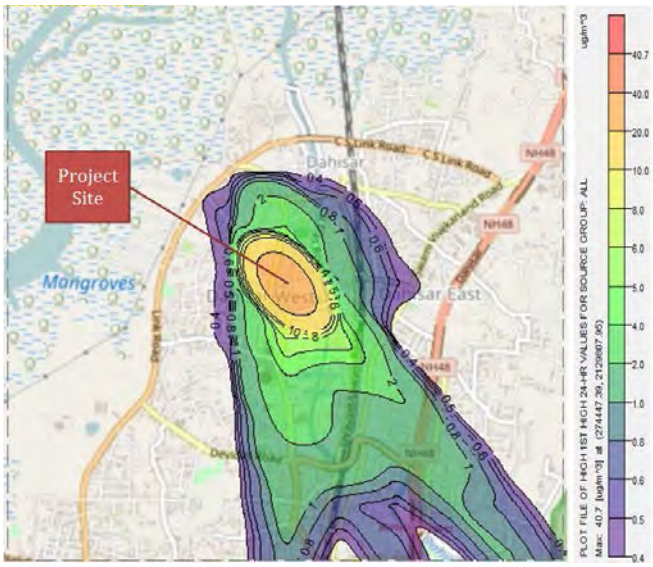


Figure 2(b): $PM_{2.5}$ 24hr average emission dispersion contours – Construction Phase

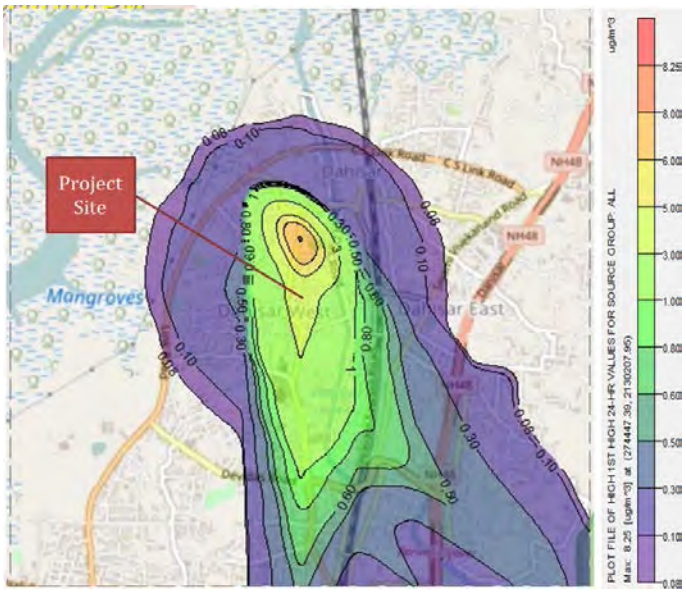


Figure 2(c): $PM_{2.5}$ 24hr average emission dispersion contours – Operations Phase (25yrs)

1.6.3. Scenario analysis for Oxides of Nitrogen (NOx)

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte Patil Developers Ltd., Dahisar** are presented for 24hr in **Figure 3(a, b, c)**. Modeled 24hr average NOx concentration was 6µg/m^3 with present traffic scenario, 10µg/m^3 with construction phase and 20µg/m^3 for operation scenario.

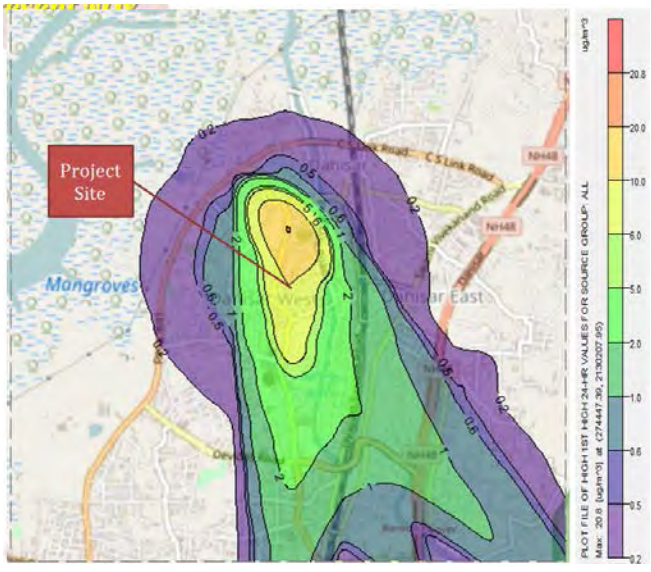


Figure 3(a): Present NOx24hr average emission dispersion contours

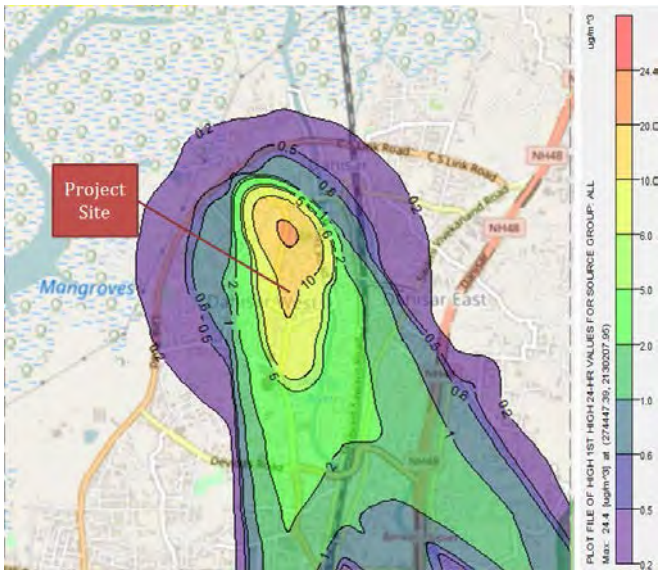


Figure 3(b): NOx24hr average emission dispersion contours– Construction Phase

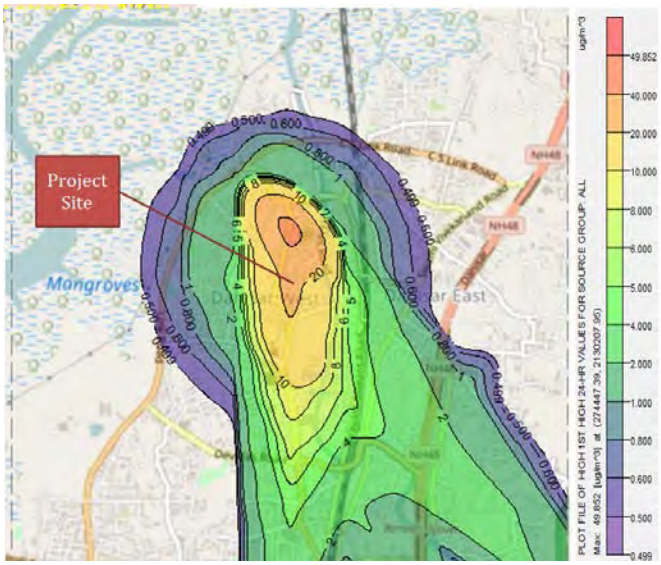


Figure 3(c): NOx24hr average emission dispersion contours – Operations Phase (25yrs)

1.6.4. Scenario analysis for Carbon Monoxide (CO)

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte Patil Developers Ltd., Dahisar** are presented in **Figure 4(a, b, c).** Modeled 1hr average CO concentration was 50µg/m^3 with present traffic scenario, 60µg/m^3 with construction phase and 100µg/m^3 for operation scenario.

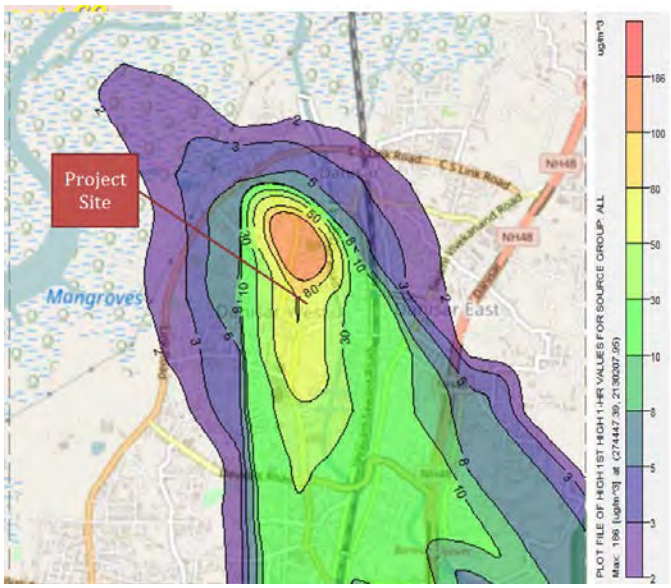


Figure 4(a): Present CO 1hr average emission dispersion contours

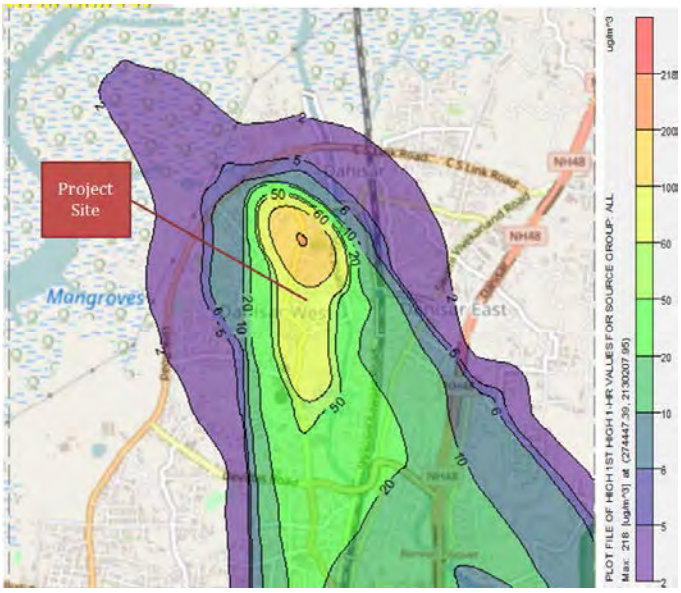


Figure 4(b): CO 1hr average emission dispersion contours– Construction Phase

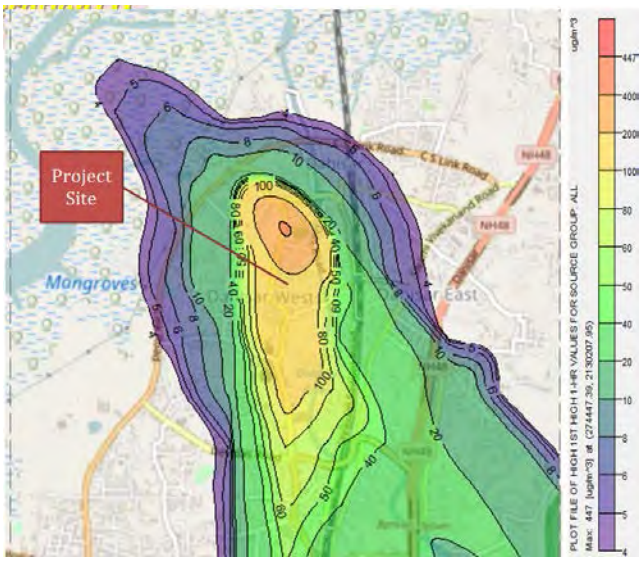


Figure 4(c): CO 1hr average emission dispersion contours – Operations Phase (25yrs)

1.7. Conclusion

Particulate matter levels were found to be above prescribed standards during construction phase. Future scenario analysis i.e. during operations phase illustrates that all pollutant concentrations to be within prescribed standards, thus project have no implication in overall air quality.

1.8. Environmental Management Plan

The predicted average concentrations with baseline BAU along with the negligible proposed contribution from the project will be below the standards. Hence considering the present and the future scenario, it can be concluded that there is minimal impact of the project. Whereas negligible impacts have to be mitigated as far as possible so as to keep the air quality pollutant free. Therefore following environment management measures need consideration the prevailing conditions;

- ✓ Site barricades will be provided along with the tree planting at the site boundary;
- ✓ Excavation and transport will be done during off peak hours along with material loading from site minimize to about 15-20mins;
- ✓ Excavation, handling and transport of materials will be avoided under high wind conditions or when a visible dust plume is present;
- ✓ During windy conditions, dust suppression measures will be adopted (dampening with water, tire washing facility at the entrance of the project site, etc.;

- ✓ The vehicles hired for transportation of material and labor shall have PUC certificate in order to reduce air emissions;
- ✓ Dust covers will be provided on trucks used for transportation of materials prone to fugitive dust emissions;
- ✓ The development will use Ready Mix Cement (RMC) to prevent any air emission occurring during mixing of the cement;
- ✓ If small volumes of concrete are to be mixed (manually), mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained;
- ✓ Traffic Management - vehicular movement to be regulated with proper parking facility and internal road system;
- ✓ The generators used on the site for energy backup will be CPCB norms complied for air emissions;
- ✓ Air & Dust monitoring will be conducted at the site boundary during drilling, excavation, stockpiling and building activities and at post occupancy stage with the help of MoEF approved laboratory.

ENCLOSURE - 9

EMERGENCY LOAD DETAILS					
SR. No.	Description	C.L.(KW)	M.D.(KW)	Fire Mode in KW	Normal Mode in KW
1	Fire Pumps	360.4	288.32	276	12
2	Water Pump Load	50	30	30	30
3	One Lift of each wing building	60	48	48	48
4	Sump Pumps	8.8	4.4	4.4	4.4
5	Common area Lighting Load	30.7	21.49	5.3725	21.49
6	Ventilation Load	15	10	10	10
7	STP	30	18	18	18
	Total	**554.90**	**420.21**	**391.77**	**143.89**

Load in KW	**392**
Load in KVA	**490**
DG Selection: 1#500 KVA	

ENCLOSURE - 10

DETAILS OF SEWAGE TREATMENT SCHEME

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

- **Preliminary Treatment:**

The treatment will include the following unit / equipment;

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

All the sewage generated will gravitate through Bar Screen. 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 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;

- MBBR Bioreactor
- Secondary Clarifier
- Sludge Dewatering System-(Filter press)

The process will be of activated sludge extended aeration 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 effluent 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 arrested 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 Filter press. The filtrate will be taken to the Raw Sewage Collection Tank. The dried sludge can be used as manure for gardening.

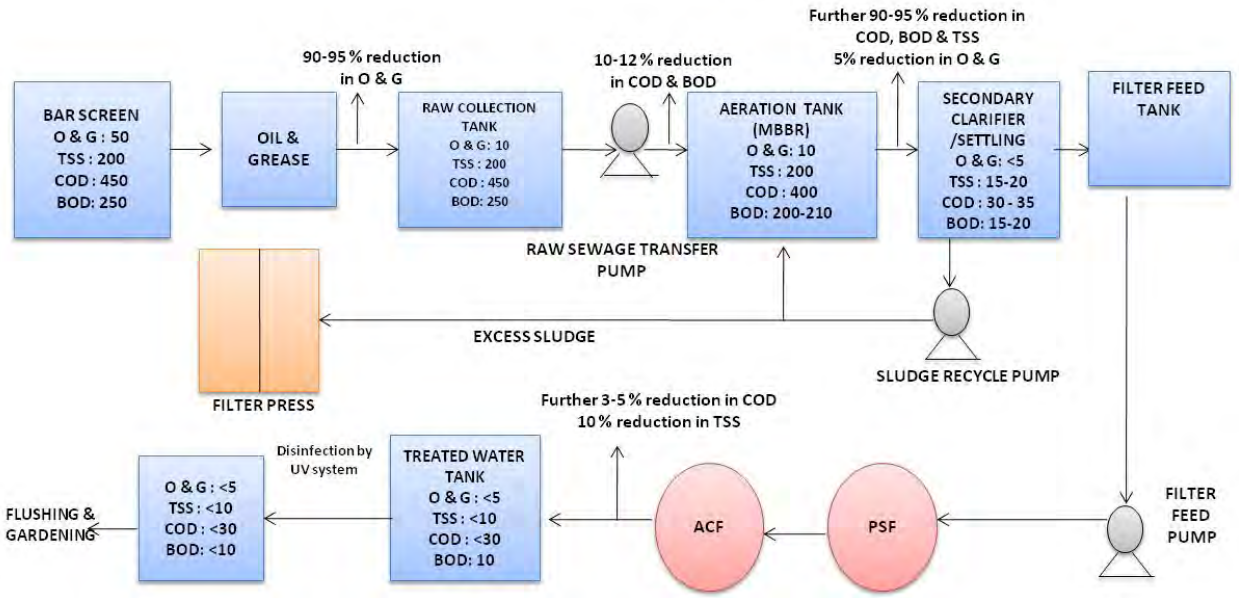
Tertiary Treatment:

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 can be used for secondary requirement.



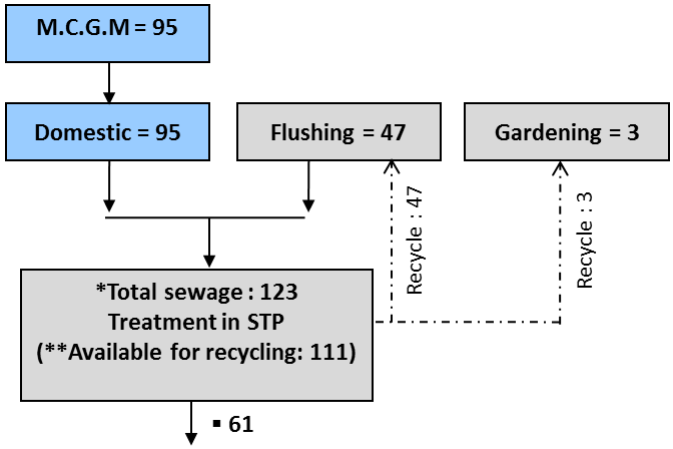
STP Process Diagram (MBBR process)

QUALITY OF UNTREATED AND TREATED SEWAGE

SR. NO.	DETAILS	VALUES		UNITS
		UNTREATED	TREATED	
1.	pH	7.0 – 8.0	6.5 – 7.5	--
2.	Total Suspended solids	250	<10	mg/lit
3.	Chemical Oxygen Demand	400	<30	mg/lit
4.	BOD, 3 days,27^0C	250	<10	mg/lit
5.	Oil & Grease	50	<5	mg/lit

WATER BALANCE PER DAY BASIS: NON MONSOON

All Quantities are in KLD



Please Note:

*Considered 80 % sewage of total of domestic and 100 % of flushing requirement hence total sewage generation is 123 KLD

**Considered 10 % less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation hence sewage available for recycling is 111 KLD

- Excess treated sewage: 61 KLD disposed to existing sewer line

Total water requirement = 145 KLD

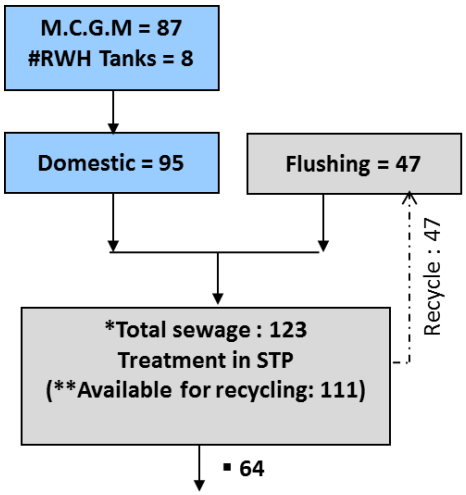
Recycling of Sewage (50 KLD) shall be done for gardening (3 KLD) and flushing (47 KLD)

Hence Net water requirement = 145 - 50 = 95 KLD [For Domestic purpose: 95 KLD (Source: M.C.G.M.)]

Reduction in water Demand = 34%

WATER BALANCE PER DAY BASIS: MONSOON SEASON

All Quantities are in KLD



Please Note:

*Considered 80 % sewage of total of domestic and 100 % of flushing requirement hence total sewage generation is 123 KLD

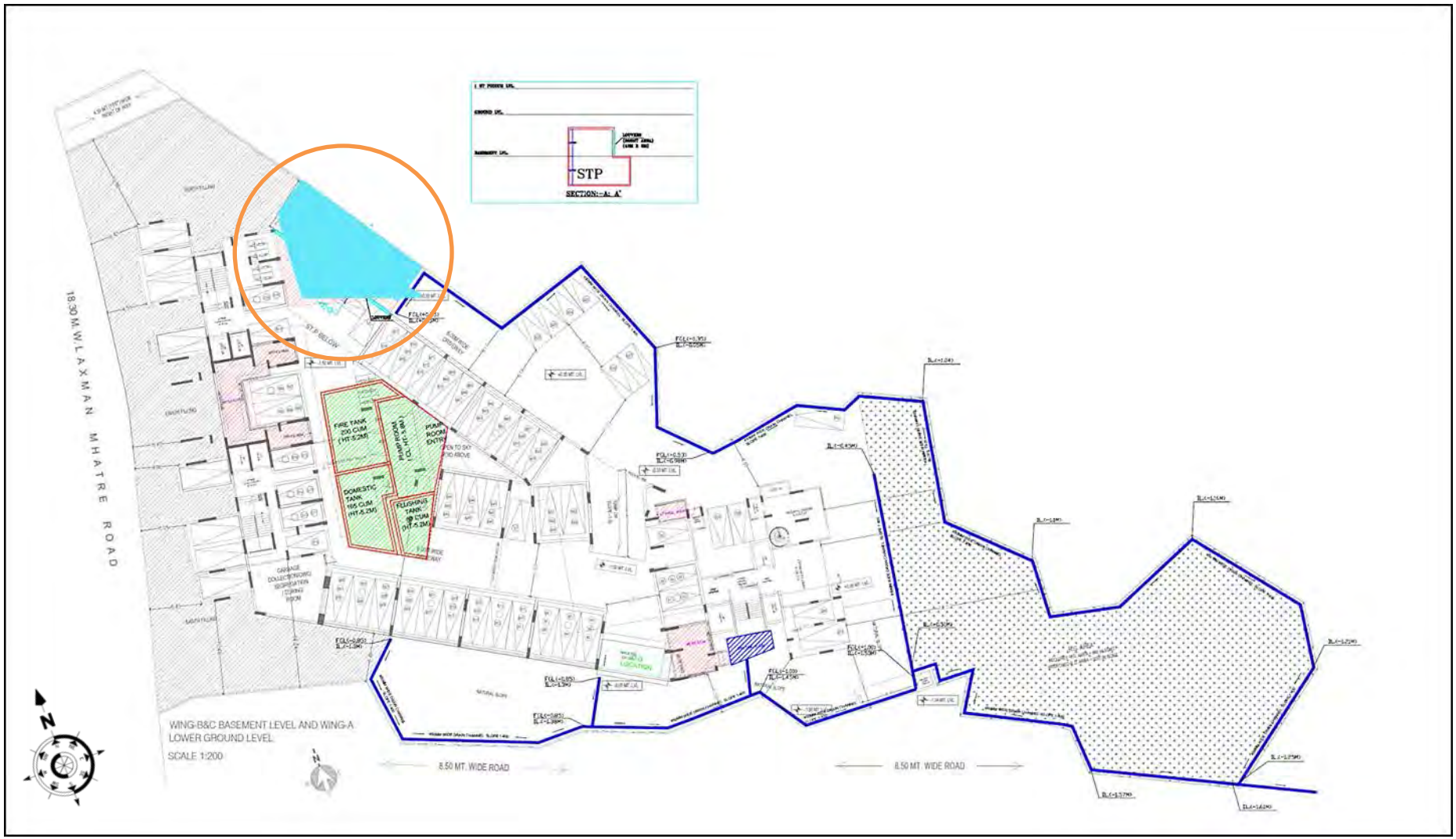
**Considered 10 % less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation hence sewage available for recycling is 111 KLD

- Excess treated sewage: 64 KLD disposed to existing 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 = 142 KLD
Recycling of Sewage (47 KLD) shall be done for flushing
From RWH tanks = 8 KLD (For domestic purpose only)
Hence Net water requirement = 142 – 47 - 8 = 87 KLD [For Domestic purpose: 87 KLD (Source: M.C.G.M.)]
Reduction in water Demand = 39 %

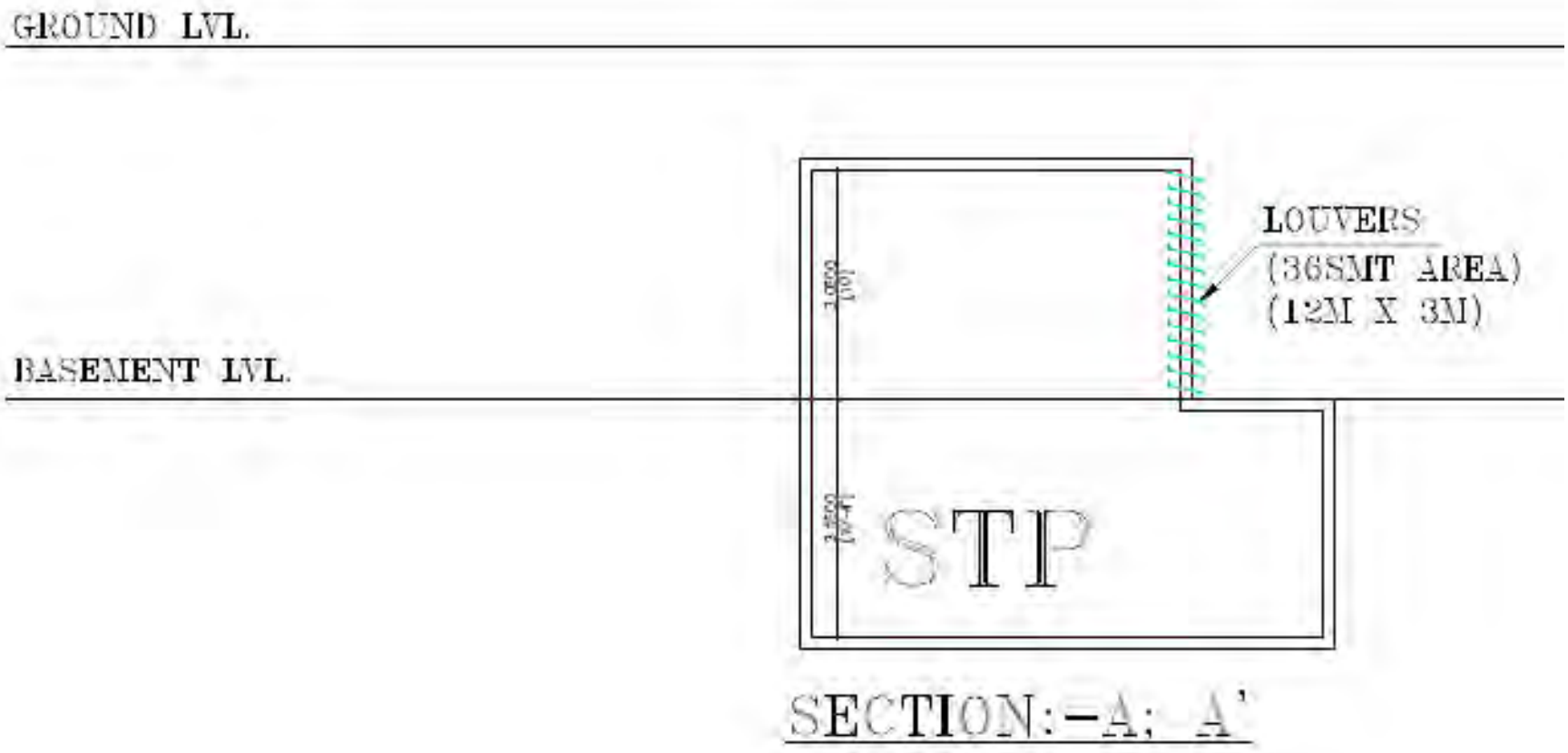
LOCATION OF STP – BASEMENT LEVEL



- Excess treated sewage discharge from project is 0.001 m^3/sec.
- Carrying capacity of external sewer line is 0.03 m^3/sec.
- Hence the capacity of external MCGM sewer line is adequate.

STP LOCATION

STP SECTION

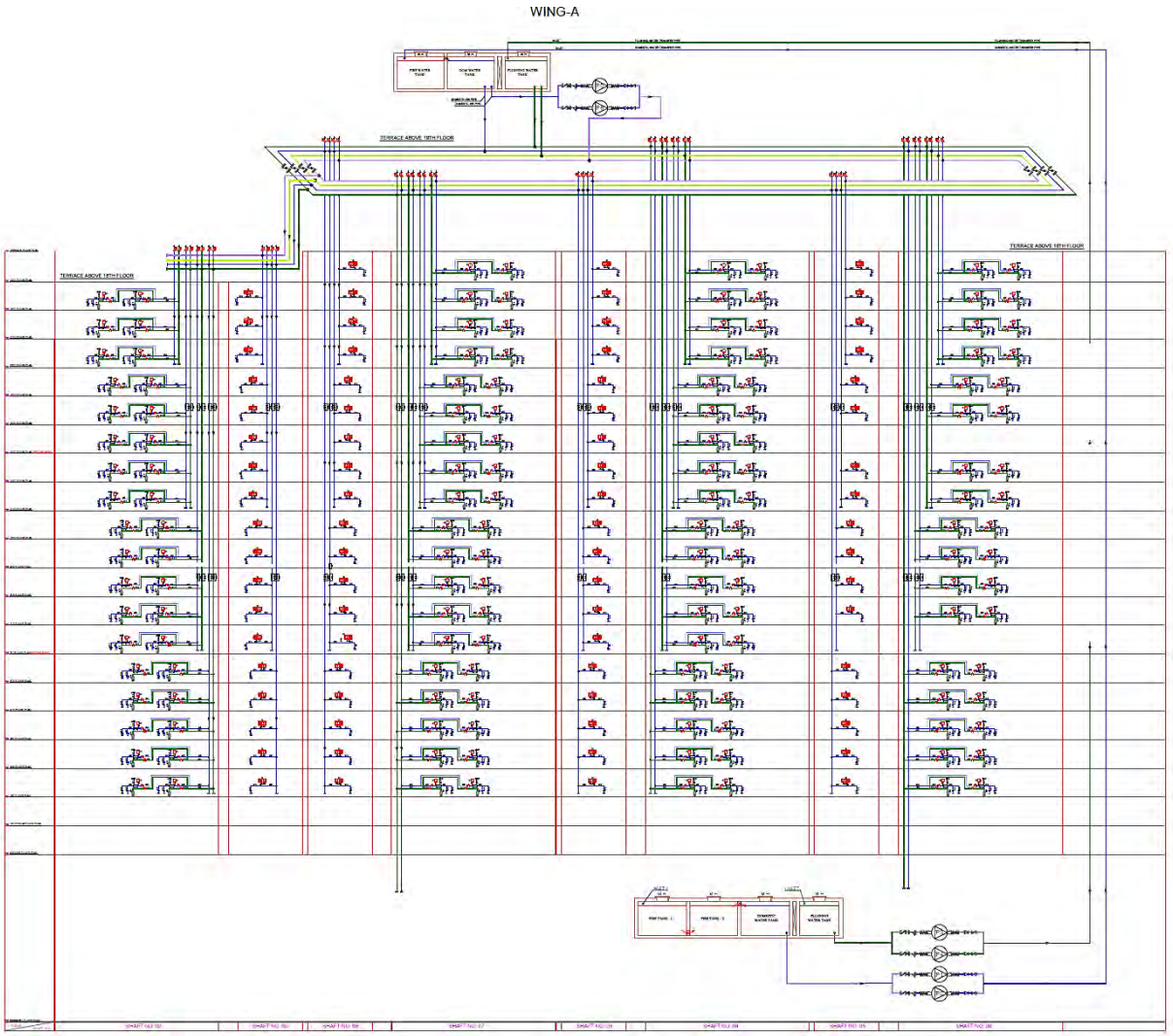


Louvers provided to achieve natural ventilation

ENCLOSURE - 11

WATER SUPPLY SCHEMATIC

WING A

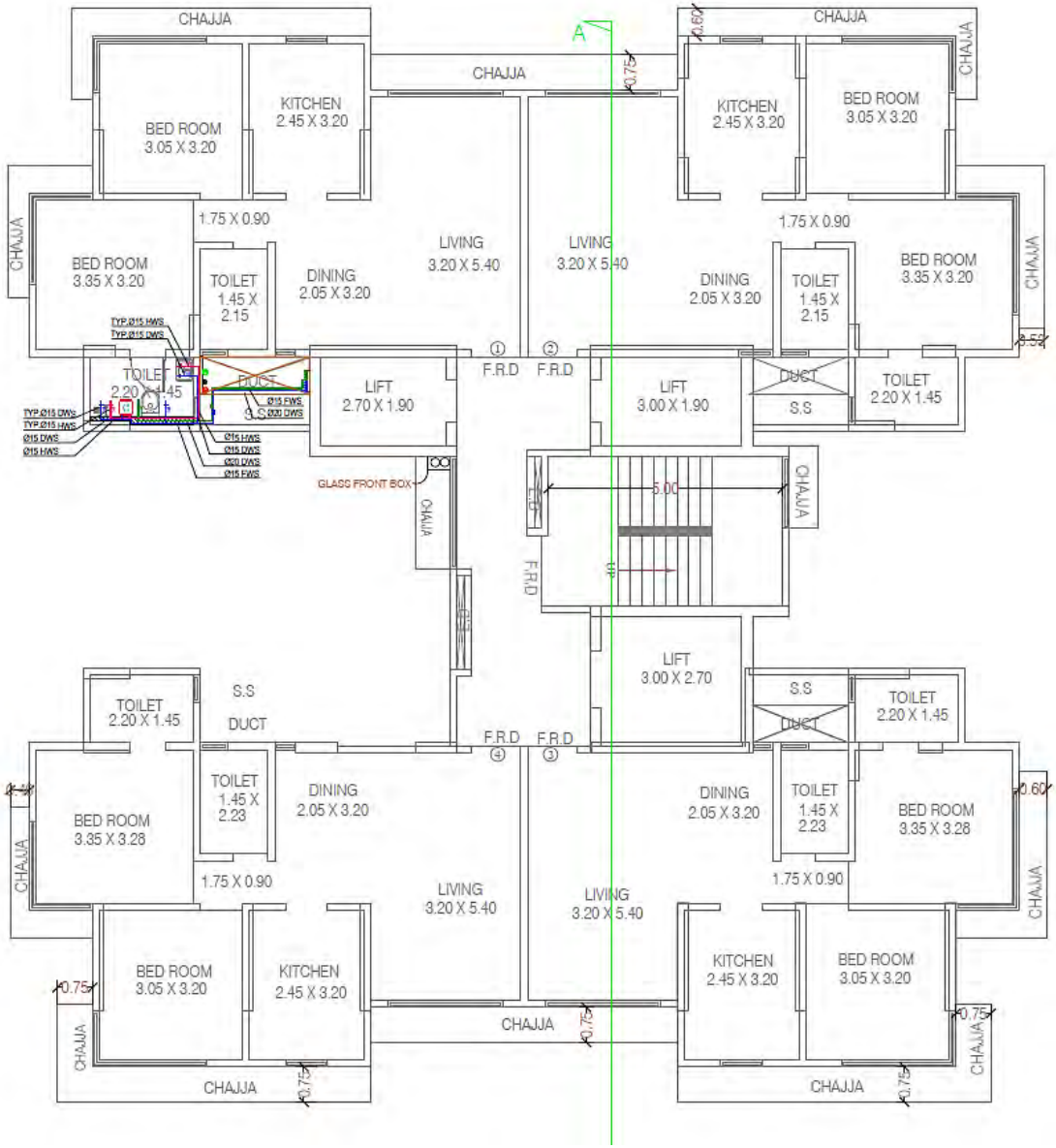


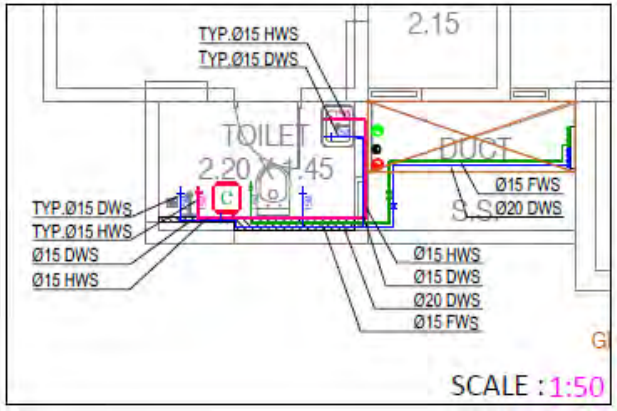
PLUMBING LEGEND

	DOMESTIC WATER
	FLUSHING WATER
	UG TO OHT TANK DOMESTIC WATER
	UG TO OHT TANK FLUSHING WATER
	BOOSTER TO LOOP TANK DOMESTIC WATER
	BOOSTER TO LOOP TANK FLUSHING WATER
MS	ELECTRICALLY SUPERVISED (SOLENOID) VALVE (MONITORING SWITCH)
	STRAINER
	GATE VALVES
	CHECK / NON RETURN VALVE.
	BALL VALVE
	BUTTERFLY VALVE
	AIR VENT AND WATER HAMMER ARRESTER
	AUTO AIR VENT
	MOTORISED BUTTERFLY VALVE
	FLOAT VALVE
	WATER SUPPLY PUMPS
HI	LEVEL CONTROL VALVE IN TANK
PRV	PRESSURE REDUCING VALVE
PI	PRESSURE GAUGE WITH CLOCKS
D	DELUGE VALVE
	WATER METER
	FLOW METER
	REDUCER
G	GYSER
	SHOWER
SH	SHOWER HEAD
WB	WASH BASIN
WM	WASHING MASHING
WC	WATER CLOSET
AT	ABLUTION TAP
BT	BIB TAP
KS	KITCHEN SINK
AG	AUGURED
DWS	DOMESTIC WATER SUPPLY
FWS	FLUSHING WATER SUPPLY

WATER SUPPLY SCHEMATIC

WING A: 1st to 5th, 7th to 12th, 14th to 18th FLOOR PLAN



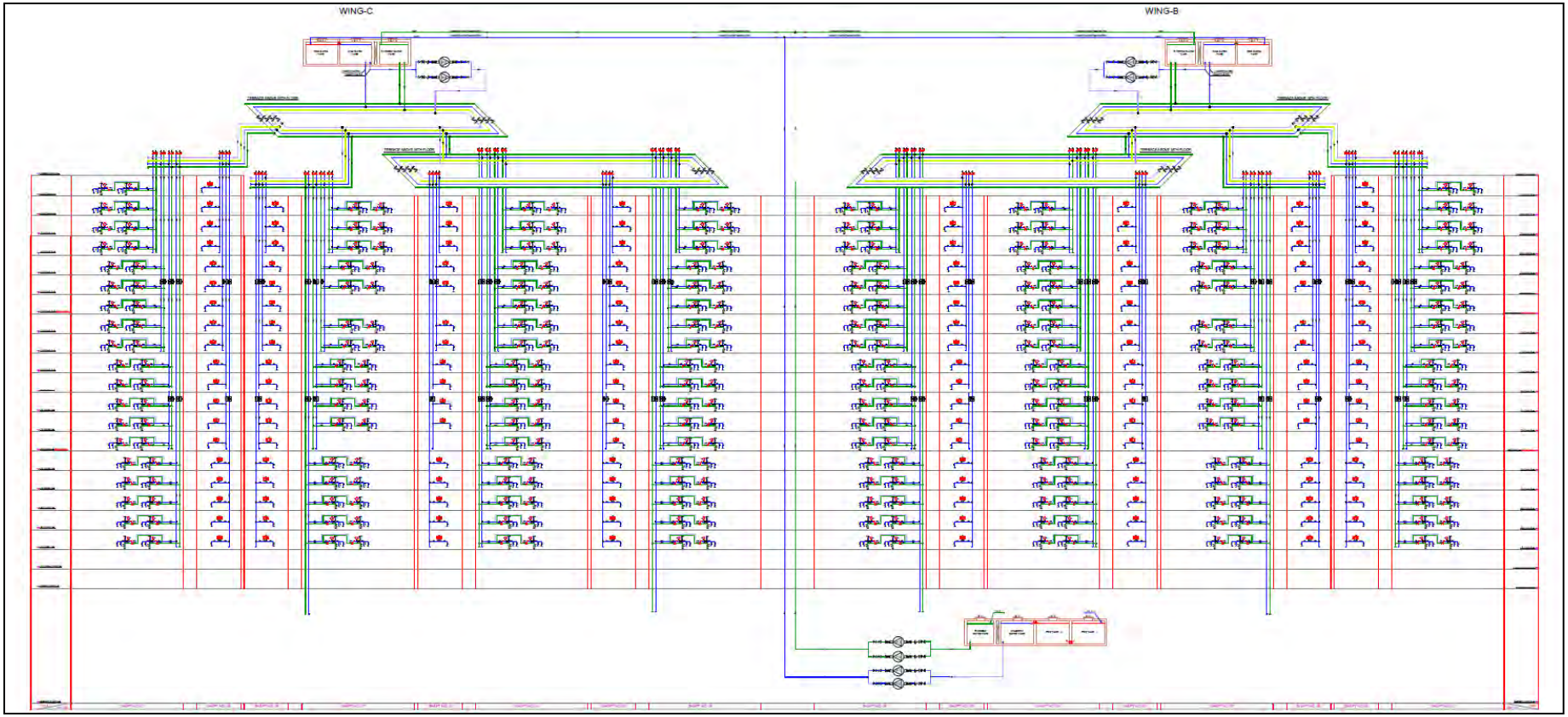


PLUMBING LEGENDS:-

	SOIL PIPE
	WASTE PIPE
	VENT PIPE
	DOMESTIC WATER SUPPLY PIPE
	FLUSHING WATER SUPPLY PIPE
	DOMESTIC WATER SUPPLY PIPE
	FLUSHING WATER SUPPLY PIPE
	HOT WATER SUPPLY PIPE
G	GEYSER
	150MM LEDGE WALL
	75MM LEDGE WALL

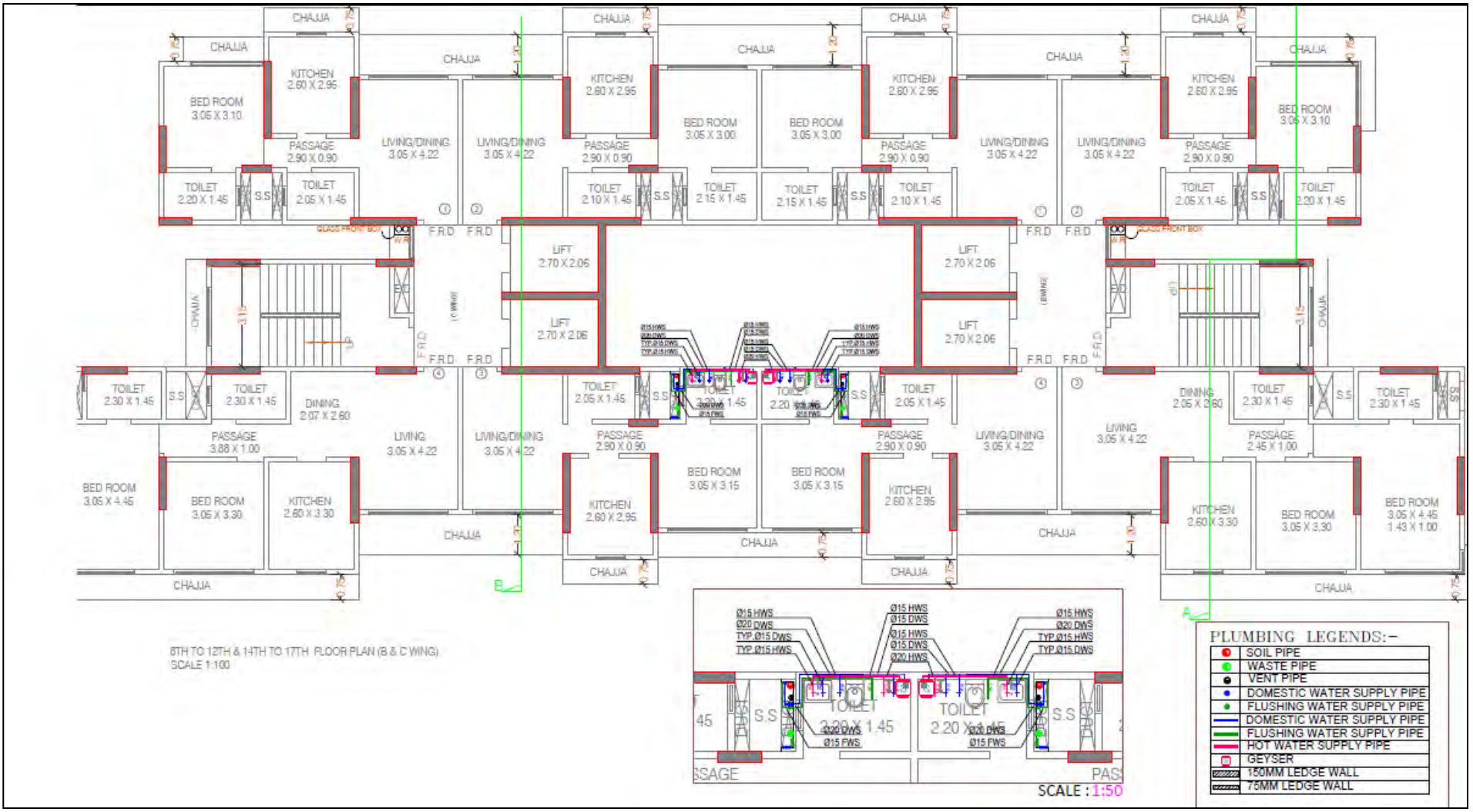
WATER SUPPLY SCHEMATIC

WING B & C



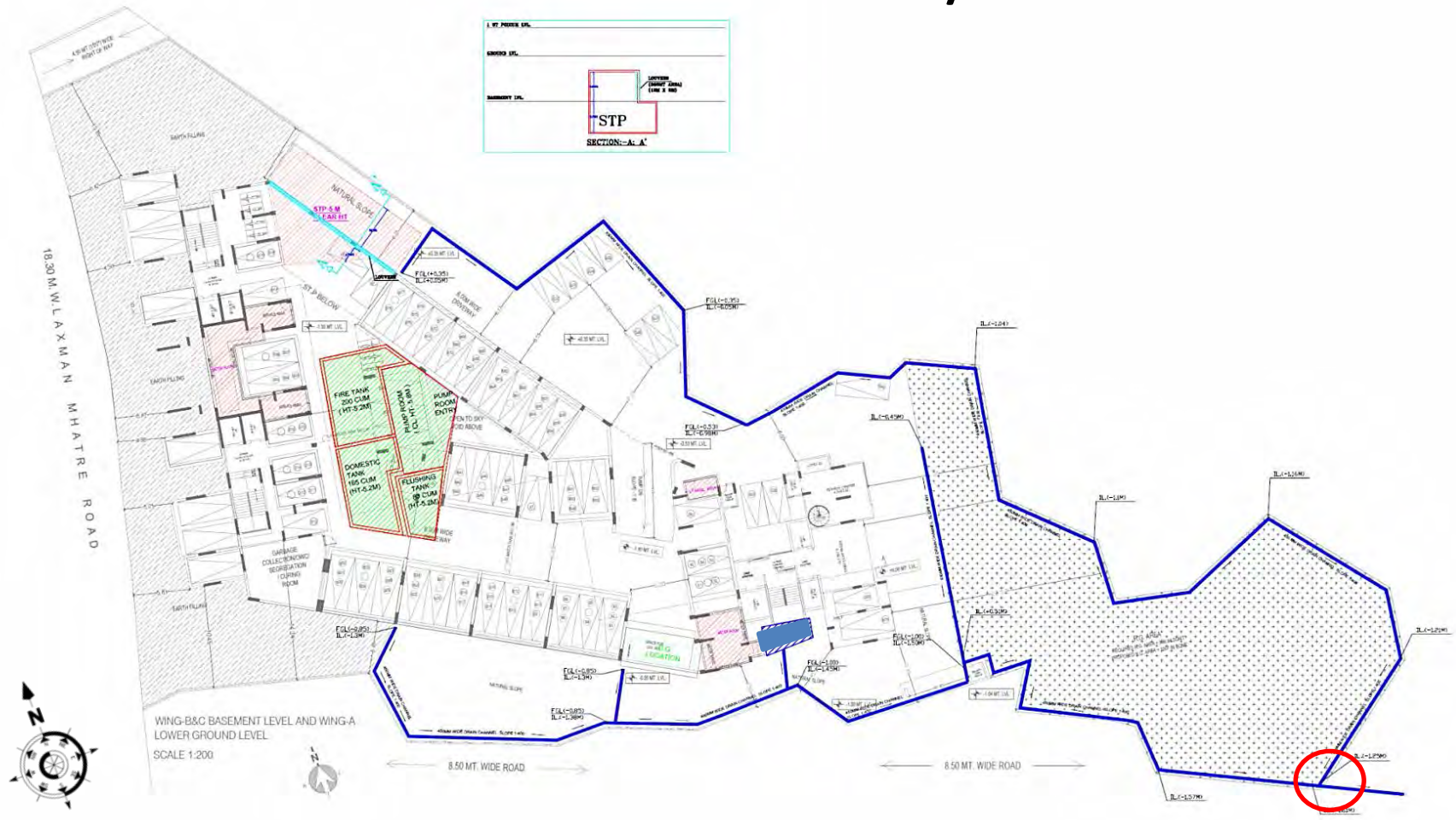
WATER SUPPLY SCHEMATIC

WING B & C: 8th to 12th & 14th to 17th FLOOR PLAN



ENCLOSURE - 12

RWH SYSTEM – LOWER GROUND/BASEMENT LEVEL

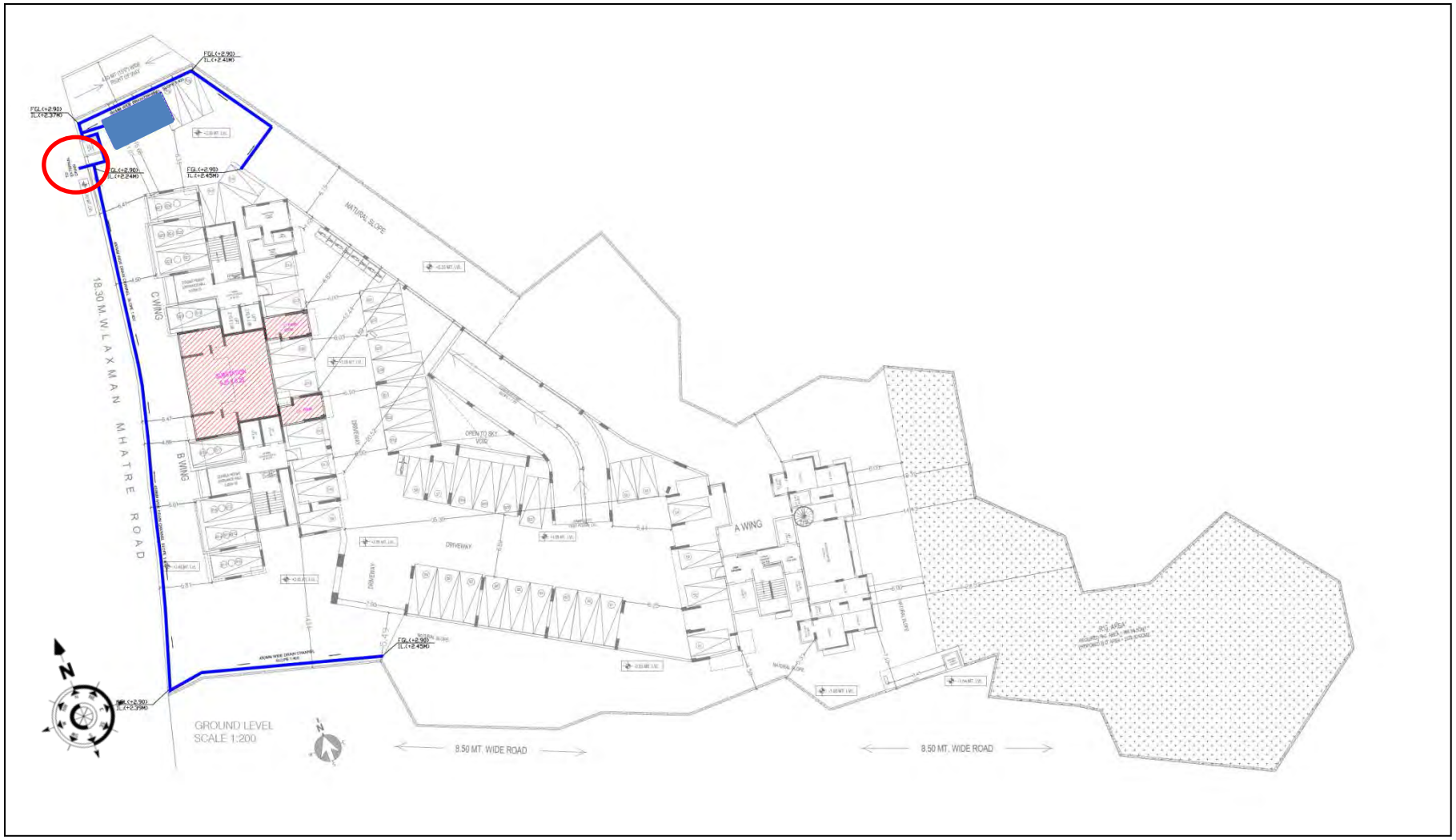


1 RWH tank of capacity 16 KL

Connection to External Drain

RWH Tank

RWH SYSTEM – GROUND LEVEL

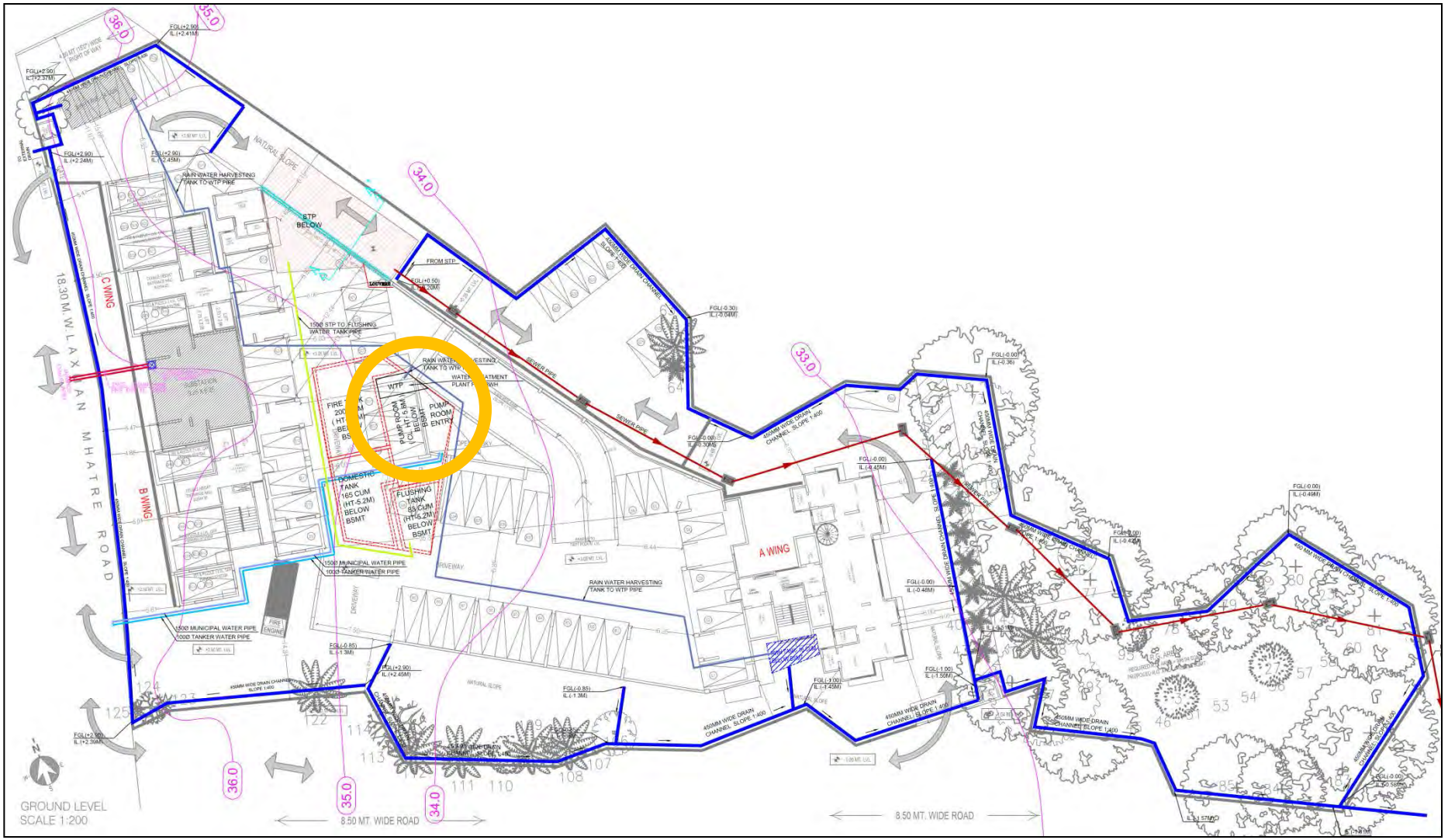


2 RWH tank of capacity 24 KL

Strom water Connection to External Drain

RWH Tank

RAIN WATER HARVESTING WITH WATER TREATMENT PLANT



ENCLOSURE - 13

CALCULATION FOR WATER HEATING SYSTEM DUE TO SOLAR

Hot Water Demand		
Typical Flat (5 Person)	211	Litres/day
Average Consumption Per Day	125	Litres/day
Temp Rise	**30**	Litres/day
Total Heat Input Kcal	6330	Litres/day
A) With Solar Heating Panels,		
The Temperature Of Cold Water Inlet To The Calorifier	25	Deg C
The Temperature Of Hot Water Outlet From The Calorifier	55	Deg C
Temp. Difference	30	
Total Hot Water Quantity For Flat With 5 Persons(In Litres/Day)	**125**	Litres/day
Total Heat Input Required	**3750**	kcal/day
Solar Panel,		
O/P Capacity/Solar Panel	**125**	Litres
Heat Energy Collection/Day	**4500**	Kcal
Rise In Temperature (Deg. C)	**36**	Deg C
Area Per Panel	**3.00**	Sq.mt.
Area Available For Solar Panels At Terrace	**72**	Sq.mt.
No. Of Solar Panels	**24**	**PANELS**
Total Heating Capacity Kcal/Day	**108000**	Kcal
Total Hot water Generation Capacity	**3000**	Litres/day
Hot water Requirement Per Typical Flat	**125**	Litres/day
Listed No. Of Flats That Can Be Benefited From Solar Hot Water	**24**	
Total No. Of Flats	**211**	
Total Heat Input Require/Day To Meet Entire Day Hw Demand Of Total Number Of Flats In The Building	**791250**	Kcal/Day
Total Heat Input Available From Listed Solar Panels	**108000**	Kcal/Day
Energy Saved Due To Solar Hot Water System	**108000**	Kcal/Day
No. Of Solar Panels	**24**	
Capital Cost	**840000**	
Operating Cost Per Annum	**24000**	

ENCLOSURE - 14

ENERGY SAVING STATEMENT

NO.	LOAD DESCRIPTION	AVG. KW	QTY.	AVG. HRS./DAY	AVG. KWH/DAY
1.0	**SALES BLOCK:**				
	4-BHK Flats			8.00	-
a	3.5-BHK Flats	13.10	5.00	6.00	393.00
b	2-BHK Flats	7.30	109.00	6.00	4,774.20
c	1-BHK Flats	6.30	97.00	6.00	3,666.60
d	1-RK Flats			5.00	-
1.1a	Passenger Lifts	12.00	6.00	6.00	432.00
1.1b	Service lifts	12.00	1.00	3.00	36.00
1.1c	18.5 KW lifts			3.00	-
1.2a	Staircase Lighting	5.81	1.00	8.00	46.48
1.2b	Common Areas Lighting & Small Power - full load for 8 hours	14.00	1.00	8.00	112.00
1.2c	Common Areas Lighting & Small Power-50% load for - 4hours	7.00	1.00	4.00	28.00
1.2d	Common Areas Lighting & Small Power-25% load for 4 hours	3.50	1.00	4.00	14.00
1.3	Club house	11.04	1.00	5.00	55.20
1.4	Fountains / water bodies		1.00	3.00	
1.5a	Compound/Street Lighting - full load for 4 hours	10.00	1.00	4.00	40.00
1.5b	Compound/Street Lighting - 50 % load for 4 hours	5.00	1.00	4.00	20.00
1.5c	Compound/Street Lighting - 25% load for 4 hours	2.50	1.00	4.00	10.00
1.6	Plumbing load	34.40	1.00	3.00	103.20
1.7	ventilation	10.00	1.00	10.00	100.00
1.8	STP	18.00	1.00	18.00	324.00
	Therefore Average KWH/Day:				10,154.68
	Therefore Average KWH/Annum:				3,706,458.20
	Therefore Average KWH/Sq.mt./Annum considering B.U.A.		22,346.00	Sq.mt.	**165.87**
REDUCTION IN CONSUMPTION BY USING ENERGY SAVING MEASURES					
	BY USING CFL / T5 LAMPS & Electronic ballast:				
	Basis - lamp comparison				
	Diff between 28W T5 and 36W T8 lamp	*8 W which comes to 22%*			
	Diff between 18W CFL and 20W T8 lamp	*2 W which comes to 10%*			
	Hence overall saving can be considered as 15%				
	Basis - ballast comparison				

	Watt losses for VPIT copper ballast compared to electronic ballast	*5 W which comes to 15% for T5 and 21% for CFL*			
	Hence overall saving can be considered as 18%				
	Area	**Per day unit consumption**	**Saving percentage**	**Per day unit consumption with savings**	**Savings in units per day**
A	**Savings due to lamp**				
1.0	Common Area Ltg. & Club House	253.68	38.00	157.28	96.40
2.0	Apartment internal lighting load - app 1 KW for 1 & 2 BHK apartment @8hours per day	844	38.00	523.28	320.72
NO.	**LOAD DESCRIPTION**	**AVG. KW**	**QTY.**	**AVG. HRS./DAY**	**AVG. KWH/DAY**
B	**Savings due to electronic ballast**				
1.0	Common Area Ltg. & Club House	253.68	18.00	208.02	45.66
3.0	Apartment internal lighting load - app 1 KW for 1 & 2 BHK apartment @8hours per day	844	18.00	692.08	151.92
C	**Savings due to timer / sensor**				
1.0	Savings in sale tower common lighting and external lighting due to timers	Refer 1.2a/b/c and 1.5 a/b/c above where by for total 12 hours operation of common area - where by time slots for 100% - 50% and 25% load is done and savings of 50% and 75% is achieved for 4 hours slots each respectively.			232.00
D	**Savings within apartment with use of Star rated geysers and AC**				
1.0	Motor load for lifts + all pumps plumbing and STP+ ventilation -995kW	at 0.8 P.F. - load is 1244 KVA, whereas at 0.98 p.f. load is 1269KVA - where by saving in consumption shall be 15%		Total units consumed by this equipment item no 1.1a / b + 1.6 + 1.7 + 1.8+1.11 above per day = 2976 units	149.25
1.1	Star Rated Acs in 1, 2 & 3.5 BHK Flats	Total AC load is 339 x 8 hrs KW= 2712 - where by saving in consumption shall be 15%			406.80
E	**Saving due to Solar Lights**				
1.0	**Apartment internal lighting & Fan load** - app 0.1 KW for 1, 2 & 3.5 BHK apartment @6hours per day	Item No 1a, 1b & 1c 8909 units @ 6Hrs/day.		Total units consumed by Solar panel x 6 Hrs. Per day = 127.8	126.60

				units	
1.0	**Common area lighting load** - app 14 KW @6hours per day	Item No 1.2a, 1.2b & 1.2c 154 units @ 6Hrs/day.		Total units consumed by Solar panel x 6 Hrs. Per day = 42 units	42.00
2.0	**External lighting** - app 10KW@6hours per day	Item No 1.5a 70 units @ 6Hrs/day.		Total units consumed by Solar panel x 6 Hrs. Per day = 60 units	60.00
E	**Saving due to Solar water heaters**				
1.0	**Apartment geysers** - 361KW@6hours per day	Item No 1a, 1b & 1c 8909 units @ 6Hrs/day.		Total units consumed by Solar panel x 6 Hrs. Per day = 361units	36.00
	Therefore Average KWH/Day Saving:				1,667.35
	Therefore Average KWH/Annum Saving:				608,583.04
	Therefore Average KWH/Sq.mt./Annum Saving considering B.U.A		22,346.00	Sq.mt.	27.23
	THEREFORE AVERAGE ANNUAL ENERGY SAVINGS				**16.42%**

	AVAILABLE TERRACE 840 SQ.MTR	REQ. PANELS	REQ. AREA
TOTAL REQUIRED PV PANELS FOR 3 BLDG		142 NOS	355.00
	One PV Panel Required Area Approx. 2.5 Sq.mt.		
	Total 21 Kw Solar Panel for flat lighting Capital Cost	Rs. 3150000	
	Total 7.0 Kw Solar Panel for common area lighting Capital Cost	Rs. 1050000	
	Total 10.0 Kw Solar Panel for External lighting Capital Cost	Rs. 1500000	
	Maintenance Cost / Year	Rs. 300000	

ENCLOSURE - 15

SOLID WASTE MANAGEMENT

1) During Construction Phase:

Table No.1: Solid Wastes during Construction Phase

No. of workers	Solid Waste Generation (Kg /day)		
	Biodegradable	Non-Biodegradable	Total
150	3	12	15

Considerations for solid waste generation: For workers: 20 % wet garbage and 80 % dry garbage out of total 0.1 Kg/person /day

1.1 Construction Waste Management Plan

The wastes generation during construction phase shall be tried to recycled and reused to the maximum possible extent and remaining shall be disposed to authorized landfill site with due care and precautions and with prior NOCs from the concerned departments of M.C.G.M. The excavation waste quantities and its management are explained in detail below:

No.	Item	Quantity	Reuse/Recycle/Disposal (Details)
Demolition Debris – Existing structure			
1	Concrete Waste	859 Cum	Shall be used for void filling & compaction of temporary road
2	Steel	121 MT	Shall be given to scrap dealers for recycling
3	Bricks & Blocks	1699 MT	Shall be given to water proofing contractor and also used for Brick bat coba for waterproofing on project site and at another site

No	Item	Quantity	Reuse/Recycle/Disposal (Details)
Debris Generation During Construction activity			
1	Top soil	600 Cum	Shall be preserved and used for gardening
2	Quantity of Cutting	6800 Cum	Quantity of Filling: 3000 Cum Remaining 3800 Cum shall be disposed to authorized landfill site as per permission from M.C.G.M.
3	Concrete Waste	4348 Cum	Shall be reused for void filling , compaction of internal roads & compaction of paving
4	Steel	924 MT	Shall be reused for lintels Shall be given to authorized recyclers
5	Bricks & Blocks	284 MT	Shall be reused for waterproofing works on site. Shall be given to waterproofing contractor for waterproofing at another site.
6	Ceramic tiles	285 MT	Shall be used for waterproofing work
7	Marble/granite	37 MT	Shall be used in paving & landscaping areas

2) During Operation Phase:

Details of various types of solid waste which will be generated during operation phase are detailed out as under

Table No. 2: Solid Wastes during Operation Phase

Occupancy	Solid Waste Generation (Kg/day)		
	Non- Biodegradable	Biodegradable	Total
1055	142	332	474

Considerations for solid waste generation as per M.C.G.M. norms: For Residential: 70 % wet garbage and 30 % dry garbage out of total 0.450 Kg/person /day

Management Plan:

- Segregation of non biodegradable and biodegradable garbage on site.
- Biodegradable garbage: Treatment in Organic Waste Converter (OWC).
- Non- biodegradable garbage:
  - Recyclable waste: Handed over to recyclers
  - Non recyclable waste: Handed over to M.C.G.M
- STP Sludge (Dry sludge): Used as manure within the premises for plants.

- **Details of Organic Waste Converter:**

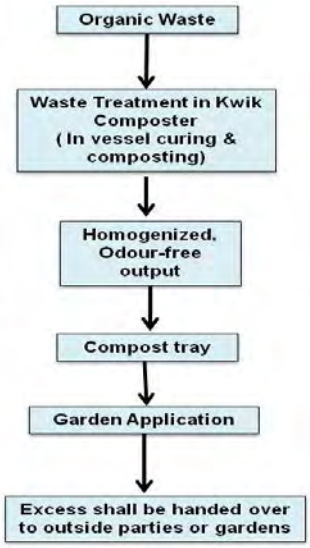


Figure: Process Diagram and Photographs of Machine

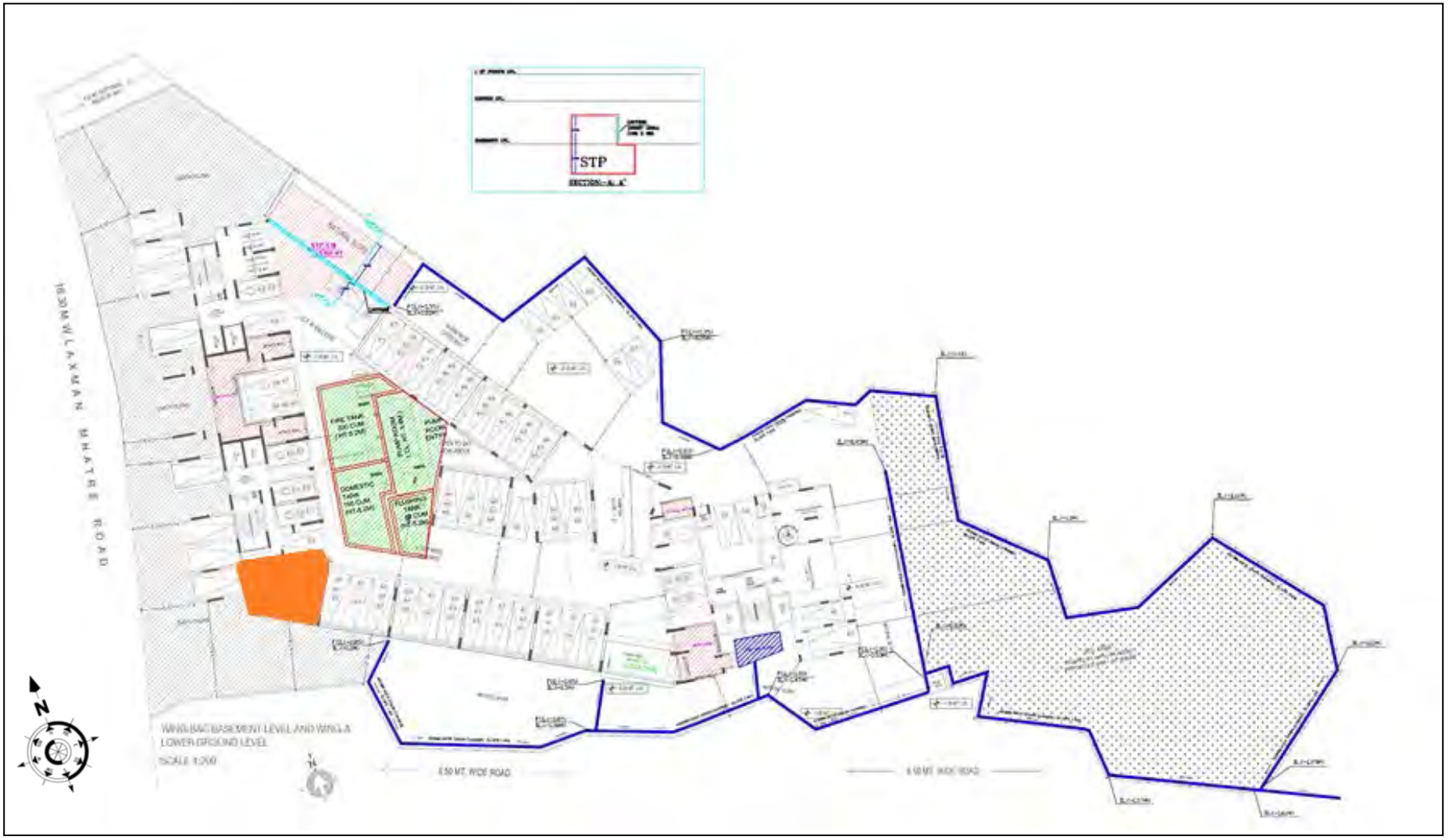
- **OWC Process Overview:**
  - OWC is a crusher / grinder which grinds the waste into small particles
  - Organic Waste Converter homogenizes organic waste with appropriate additive such as saw dust or old manure & bio culture.
  - Organic Waste Converter homogenizes organic waste with appropriate additive & bio culture.
  - The homogenizes organic mixture is stored in trays for 15 days for curing.
  - The output from this machine is uniform colored coarse powder in appearance and is without any bad smell.
  - The treated material over-come major cause of nuisance to community related to eye & nose sense.
  - It can be composted into good quality organic manure in 2 weeks.

- **Area requirement & Provision for Solid Waste Management :**

Items		Dry Garbage	Wet Garbage
Total Garbage Generation kg/day		144	332
Total Garbage Generation T/day (Mass)		0.14	0.33
Density (T /m^3) as per C.P.H.E.E.O. Manual for Solid waste		0.269	0.58
Volume (m^3) (Mass / Density)		0.5	0.6
Considered Height of Bag (mt..)		1.2	1.2
Area required (m^2) (Volume / Height)	1 day capacity	0.45	0.48
	2 day capacity	0.9	1
Considering additional 40% area for processing		0.4	0.4
Garbage type-wise Area required for collection (Sq. mt.)		1.2	1.3
Total Area Required for Collection (Sq. mt.) for Dry + Wet		**2.6**	
Area Required for Segregation (Sq.mt.) (same as collection)		**2.6**	
Total area requirement for garbage :		5.2	
Collection & Segregation (Sq.mt.)			

Area requirement (Sq. mt.) for Treatment of Wet garbage			
	OWC Machine	**Curing Space**	**Total**
AS per vender details	12	13.4	30.6
(Please Note : The area requirement for OWC machine & Curing space is referred from the vender Excel Industries LTD.) Machine has as fixed space curing area depends upon the quantity of wet garbage			
Total Area Required (Collection + Processing + Segregation + Treatment + Curing) = 30.6 sq. mt.			
Total Area Provided (Collection + Processing + Segregation + Treatment + Curing) = 31 sq. mt.			

LOCATION OF SWM - BASEMENT LEVEL



SWM Area – 31 Sq.mt.

ECBC Compliance

Section	Requirement	Compliance/Remarks
4.3.1	Roof assembly U factor to be max 0.409 W/m²°K	Complied with
6.2.2	Equipment efficiency standards	Equipment will be specified to meet the minimum standards.
7.2.1.2	Space control for lighting	Space controls will be provided for lighting in common areas
7.2.1.4	Exterior lighting to be controlled by sensor or time switch.	External lighting will be switched on / off by photo sensors.
7.3.1	Interior lighting power to be with in specified limits	For Common Area Lighting power Density) will be with in specified limits.
7.3.5	Exterior lighting power to be with in specified limits	LPD for exterior lighting will be as specified.
8.2.2	Energy efficient motors	All motors of PHE systems have nominal full load efficiency as per IS 12615.
8.2.3	Power factor to be maintained between 0.95 and unity	PF is maintained above 0.95
8.2.4	Check metering	Check meters are provided on all major consumption centers such as PHE, Lifts, Fire fighting etc.

ENCLOSURE - 17: GREEN BELT PLAN

FORM – 1 & 1A

REVISION 2

REDEVELOPMENT OF "SAGAR VAIBHAV CO-OP HOUSING SOCIETY LTD."

At

Plot bearing CTS no. 51 of Village Mandapeshwar, Dahisar (West), Opposite Mary Immaculate Girls School, Laxman Mhatre Road, Dahisar (West), Mumbai – 400068

By

M/s. Kolte-Patil Developers Ltd.

501, 5th Floor, The Capital, Plot No. C70, G-Block, Bandra-Kurla Complex, Bandra (East), Mumbai – 400051

FORM – 1

REVISION 2

REDEVELOPMENT OF "SAGAR VAIBHAV CO-OP HOUSING SOCIETY LTD."

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APPENDIX - I
(See paragraph - 6)
FORM 1

(I) Basic Information

<table>
<tr><th>Sr.</th><th>Item</th><th>Details</th></tr>
<tr><td>1.</td><td>Name of the project/s</td><td>Redevelopment of “Sagar Vaibhav Co-op Housing Society Ltd.” at Dahisar</td></tr>
<tr><td>2.</td><td>S. No. in the schedule</td><td>8 (B2)</td></tr>
<tr><td>3.</td><td>Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled</td><td>Total Plot Area: 4,994.70 Sq.mt.
Built-up Area as per FSI: 12,472.91 Sq.mt.
Total Construction Built -up Area: 22,346.42 Sq.mt.

Project Proposal:
<table>
<tr><th>Configuration: 1 Building with 3 Wings</th><th>Details</th></tr>
<tr><td>Wing A: Lower Ground + Ground + Podium + 18 Floors + 19th Floor (Pt.)</td><td rowspan="3">Flats: 211 Nos.</td></tr>
<tr><td>Wing B: Basement + Ground + Podium + 18 Floors + 19th Floor (Pt.)</td></tr>
<tr><td>Wing C: Basement + Ground + Podium + 18 Floors + 19th Floor (Pt.)</td></tr>
</table></td></tr>
<tr><td>4.</td><td>New/Expansion/Modernization</td><td>New</td></tr>
<tr><td>5.</td><td>Existing Capacity/ Area etc.</td><td>Not applicable</td></tr>
<tr><td>6.</td><td>Category of project i.e.’ A’ or ‘B’</td><td>8(B2)</td></tr>
<tr><td>7.</td><td>Does it attract the general condition? If yes, please specify.</td><td>Not Applicable</td></tr>
<tr><td>8.</td><td>Does it attract the specific condition? If yes, please specify.</td><td>Not Applicable</td></tr>
<tr><td rowspan="6">9.</td><td>Location</td><td>Dahisar (West)</td></tr>
<tr><td>Plot/Survey/Khasra No.</td><td>CTS no. 51</td></tr>
<tr><td>Village</td><td>Mandapeshwar</td></tr>
<tr><td>Tehsil</td><td>Borivali</td></tr>
<tr><td>District</td><td>Mumbai Suburban</td></tr>
<tr><td>State</td><td>Maharashtra</td></tr>
<tr><td>10.</td><td>Nearest railway station
Nearest airport</td><td>Dahisar Railway station: Within 2.00 Km (Road Distance)
Mumbai Chhatrapati Shivaji Airport: Within 20.00 Km (Road Distance)</td></tr>
<tr><td>11.</td><td>Nearest Town, city, District headquarters along with distance in kms.</td><td>Mumbai Metropolitan Region</td></tr>
<tr><td>12.</td><td>Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal address with telephone nos. to be given)</td><td>Municipal Corporation of Greater Mumbai (M.C.G.M.)</td></tr>
<tr><td>13.</td><td>Name of the applicant</td><td>M/s. Kolte-Patil Developers Ltd.</td></tr>
<tr><td>14.</td><td>Registered Address</td><td>501, 5th Floor, The Capital, Plot No. C70, G-Block, Bandra-Kurla Complex, Bandra (East), Mumbai – 400051</td></tr>
<tr><td rowspan="3">15.</td><td>Address for correspondence</td><td>501, 5th Floor, The Capital, Plot No. C70, G-Block, Bandra-Kurla Complex, Bandra (East), Mumbai – 400051</td></tr>
<tr><td>Name</td><td>Mr. Niren Chaudhary</td></tr>
<tr><td>Designation(Owner/Partner/ CEO)</td><td>Deputy Project Director</td></tr>
</table>

	Address	501, 5th Floor, The Capital, Plot No. C70, G-Block, Bandra-Kurla Complex, Bandra (East), Mumbai
	Pin Code	400051
	E-mail	gopal.sarda@koltepatil.com
	Mobile number	8550996875
	Telephone No.	022 61770100
	Fax No.	022 61770100
16.	Details of Alternative Sites examined, if any. Location of these sites should be shown on a topo-sheet.	Not applicable
17.	Interlinked Projects	Not applicable
18.	Whether separate application of interlinked project has been submitted?	Not applicable
19.	If yes, date of submission	Not applicable
20.	If no, reason	Not applicable
21.	Whether the proposal involves approval/clearance under: if yes, details of the same and their status to be given.	
(a)	The Forest (Conservation) Act, 1980?	Not Applicable
(b)	The Wildlife (Protection) Act, 1972?	NOC from Wild Life Board is Not Applicable as per Notification reg. ESZ of SGNP published by MOEF & CC u/no. S.O. 3645 (E) dated 5/12/2016, as our project site is not affected by the ESZ belt as per Notification published.
(c)	The C.R.Z Notification, 1991?	Not Applicable
22.	Whether there is any Government Order/Policy relevant/ relating to the site?	Not Applicable
23.	Forest land involved (hectares)	Not applicable
24.	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up? (a) Name of the Court (b) Case No. (c) Order /directions of the Court, if any and its relevance with the proposed project.	No

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	No	Project site is in residential zone as per DP remarks. DP remarks are attached as **Enclosure 1**

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.2	Clearance of existing land, vegetation and building?	No	There are 5 Existing Residential Buildings and one society office at site which shall be demolished.
1.3	Creation of new land uses?	No	--
1.4	Pre-construction investigation e.g. bore houses, soil testing?	Yes	Geotechnical Investigation has been carried out and report is attached as **Enclosure-2**
1.5	Construction works?	Yes	Residential redevelopment
1.6	Demolition works?	No	There are 5 Existing Residential Buildings and one society office at site which shall be demolished
1.7	Temporary sites used for construction works or housing of construction workers?	No	--
1.8	Above ground building, structures or earthworks including linear structures, cut and fill or excavations	Yes	Demolition debris shall be partly reused and remaining disposed to the authorized land fill site. Quantity of Excavation material (6800 Cum), 3800 cum shall be reused on site for backfilling and levelling and remaining (3000) shall be disposed to authorized landfill site. Construction waste material shall be partly recycled and remaining shall be disposed to the authorized land fill site.
1.9	Underground works including mining or Tunneling?	Yes	**Wing A:** Lower Ground **Wing B & C:** Basement
1.10	Reclamation works?	No	--
1.11	Dredging?	No	--
1.12	Offshore structures?	No	--
1.13	Production and manufacturing processes?	No	--
1.14	Facilities for storage of goods or materials?	Yes	Temporary storage facilities to store the construction raw material.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	• STP for treatment of sewage • Segregation of solid waste into non-biodegradable and biodegradable garbage • Treatment of biodegradable waste in Organic Waste Converter • Segregation of Non-biodegradable waste into recyclable & non-recyclable. ➢ Recyclable waste: To recyclers ➢ Non-Recyclable waste: To M.C.G.M. • Dried sludge from STP : As manure
1.16	Facilities for long term housing of operational workers?	No	--
1.17	New road, rail, or sea traffic during construction or operation?	No	--
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	--

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic Movements?	No	--
1.20	New or diverted transmission lines or pipelines?	No	--
1.21	Impoundment, damming, culverting, realignment or other change to the hydrology of watercourses or aquifers?	No	--
1.22	Stream crossings?	No	
1.23	Abstraction or transfers of water from ground or surface waters?	No	--
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	By considering the runoff prior to development and runoff after development there is some increment in runoff of storm water. Incremental Runoff = 0.06 m^3/sec
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Transport of construction materials. Precautions taken to reduce the impact of the vehicular movement by trying to avoid the vehicular trips during peak hours.
1.26	Long-term dismantling or decommissioning or restoration works?	No	--
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	--
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Since this is a redevelopment project there will be influx of ~ 615 persons for additional sale tenements
1.29	Introduction of alien species?	No	--
1.30	Loss of native species or genetic diversity?	No	--
1.31	Any other actions?	No	--

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

Sr. No.	Information/checklist confirmation	Yes / No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	No	The land is in developed infrastructure area.
2.2	Water (expected source & competing users) unit : KLD	Yes	**During Construction Phase –** For Workers : From M.C.G.M.: 12 KLD For Construction: From Water tankers: 10 - 20 KLD (Depending upon the activity) **During Operational Phase –** Fresh water from M.C.G.M.: 95 KLD (Domestic)
2.3	Minerals (MT)	No	---

<table>
<tr><th>Sr. No.</th><th>Information/checklist confirmation</th><th>Yes / No</th><th>Details thereof (with approximate quantities /rates, wherever possible) with source of information data</th></tr>
<tr><td>2.4</td><td>Construction material – stone, aggregates, and / soil (expected source – MT)</td><td>Yes</td><td>Quantity : As per requirement
Sources: The material required for construction activities shall be procured from company’s authorized / approved vendors/open market.</td></tr>
<tr><td>2.5</td><td>Forests and timber (source – MT)</td><td>Yes</td><td>Timber required for doors sourced from local suppliers.</td></tr>
<tr><td>2.6</td><td>Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)</td><td>Yes</td><td>During Construction Phase -
From Maharashtra State Electricity Distribution Company Limited (MSEDCL): 100 KW
D.G. Sets: As per requirement

During Operational Phase –
Source: MSEDCL<table><tr><td>Connected load</td><td>4142 KW</td></tr><tr><td>Maximum demand</td><td>1785 KW</td></tr><tr><td>D.G sets
(For emergency back-up in case of power failure)</td><td>1 DG set of 500 kVA</td></tr></table></td></tr>
<tr><td>2.7</td><td>Any other natural resources (use appropriate standard units)</td><td>No</td><td>--</td></tr>
</table>

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	No	---
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	---
3.3	Affect the welfare of people e.g. by changing living conditions?	No	---
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	No	---
3.5	Any other causes	No	---

4. Production of solid wastes during construction or operation or decommissioning (MT/month):

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	---
4.2	Municipal waste (domestic and or commercial wastes)	Yes	**During Construction Phase:** Total quantity of solid waste = 15 kg/day (Biodegradable and Non-biodegradable)

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
			During Operation Phase: The total quantity of solid waste: 474 Kg /day. (Biodegradable and Non biodegradable)
4.3	Hazardous wastes (as per Hazardous waste Management Rules)	Yes	Waste oil generated from D.G. shall be stored at separate location duly marked and will be sold to the authorized recyclers.
4.4	Other industrial process wastes	No	--
4.5	Surplus product	No	--
4.6	Sewage sludge or other sludge from effluent treatment.	Yes	Dried sludge from STP will be used as manure
4.7	Construction or demolition wastes.	Yes	Demolition debris shall be partly reused and remaining disposed to the authorized land fill site. Quantity of Excavation material (6800 Cum), 3800 cum shall be reused on site for backfilling and levelling and remaining (3000) shall be disposed to authorized landfill site. Construction waste material shall be partly recycled and remaining shall be disposed to the authorized land fill site.
4.8	Redundant machinery or equipment.	No	---
4.9	Contaminated soils or other materials.	No	---
4.10	Agriculture wastes.	No	---
4.11	Other solid wastes.	No	---

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr) :

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	CPCB approved D.G. Sets will be used during power failure.
5.2	Emissions from production processes	No	--
5.3	Emissions from materials handling including storage or transport	Yes	Fugitive dust emission due to handling and loading-unloading activities is envisaged during construction. Frequent water sprinkling will be done to minimise the fugitive emissions.
5.4	Emissions from construction activities including plant and equipment	Yes / Marginal	The project may cause rise in dust levels during construction phase. Precautions would be taken to reduce dust generation are given as follows: • Dust suppression • On site sensors shall be installed to monitor PM10 and PM 2.5 • Barricading site with tin sheets with height of 4.00 mt

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
			• Use of covering sheets while transporting the material • Use of polymeric spray for dust suppression instead of water wherever possible • Curing water shall be sprayed on concrete structures, free flow of water should not be allowed for curing • Use of wet jute cloth/gunny bags instead of water spray for curing activity
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Dust generation controlled as described above. For odour control: Proper ventilation shall be provided around STP and solid waste management facilities
5.6	Emissions from incineration of waste	No	--
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	--
5.8	Emissions from any other sources	No	--

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers.	Yes but negligible	For control of noise following measures shall be adopted: • Regular noise monitoring to be scheduled to maintain the noise level within the levels prescribed by CPCB during day and night time • Provision of ear plugs to workers • Use of high efficiency mufflers • No noise polluting work in night shifts • Provision of barricades along the periphery of the site.
6.2	From industrial or similar processes.	No	--
6.3	From construction or demolition.	Yes	Noise levels may increase due to operation of machinery as well as transportation vehicles. This may cause nuisance to the nearby area. Following precautions shall be taken to control noise pollution: • High noise generating construction activities would be carried out only during day time • Installation, use and maintenance of mufflers on equipment • Workers working near high noise construction machinery would be supplied with ear muffs/ear plugs • Provision of barricades along the periphery of the site

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
			• Plantation of trees • Acoustic enclosure for DG sets
6.4	From blasting or piling.	No	--
6.5	From construction or operational traffic.	Yes	**During Construction phase:** • Proper traffic management for the construction vehicles • Regular maintenance of vehicles with suitable enclosures and intake silencers • Planning and ensuring effective implementation of the waste movement plan for loading and offsite movement in non-traffic hours. **During Operation Phase :** • Install traffic control measures to regulate the flow of traffic • Assign traffic wardens to regulate flow of project traffic during peak hours • Compensatory plantation shall be done as per M.C.G.M. norms on the land suggested by MCGM or Environment Department.
6.6	From lighting or cooling systems.	No	--
6.7	From any other sources.	No	--

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea :

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials.	No	--
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge).	No	**During Construction Phase:** Disposal of sewage to municipal sewer line **During Operation Phase:** The treated sewage will be reused for flushing and gardening within the premises. Excess treated sewage will be disposed to existing sewer line
7.3	By deposition of pollutants emitted to air into the land or into water.	No	Dust will be generated during construction phase from earthworks and movement of vehicles. Appropriate fugitive dust control measures, including watering, water sprinkling of exposed areas and dust covers for trucks, will be provided to minimize any impacts. DG exhaust will be discharged at stipulated height by providing adequate stack height to the DG sets.
7.4	From any other sources.	No	--
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	--

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment :

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	No	--
8.2	From any other causes.	No	--
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, and cloudburst)?	--	Landslides are not expected in the area. Management plan for flood and earthquake is as follows : **Flood :** • Minimizing the incremental runoff from the site with the help of rain water harvesting tank (40 KL) • Proper management of channelization of storm water from site by using proper internal SWD system and discharge points of adequate capacity • Use of screens and silt traps to SWD • Proper maintenance of storm water drainage to avoid choking of drains and flooding on site • Ensure discharge of storm water from the site is clear of sediment and pollution **Earthquake :** The structure of the building is designed as per IS codes for zone III. Disaster Management Plan is attached as **Enclosure-3**

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality:

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:		
	•Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)	No	Supporting infrastructure is already in existence.
	• housing development • extractive industries • supply industries • other	Yes	Redevelopment Project
9.2	Lead to after-use of the site, which could have an impact on the	No	---

Sr. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
	environment		
9.3	Set a precedent for later developments	Yes	Will create job opportunities in construction and operation phase with support staff like security, maintenance, household workers, shop keepers etc.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	Impacts on water availability, storm water drainage, availability of electricity, traffic congestion etc.

(III) Environmental Sensitivity

Sr. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) from Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Sanjay Gandhi national Park Tungareshwar Sanctuary	Approx 2.00 km Approx 12.00 km
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Vasai Creek Dahisar River Manori Creek Tulsi Lake Malad creek Yeoor Lake Vihar Lake Upvan Lake Kachrali Lake Siddheshwar Lake Raila Devi Lake Masunda Lake Rewale Lake Powai Lake Bramhala Lake Jail Lake Ambe Bhosale Lake Hariyali Lake Ulhas river Arabian Sea	Approx 8.00 km Approx 1.00 km Approx 4.00 km Approx 9.00 km Approx 9.00 km Approx 10.00 km Approx 11.00 km Approx 11.00 km Approx 13.00 km Approx 13.00 km Approx 13.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 15.00 km Approx 15.00 km Approx 8.00 km
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Sanjay Gandhi national Park Tungareshwar Sanctuary	Approx 2.00 km Approx 12.00 km
4	Inland, coastal, marine or underground waters	Vasai Creek Dahisar River Manori Creek Tulsi Lake Malad creek Yeoor Lake Vihar Lake	Approx 8.00 km Approx 1.00 km Approx 4.00 km Approx 9.00 km Approx 9.00 km Approx 10.00 km Approx 11.00 km

		Upvan Lake Kachrali Lake Siddheshwar Lake Raila Devi Lake Masunda Lake Rewale Lake Powai Lake Bramhala Lake Jail Lake Ambe Bhosale Lake Hariyali Lake Ulhas river Arabian Sea	Approx 11.00 km Approx 13.00 km Approx 13.00 km Approx 13.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 14.00 km Approx 15.00 km Approx 15.00 km Approx 8.00 km
5	State, National boundaries	None	---
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	--
7	Defence installations	No	--
8	Densely populated or built-up area	Mumbai Metropolitan Region	--
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Mumbai Metropolitan Region	--
10	Areas containing important, high quality or scarce resources (Ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	No	--
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	No	--
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (Earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)	No	--

(IV) **Proposed Terms of Reference for EIA studies: Not applicable**

KOLTE • PATIL
Creation, not construction.

"I hereby give undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost."

Date: 03.01.2017

Place: Mumbai

KOLTE-PATIL DEVELOPERS LTD.

KOLTE-PATIL DEVELOPERS LTD. MUMBAI

Niren Chaudhary,
For Kolte-Patil Developers ltd,
501,5th floor, The Capital, Plot No.C70,
G – Block, Bandra-Kurla Complex,
Bandra (East), Mumbai – 400051.
(Project proponent/s Authorized Signatory)

FORM – 1A

REVISION 2

REDEVELOPMENT OF "SAGAR VAIBHAV CO-OP HOUSING SOCIETY LTD."

At

Plot bearing CTS no. 51 of Village Mandapeshwar, Dahisar (West), Opposite Mary Immaculate Girls School, Laxman Mhatre Road, Dahisar (West), Mumbai – 400068

By

M/s. Kolte-Patil Developers Ltd.

501, 5th Floor, The Capital, Plot No. C70, G-Block, Bandra-Kurla Complex, Bandra (East), Mumbai – 400051

APPENDIX II
(See paragraph 6)
FORM-1 A (only for construction projects listed under item 8 of the Schedule)

CHECK LIST OF ENVIRONMENTAL IMPACTS

[Project proponents are required to provide full information and wherever necessary attach explanatory notes with the Form and submit along with proposed environmental management plan & monitoring programme]

1	**LAND ENVIRONMENT [Attach panoramic view of the project site and the vicinity]**
1.1	**Will the existing land use get significantly altered from the project that is not consistent with the surroundings? (Proposed land use must conform to the approved Master Plan / Development Plan of the area. Change of land use if any and the statutory approval from the competent authority to be submitted). Attach Maps of (i) site location, (ii) surrounding features of the proposed site (within 500 meters) and (iii) The site (indicating levels & contours) to appropriate scales. If not available attach only conceptual plans.**
	Site Location: The project site is located at Plot bearing CTS no. 51 of Village Mandapeshwar, Dahisar (West), Opposite Mary Immaculate Girls School, Laxman Mhatre Road, Dahisar (West), Mumbai – 400068. **Land use pattern:** Project site is in Residential zone. **Site levels:** The site is a contoured land with level difference of 4.00 mt.over a length of 40.00 mt. The following details are enclosed:

1.	Site Location Map	**Enclosure 4**
2.	Surrounding features of the proposed site (within 500 meters)	**Enclosure 5**
3.	Contour Plan	**Enclosure 6**
4.	Conceptual Plan	**Enclosure 7**

1.2	**List out all the major project requirements in terms of the land area, built up area, water consumption, power requirement, connectivity, community facilities, parking needs etc.**
	A. Connectivity and community facilities The project is a residential development and is located at Dahisar. It is well connected by 18.30 mt wide Laxman Mhatre Road and 14.00 mt wide Babudev Ranade Road to major arterial roads of the area. Nearby railway station is Dahisar Railway station on Western Railway Line. Basic amenities like shopping, schools, hospitals etc. are available near the project site. **B. Building Details:**

Table 1: Building details

Configuration	**Details**
Wing A: Lower Ground + Ground + Podium + 18 Floors + 19th Floor (Pt.)	Flats: 211 Nos.
Wing B: Basement + Ground + Podium + 18 Floors + 19th Floor (Pt.)	
Wing C: Basement + Ground + Podium + 18 Floors + 19th Floor (Pt.)	

C. Area Statement:

Table 2: Area Statement

No.	Description	Area (Sq.mt.)
1	Total Plot Area	4,994.70
2	Ground Coverage Area	2,090.00
3	Recreational Ground Area (on ground)	1,024.82
4	Proposed Built - up Area as per FSI	12,472.91
5	Proposed Built - up Area as per Non-FSI	9,873.51
6	Total Construction Built-up Area (FSI + Non FSI)	22,346.42

D. Parking Statement:

Table 3: Parking Statement

Component	Parking Required as per DCR of Municipal Corporation of Greater Mumbai (M.C.G.M) (Nos.)	Parking Spaces provision (Nos.)
4 Wheeler	209	209
2 Wheeler	Nil	20

E. Occupancy load of the project:

Table 4: Occupancy Load

No. of Flats	Criteria for Occupancy	Occupancy (Nos.)
211 Flats	5 persons /flat	1055

Reference: National Building Code (NBC) -2005 – Part 4, Page 27, Occupant Load

F. Water requirement for the project:

1. **During Construction Phase:**

- From Tanker water of potable quality: 12 KLD (For workers)
- From Water Tankers: 10 – 20 KLD (Depending on construction activity)

2. **During Operational Phase:**

Table 5: Water requirement (Domestic and flushing requirement)

Occupancy	Domestic & flushing Requirement (KLD)		
	Domestic	Flushing	Total
1055	95	47	142

Reference: Criteria for Water Requirement: National Building Code (NBC) -2005 – Part 9, Page 19, Water Requirement

Considerations for water requirement: For Residential: 90 LPCD for Domestic and 45 LPCD for Flushing

The amount of water demand is calculated based on the occupancy of the building and the per capita consumption as given in MOEF Manual on norms and standards for EC of large construction projects i.e.
Total quantity of water used (LPCD) = Occupancy x Quantity (LPCD)
Then Total quantity of water used for Domestic and Flushing in KLD is calculated.

- **Total water requirement for the project and source:**

Table 6: Total water requirement for the project and source :

No.	Description	Quantity of water required in KLD	Source of water supply
I	**Construction phase**		
1	For Workers	12	From Tanker water of potable quality
2	For Construction	10 - 20 (Depending upon the construction activity)	Water Tankers
II	**Operation phase**		
1	Domestic	95	M.C.G.M./ Rain Water Harvesting (RWH) during monsoon season
2	Flushing	47	Treated sewage from STP
3	Gardening	3*	Treated sewage from STP

*Water requirement for gardening purpose is considered as 3 liters per square meter of gardening area on ground

Total quantity of water used (LPCD) = Gardening Area (Sq.mt.) x Quantity (Lit /Sq.mt.)

Then Total quantity of water for gardening in KLD is calculated.

G. Sewage Generation

Table 7: Sewage Generation :

No	Description	Quantity of Sewage generated (KLD)	Treatment/ Disposal
1.	Construction Phase	11	Disposal to existing municipal sewer line
2.	Operation Phase	123	Treatment in STP and reuse of treated sewage (available for recycling – 111 KLD) for flushing – 47 KLD and gardening – 3 KLD. Excess treated sewage will be disposed to existing sewer line. The dried sludge will be used as manure.

Reference: Manual on norms and standards for EC of large construction projects MoEF

H. Solid Wastes Generation from the project:

1) During Construction Phase:

Table 8: Solid Wastes During Construction Phase

No. of workers	Solid Waste Generation (Kg /day)		
	Biodegradable	Non-Biodegradable	Total
150	3	12	15

Considerations for solid waste generation: For workers: 20 % wet garbage and 80 % dry garbage out of total 0.1 Kg/person /day

The solid waste generation due to workers dwelling on the site will be segregated and will be handed over to authorized recyclers

2) During Operation Phase:

Table 9: Solid Wastes During Operation Phase

Occupancy	Solid Waste Generation (Kg/day)		
	Non- Biodegradable	Biodegradable	Total
1055	142	332	474

Considerations for solid waste generation as per M.C.G.M. norms: For Residential: 70 % wet garbage and 30 % dry garbage out of total 0.450 Kg/person /day

The total quantities of solid waste that will be generated in the project will be 474 kg/day. Out of which 142 kg/day will be non-biodegradable and 332 kg/day will be biodegradable.

- Segregation of non-biodegradable and biodegradable garbage on site.
- Bio degradable garbage: Treatment in OWC (Organic Waste Convertor)
- Non- biodegradable garbage: Segregation into recyclable and non-recyclable waste
  - Recyclable waste: To recyclers
  - Non-recyclable waste: To M.C.G.M.
- STP Sludge (Dry sludge): Use as manure

I. Power requirement:

During Construction Phase -

From Maharashtra State Electricity Distribution Company Limited (MSEDCL): 100 KW

D.G. Sets: As per requirement

During Operational Phase –

Source: MSEDCL

Connected load	4142 KW
Maximum demand	1785 KW
D.G sets (In case of power failure)	1 DG set of 500 kVA

1.3	**What are the likely impacts of the proposed activity on the existing facilities adjacent to the proposed site? (Such as open spaces, community facilities, details of the existing land use, disturbance to the local ecology).**
	Project site shall be developed into a Residential development. Hence, there shall be some impacts on water, air environment, power requirement but it shall be mitigated by providing proper pollution control facilities. STP shall be provided for treatment of recycling of sewage there by reducing fresh water demand. Also for water conservation, rain water harvesting shall be done. Power consumption shall be reduced by using energy saving practices. Impact on air quality shall be reduced by plantation of trees on green cover area. This project will generate employment during construction and operation phase and there by shall have positive impact on socio economy
1.4	**Will there be any significant land disturbance resulting in erosion, subsidence & instability? (Details of soil type, slope analysis, vulnerability to subsidence, seismicity etc. may be given).**
	As per the Seismic Zoning Map of India, region falls under Zone- III. Stability Certificate, as per prevalent IS Code will be obtained for these buildings from registered Consulting Structural Engineer considering the seismic forces and wind forces etc.
1.5	**Will the proposal involve alteration of natural drainage systems? (Give details on a contour map showing the natural drainage near the proposed project site)**
	No
1.6	**What are the quantities of earthwork involved in the construction activity-cutting, filling, reclamation etc. (Give details of the quantities of earthwork involved, transport of fill materials from outside the site etc)**
	Demolition debris shall be partly reused and remaining disposed to the authorized land fill site. Quantity of Excavation material (6800 Cum), 3800 cum shall be reused on site for backfilling and levelling and remaining (3000) shall be disposed to authorized landfill site. Construction waste material shall be partly recycled and remaining shall be disposed to the authorized land fill site.
1.7	**Give details regarding water supply, waste handling etc during the construction period.**
	Water Requirement during Construction Phase:

	From Water tankers (For Construction): 10 – 20 KLD. (Depending upon the construction activity) From Tanker water of potable quality (For Workers): 12 KLD The sewage generated approximately 11 KLD will be disposed existing sewer line
1.8	**Will the low lying areas & wetlands get altered? (Provide details of how low lying and wetlands are getting modified from the proposed activity)**
	The project site is not located on the wet land. Please refer the DP plan & remarks given in same Enclosure-1.
1.9	**Whether construction debris & waste during construction cause health hazard? (Give quantities of various types of wastes generated during construction including the construction labour and the means of disposal)**
	Solid Waste Generation during Construction Phase: Demolition debris shall be partly reused and remaining disposed to the authorized land fill site. Quantity of Excavation material (6800 Cum), 3800 cum shall be reused on site for backfilling and levelling and remaining (3000) shall be disposed to authorized landfill site. Construction waste material shall be partly recycled and remaining shall be disposed to the authorized land fill site. **From Construction labour :** Biodegradable garbage = 3 kg/day Non-biodegradable garbage = 12 kg/day Total = 15 kg/day Proper segregation of the wastes done and disposal to the authorized recyclers ensured.
2	**WATER ENVIRONMENT**
2.1	**Give the total quantity of water requirement for the proposed project with the breakup of requirements for various uses. How will the water requirement be met? State the sources & quantities and furnish a water balance statement.**

Water Requirement & Source:

<u>During Construction Phase –</u>

- For Workers : From Tanker water of potable quality: 12 KLD
- For Construction : From Water tankers : 10 – 20 KLD

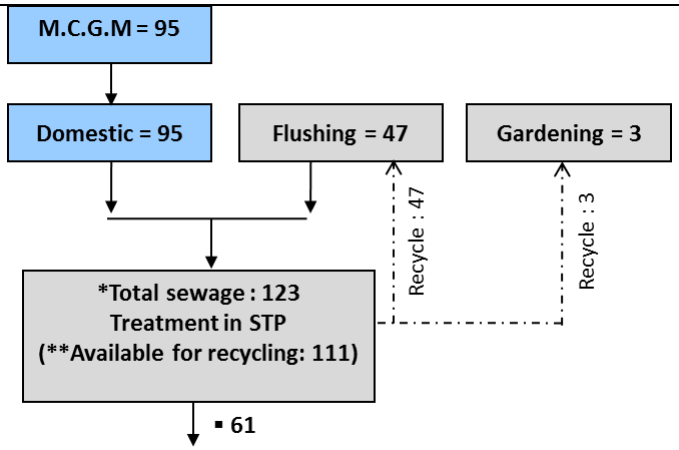
<u>During Operational Phase</u>

Table 11: Total Water Requirement

Use	Quantity in KLD	Source
Domestic	95	M.C.G.M./ Rain Water Harvesting (RWH) during monsoon season
Flushing	47	Treated sewage from STP
Gardening	3	Treated sewage from STP

<u>WATER BALANCE PER DAY BASIS: NON MONSOON</u>

All Quantities are in KLD



Please Note:

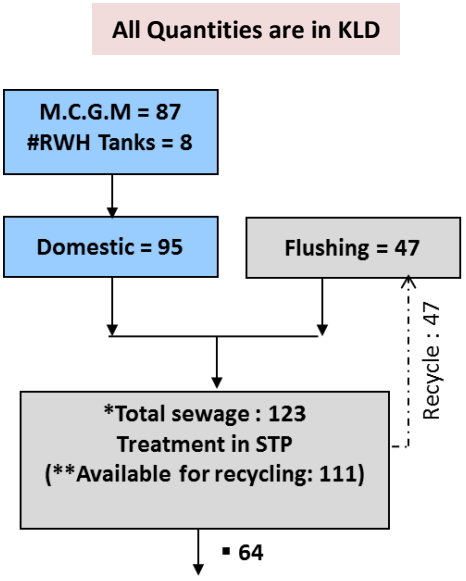
*Considered 80 % sewage of total of domestic and 100 % of flushing requirement hence total sewage generation is 123 KLD

**Considered 10 % less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation hence sewage available for recycling is 111 KLD

- Excess treated sewage: 61 KLD disposed to existing sewer line

Total water requirement = 145 KLD
Recycling of Sewage (50 KLD) shall be done for gardening (3 KLD) and flushing (47 KLD)
Hence Net water requirement = 145 - 50 = 95 KLD [For Domestic purpose: 95 KLD (Source: M.C.G.M.)]
Reduction in water Demand = 34%

WATER BALANCE PER DAY BASIS: MONSOON SEASON



Please Note:

*Considered 80 % sewage of total of domestic and 100 % of flushing requirement hence total sewage generation is 123 KLD

**Considered 10 % less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation hence sewage available for recycling is 111 KLD

- Excess treated sewage: 64 KLD disposed to existing 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 = 142 KLD
Recycling of Sewage (47 KLD) shall be done for flushing
From RWH tanks = 8 KLD (For non-drinking domestic purpose only)
Hence Net water requirement = 142 – 47 - 8 = 87 KLD [For Domestic purpose: 87 KLD (Source: M.C.G.M.)]
Reduction in water Demand = 39 %

2.2	**What is the capacity (dependable flow or yield) of the proposed source of Water?**
	Domestic Water Supply from Municipal Corporation of Greater Mumbai (M.C.G.M.)
2.3	**What is the quality of water required, in case, the supply is not from a municipal source? (Provide physical, chemical, biological characteristics with class of water quality)**
	Drinking water shall be supplied by M.C.G.M.
2.4	**How much of the water requirement can be met from the recycling of treated wastewater? (Give the details of quantities, sources and usage)**
	All Secondary requirements like flushing (47 KLD) and gardening (3 KLD) would be fulfilled by treated sewage from STP. Excess treated sewage during non-monsoon and monsoon shall be disposed to existing sewer line.
2.5	**Will there be diversion of water from other users? (Please assess the impacts of the project on other existing uses and quantities of consumption)**
	Drinking water shall be supplied by M.C.G.M.
2.6	**What is the incremental pollution load from wastewater generated from the proposed activity? (Give details of the quantities and composition of wastewater generated from the proposed activity)**
	Sewage generation will be 123 KLD. Treated sewage will be reused for flushing (47 KLD) and gardening (3 KLD). Excess treated sewage (during non-monsoon and monsoon season) shall be disposed to sewer line.

UNTREATED AND TREATED SEWAGE QUALITY:

Table 12: Untreated & Treated Sewage Quality

NO.	DETAILS	VALUES		UNITS
		UNTREATED	TREATED	
1.	pH	7.0 – 8.0	6.5 – 7.5	
2.	Total Suspended solids	250	<10	mg/lit
3.	Chemical Oxygen Demand	400	<30	mg/lit
4.	BOD, 3 day, 27 °C	250	<10	mg/lit
5.	Oil & Grease	50	<5	mg/lit

2.7	**Give details of the water requirements met from water harvesting? Furnish details of the facilities created.**
	Provision of 3 RWH tanks of total capacity 40 KL Water from RWH tanks shall be passed through Water Treatment Plant (WTP) including carbon filters and multi-grade sand filter system and disinfection with UV system. Further it will be used for non-drinking domestic purposes.
2.8	**What would be the impact of the land use changes occurring due to the proposed project on the runoff characteristics (quantitative as well as qualitative) of the area in the post construction phase on a long term basis? Would it aggravate the problems of flooding or water logging in any way?**

Name of road	Runoff from plot	Capacity of internal drain	Capacity of external existing drain
Laxman Mhatre Road	**0.039 m^3/s**	**0.135 m^3/s**	**1.44 m^3/s**
Babudev Ranade Road	**0.095 m^3/s**	**0.135 m^3/s**	**1.44 m^3/s**

Precaution to avoid water logging on site:

- Storm water drain shall be cleaned at regular interval.
- Minimizing the incremental runoff from the site with the help of 3 rain water

harvesting tank of total capacity 40 KL

- Proper management of channelization of storm water from site by using proper internal SWD system and discharge points of adequate capacity
- Use of screens and silt traps to SWD
- Proper maintenance of storm water drainage to avoid choking of drains and flooding on site
- Ensure discharge of storm water from the site is clear of sediment and pollution

Storm Water Drainage Layout is attached as **Enclosure 8**

2.9 **What are the impacts of the proposal on the ground water? (Will there be tapping of ground water; give the details of ground water table, recharging capacity, and approvals obtained from competent authority, if any)**

The ground water table at the project site is 1.50 to 1.70 mt below ground surface hence ground water recharging is not proposed.

2.10 **What precautions/measures are taken to prevent the run-off from construction activities polluting land & aquifers? (Give details of quantities and the measures taken to avoid the adverse impacts).**

The runoff from the site during construction phase would be prevented as under:

i. Use of polymeric spray for dust suppression instead of water wherever possible
ii. Curing water shall be sprayed on concrete structures, free flow of water shall not be allowed for curing
iii. Use of wet jute cloth/gunny bags instead of water spray for curing activity.

2.11 **How is the storm water from within the site managed?(State the provisions made to avoid flooding of the area, details of the drainage facilities provided along with a site layout indication contour levels)**.

Internal storm water drains will be constructed strictly in accordance to the governing authority regulations. Internal SWD is designed considering peak runoff after development.

Peak runoff after development = 0.134 m^3/sec

2.12 **Will the deployment of construction labourers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation)**

- Disposal of sewage to sewer line
- Disposal of segregated waste to M.C.G.M.
- First aid and medical facilities
- Proper housekeeping
- Regular pest control
- Site sanitation

2.13 **What on-site facilities are provided for the collection, treatment & safe disposal of sewage? (Give details of the quantities of wastewater generation, treatment capacities with technology & facilities for recycling and disposal).**

Design Basis of Treatment plant –MBBR (MOVING BED BIO REACTOR)

Table 13: Untreated & Treated Sewage Quality

NO.	DETAILS	VALUES		UNITS
		UNTREATED	TREATED	
1.	pH	7.0 – 8.0	6.5 – 7.5	
2.	Total Suspended solids	250	<10	mg/lit
3.	Chemical Oxygen Demand	400	<30	mg/lit
4.	BOD, 3 day, 27 °C	250	<10	mg/lit
5.	Oil & Grease	50	<5	mg/lit

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

- **Preliminary Treatment:**

The treatment will include the following unit / equipment;

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

All the sewage generated will gravitate through Bar Screen. 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 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;

- MBBR Bioreactor
- Secondary Clarifier
- Sludge Dewatering System-(Filter press)

The process will be of activated sludge extended aeration 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 effluent 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.

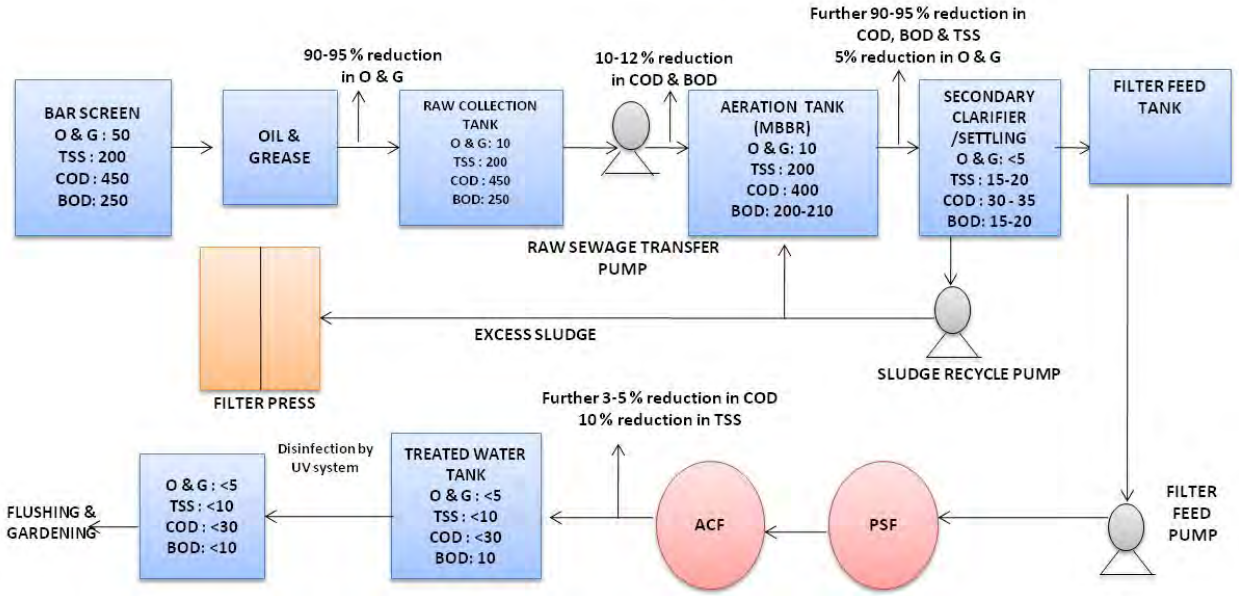
The overflow from MBBR Reactor will gravitate to the Secondary clarifier. The arrested sludge will be pumped back to the Aeration tank to maintain the bacterial concentration in the tank and excess sludge will be sent to the Sludge collection pit and shall be dewatered using a Filter press. The filtrate will be taken to the Raw Sewage Collection Tank. The dried sludge can 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 can be used for secondary requirement.  **Figure: STP Process Diagram (MBBR process)**
2.14	**Give details of dual plumbing system if treated waste used is used for flushing of toilets or any other use.**
	Recycling of treated sewage for flushing and gardening. Color coding for dual plumbing system shall be done as per standard practices. The project is situated within the limit of Municipal Corporation of Greater Mumbai (MCGM) hence water supply is assured by MCGM for Domestic fresh water demand. The criterion for total water demand per person per day is 135 LPCD for residential (Domestic – 90 LPCD & Flushing – 45 LPCD). Out of which 90 LPCD shall be supplied by MCGM for entire Domestic requirement of project (Total 95 KLD for domestic). The rest of the demand 45 LPCD for flushing purpose shall be fulfilled by STP treated sewage (total 47 KLD for flushing).
3	**VEGETATION**
3.1	**Is there any threat of the project to the biodiversity? (Give a description of the local ecosystem with its unique features, if any)**
	No
3.2	**Will the construction involve extensive clearing or modification of vegetation? (Provide a detailed account of the trees & vegetation affected by the project).**
	o **Retained trees:** 34 Nos. o **Trees to be transplanted:** 29 Nos. o **Trees to be cut:** 80 Nos.
3.3	**What are the measures proposed to be taken to minimize the likely impacts on important site features (Give details of proposal for tree plantation, landscaping, creation of water bodies etc along with a layout plan to an appropriate scale)**
	Compensatory plantation of 160 Nos. of trees shall be done as per M.C.G.M. norms on the land suggested by M.C.G.M. or Environment Department.
4	**FAUNA**
4.1	**Is there likely to be any displacement of fauna- both terrestrial and aquatic or creation of barriers**

	for their movement? Provide the details.
	No
4.2	**Any direct or indirect impacts on the avifauna of the area? Provide details.**
	No
4.3	**Prescribe measures such as corridors, fish ladders etc to mitigate adverse impacts on fauna.**
	Not applicable.
5	**AIR ENVIRONMENT**
5.1	**Will the project increase atmospheric concentration of gases & result in heat islands? (Give details of background air quality levels with predicted values based on dispersion models taking into account the increased traffic generation as a result of the proposed constructions)**
	Detailed report for background air quality with predicted values based on Air Quality Modeling is attached as **Enclosure 9**
5.2	**What are the impacts on generation of dust, smoke, odorous fumes or other hazardous gases? Give details in relation to all the meteorological parameters.**

During construction phase, Dust, Particulate Matter is the main pollutant, which may be generated during construction activities. Other emission sources are intermittent and include emissions of SO_2 NOx and CO from materials transport of heavy vehicles on site etc. Proper upkeep and maintenance of vehicles, sprinkling of water on roads and construction site are some of the measures that would reduce the impact during construction phase.

Sources of Air pollution During Operational phase :

- The gaseous emissions from vehicles
- Emissions from DG sets while in operation only during power failure

Mitigation Measures:

- The traffic congestion will be avoided by proper parking arrangement and maintaining smooth traffic flow
- Regular PUC checkup for vehicles
- CPCB approved DG sets only will be used.
- Proper maintenance of DG sets shall be done and Low sulphur fuel shall be used.
- Plantation of trees which will act as noise and dust buffer

AVERAGE/ MAXIMUM AND MINIMUM METEOROLOGICAL DATA
Period: Year 2015
Table 15: Average/ Maximum and Minimum Meteorological Data

Study period	Temp (°C)		Predominant □in direction	Wind speed (km/hr)		Relative Humidity□(%)	
	Max.	Min.		Max.	Min.	Max.	Min.
January	34.0	15.2	N	18	0	26	23
February	37.8	17.0	NW	14	0	94	17
March	38.4	15.8	NNW	22	0	63	19
April	34.6	20.8	W	22	0	81	34
May	35.4	25.6	W	22	0	98	46
June	36.0	24.4	SW	32	0	98	47
July	32.8	25.2	SW	24	0	95	63
August	32.0	20.8	W	18	0	95	62

September	37.0	22.6	W	22	0	95	41
October	36.4	21.2	W	14	0	93	34
November	36.4	20.6	N	18	0	91	25
December	35.4	14.0	N	18	0	77	18

Source: Meteorological data for the year 2015 has been collected from Indian Meteorological Department (IMD), Santacruz, Mumbai being the nearest station

The proposed project will not have any direct impact on air environment after completion.

5.3 **Will the proposal create shortage of parking space for vehicles? Furnish details of the present level of transport infrastructure and measures proposed for improvement including the traffic management at the entry & exit to the project site.**

The project proponents have proposed to provide well organized arrangement.

Table 16: Parking Statement

Component	Parking Required as per DCR of M.C.G.M. (Nos.)	Parking Spaces provision (Nos.)
4 Wheeler	209	209
2 Wheeler	Nil	20

Detailed Traffic Report is attached as **Enclosure 10**

5.4 **Provide details of the movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc., with areas under each category.**

- Provide adequate traffic signs and signages to notify residents
- Install safety mirrors to aid visibility in conflict points
- Prevent parking near the Entry and Exit Gate
- Provide speed humps to regulate speed of vehicles
- Provide pedestrian crossings and dedicated footpath to cater to the walking population
- Assign traffic wardens to regulate flow of project traffic during peak hours

Traffic movement plan showing internal roads, pedestrian pathways etc. is given in detailed traffic report.

5.5 **Will there be significant increase in traffic noise & vibrations? Give details of the sources and the measures proposed for mitigation of the above.**

The proposed project being residential development, the source of noise is mainly vehicular noise. The project proponents have proposed to provide well organized parking arrangement and maintaining smooth traffic flow which would help in reducing traffic congestion and noise levels. Trees would act as noise barrier and will reduce the noise level.

5.6 **What will be the impact of DG sets & other equipment on noise levels & vibration in & ambient air quality around the project site? Provide details.**

D.G. Set will be operated only in case of power failures during operational phase. The Pollutants like RSPM, SO_2 that may arise from emissions from D.G. Sets will be discharged through vent of proper height.

D.G. sets are with inbuilt acoustic enclosures to reduce the noise of D.G. sets while in operation. Plantation of trees would act as noise barrier and will reduce the noise level.

6 AESTHETICS

6.1 **Will the proposed constructions in any way result in the obstruction of a view, scenic amenity or landscapes? Are these considerations taken into account by the proponents?**

No.

6.2 **Will there be any adverse impacts from new constructions on the existing structures? What are the considerations taken into account?**

	All precautions will be taken to mitigate the impact due to water, air and noise pollution during construction and operation phase. Environmental Management plan is prepared and shall be implemented along with Environmental Monitoring Programme.
6.3	**Whether there are any local considerations of urban form & urban design influencing the design criteria? They may be explicitly spelt out.**
	No
6.4	**Are there any anthropological or archaeological sites or artifacts nearby? State if any other significant features in the vicinity of the proposed site have been considered.**
	Not applicable
7	**SOCIO-ECONOMIC ASPECTS:**
7.1	**Will the proposal result in any changes to the demographic structure of local population? Provide the details.**
	Since this is a redevelopment project there will be influx of ~ 615 persons
7.2	**Give details of the existing social infrastructure around the proposed project.**
	It is a well-developed City of India, having all modern amenities. Civil structures, School, Colleges, Hospitals, Recreation facilities, Markets, etc. are available in the area to a reasonable degree.
7.3	**Will the project cause adverse effects on local communities, disturbance to sacred sites or other cultural values? What are the safeguards proposed?**
	No
8	**BUILDING MATERIALS**
8.1	**May involve the use of building materials with high-embodied energy. Are the construction materials produced with energy efficient processes? (Give details of energy conservation measures in the selection of building materials and their energy efficiency)**
	Cement containing fly ash shall be used. Construction materials from nearest source shall be chosen to minimize energy consumption for transportation
8.2	**Transport and handling of materials during construction may result in pollution, noise & public nuisance. What measures are taken to minimize the impacts?**
	The material required for construction activities shall be procured from company's authorized / approved vendors only. The vendor's performance is monitored periodically. In case of urgency or non-availability of materials from authorized/approved vendors, it will be procured from the open market to maintain the pace of the work. The mode of transport for above materials will be by trucks and / or by trailers. • The construction material will be carried in properly covered vehicles. • All the contractors / Vendors will be instructed to use vehicles having PUC certificates • Security staff presents at site will supervise loading and unloading of material at site • Construction material will be stored at identified site/ temporary godowns at site
8.3	**Are recycled materials used in roads and structures? State the extent of savings achieved?**
	Cement containing fly ash shall be used. Construction materials from nearest source shall be chosen to minimize energy consumption for transportation
8.4	**Give details of the methods of collection, segregation & disposal of the garbage generated during the operation phases of the project.**

	• Segregation of non-biodegradable and biodegradable garbage on site.
	• Bio degradable garbage: Treatment in OWC (Organic Waste Convertor)
	• Non- biodegradable garbage: Segregation into recyclable and non-recyclable waste
	  ➢ Recyclable waste: To recyclers
	  ➢ Non-recyclable waste: To M.C.G.M.
	• STP Sludge (Dry sludge): Use as manure

9	**ENERGY CONSERVATION**

9.1	**Give details of the power requirements, source of supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?**

Power Requirement

During Construction Phase -

From MSEDCL: 100 KW

D.G. Sets: As per requirement

During Operational Phase –

Source: MSEDCL

Connected load	4142 KW
Maximum demand	1785 KW
D.G sets (In case of power failure)	1 DG set of 500 kVA

Following Energy conservation measures are proposed for Energy Saving:

- Provision of 2 solar powered lights and one fan shall be provided in each flat and solar lighting for common area
- Provision of solar water heating system
- Provision of electronic ballast
- High efficiency pumps & motors
- Use Low wattage LED fixtures in common area
- Overall Energy Saving: 16 %

Therefore Average KWH/Day Saving:	1,667.35
Therefore Average KWH/Annum Saving:	608,583.04
Therefore Average KWH/Sq.mt./Annum Saving considering B.U.A. of (in Sq.mt.):	27.23

ECBC compliance is also attached as **Enclosure**

9.2	**What type of, and capacity of, power back-up to you plan to provide?**
	1 DG set of 500 kVA (For emergency back-up in case of power failure)
9.3	**What are the characteristics of the glass you plan to use? Provide specifications of its characteristics related to both short wave and long wave radiation?**
	Glass shall be used only for windows
9.4	**What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project.**
	The roof shall be insulated so that there will not be direct heat gain due to sunlight
9.5	**Does the layout of streets & buildings maximize the potential for solar energy devices? Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.**
	• Provision of 2 solar powered lights and one fan shall be provided in each flat and solar lighting for common area • Provision of solar water heating system
9.6	**Is shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of Walls on the East and the West and the Roof? How much energy saving has been effected?**
	Roof insulation as per ECBC guidelines
9.7	**Do the structures use energy-efficient space conditioning, lighting and mechanical systems? Provide technical details. Provide details of the transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions? Are you using CFC and HCFC free chillers? Provide**

	specifications.
	This is not a centrally air conditioned building, hence not applicable.
9.8	**What are the likely effects of the building activity in altering the micro-climates? Provide a self-assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects?**
	The proposed project is of residential type and will not have space conditioners or glass wall. Alteration of microclimate is not notable in this case. Systematic design of buildings in order to assure light ventilation, open spaces , green areas , tree plantation as per requirement are considered which will help to reduce the effect of creation of heat island.
9.9	**What are the thermal characteristics of the building envelope? (a) roof; (b) external walls; and (c) fenestration? Give details of the material used and the U-values or the R values of the individual components.**
	Roof insulation as per ECBC guidelines
9.10	**What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.**
	Fire fighting measures: • Fire fighting system has been designed as per No Objection Certificate from Chief Fire Officer (CFO NOC), M.C.G.M. • Provision of UG Tanks (300 KL) • Fire Hydrant system & wet risers • One Twin headed landing valves with hose reel boxes • Automatic Sprinkler system • Fire alarm system • External Hydrant System • Separate power system for fire fighting • Fire detection system • Fire resistant doors at flat entry and staircases • Portable fire extinguishers • Emergency & escape lighting, emergency exit signage Disaster Management plan enclosed.
9.11	**If you are using glass as wall material provides details and specifications including emissivity and thermal characteristics.**
	Glass shall be used only for windows
9.12	**What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration.**
	This is not a centrally air conditioned building hence it has not been studied.
9.13	**To what extent the non-conventional energy technologies are utilized in the overall energy consumption? Provide details of the renewable energy technologies used.**
	• Provision of 2 solar powered lights and one fan shall be provided in each flat and solar lighting for common area • Provision of solar water heating system
10	**Environment Management Plan**
	The Environment Management Plan would consist of all mitigation measures for each activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the site including fire.

ENVIRONMENTAL MANAGEMENT PLAN

No.	Environmental Issues/Impacts	Mitigation measures	Responsibility	Legal & Other requirements
		LOCATION SPECIFIC		
1.	Level difference in Land	• The plot has a natural gradient From Laxman Mhatre road towards Wing A. The gradient absolves the need for large-scale cutting and filling for the construction of Lower Ground and basement. Only minimum cutting/ filling is required to match internal road level with level of adjacent road. • Parking level are planned along the contours and proposed formation levels shall be created by using ramp along the natural slope • Proper measures shall be adopted for noise and dust suppression on site and in surrounding areas	Project Proponents /Architects	NOC from M.C.G.M.
2.	Loss of vegetation	• Transplantation of trees (29 Nos.) • Good Landscaping with retention of existing trees (34 Nos.) • Compensatory plantation of 160 Nos. of trees shall be done as per M.C.G.M. norms on the land suggested by M.C.G.M. or Environment Department.	Contractor/ Project Manager	Tree NOC from M.C.G.M.
		DESIGN SPECIFIC		
1.	Building Height	• Height of the building is in accordance with the local planning permissions and the NOC	Architects	Guidelines of M.C.G.M
2.	Incremental runoff due to Increase in paved areas (0.06 m^3/sec)	• Planned RG area on ground (1,024.82 Sq.mt.) to allow natural percolation • Minimizing the incremental runoff from the site with the help of rain water harvesting (40 KL)	Architects	--
		CONSTRUCTION PHASE		
1.	Increase in water demand (12 KLD) due to water usage for construction, dust suppression and for workers	• Use of polymeric spray for dust suppression instead of water wherever possible • Curing water shall be sprayed on concrete structures, free flow of water shall not be allowed for curing	Contractor & Project Manager	--

			• Use of wet jute cloth/gunny bags instead of water spray for curing activity.		
	2.	Sewage generation (11 KLD) and disposal	• Disposal of sewage generated to sewer line • Daily watch on sanitation facilities, drains & good housekeeping	Contractor & Project Manager	Water (P & CP) Act 1974
	3.	Municipal solid waste generation (15 kg/day) by workers	• Segregation of Biodegradable (3 kg/day) and non-biodegradable garbage (12 kg/day) • Disposal of segregated waste to MCGM	Contractor & Project Manager	--
	4.	Construction activity may lead to • Water logging on site • Unsanitary conditions and mosquito breeding on site • Sedimentation of outside drains	• Computation of the runoff from the catchment areas outside the plot and runoff within the plot. • Proper management of channelization of storm water • Designing storm water drainage with adequate capacity to cater the total runoff from site to avoid flooding on site • Use of screens and silt traps in advance of earthworks • Proper maintenance of storm water drainage to avoid choking of drains and flooding on site • Prompt completion of works relating to drainage and sediment control • Ensure discharge of storm water from the site or inflow to the site due to contributing catchment is clear of sediment and pollution	Contractor & Project Manager	Storm water drainage remarks from M.C.G.M.
	5	**Demolition/Construction activity**			
	a.	Dust generation	• Use of polymeric spray wherever possible /water for dust suppression • On site sensors shall be installed to monitor PM10 and PM 2.5 • Provision of Barricades of adequate height along the periphery of the site • Use of covering sheets while transporting the material	Contractor/ Proponents	--
	b.	Noise & Vibration	• Regular noise monitoring to be scheduled to maintain the noise level within the levels prescribed by CPCB during day and night time • Provision of ear plugs to workers • Use of high efficiency mufflers • No noise polluting work in night shifts		

			• Provision of barricades along the periphery of the site		
	c.	Disruption of soil & runoff	• Sedimentary controls to be implemented		
	d.	Oil leaks	• Regular maintenance of machineries to prevent and repair leaks • Contaminated soil (if any) disposed to authorized CHWTSDF		
	e	Generation of construction waste - Debris/ Excavation material	• Demolition debris: Shall be reused partly and remaining shall be disposed to authorized landfill site as per permission from M.C.G.M. • 3000 Cum quantity shall be reused for filling and remaining 3800 Cum shall be disposed to authorized landfill site as per permission from M.C.G.M. • Disposal of hazardous waste to CHWTSDF • Construction waste (Empty Cement Bags, Paint container, other Barrels & Scrap metal) will be handed over/sold to Authorized recyclers	Contractor/ Proponents	NOC for Solid Waste Management/Excavation permission from M.C.G.M.
	6	Vehicular movement • Increase in traffic • Air emissions & Noise • Oil leaks	• Proper traffic management for the construction vehicles • Provision of oil and grease traps to the Storm water drains • Contaminated soil found if any to authorized CHWTSDF • Regular maintenance of vehicles with suitable enclosures and intake silencers • Planning and ensuring effective implementation of the waste movement plan for loading and offsite movement in non-traffic hours	Project Manager	--
	7	Use of DG sets may leads to air and noise pollution	• DG sets with inbuilt acoustic enclosures • Site barricading • Regular maintenance	Project Manager	--
	8	Impact on health of workers Accidents, Hazards, injuries to workers	• Adequate drinking water, canteen, toilet and bathing facilities • First aid facility • Regular health checkup of workers • Risk assessment and preparation of disaster management plan	Safety officer	--

			• Provision of temporary water tank for firefighting and appropriate fire suppression measures • Safety educational and awareness programme • Proper security arrangements		
		OPERATION PHASE			
	1.	Increase in water demand (95 KLD)	• Use of treated sewage for flushing (47 KLD) and gardening (3 KLD) • Use of Treated Waste Water for flushing and gardening resulting in reduction of Net water demand by 34 % • Use of harvested rain water for domestic purpose (8 KLD) and its reuse thereby reducing the fresh water demand up to 87 KLD in monsoon season i.e. 39 %	Project Proponents/ Society/ Facility Management system	Water Act 1974 as amended
	2.	Sewage generation (123 KLD)	• Provision of STP of capacity 140 KL for treatment of sewage up to tertiary level. • Proper operation and maintenance of STP and Daily analysis of general parameters like pH, BOD, COD and TSS & O & G of the STP outlet to ensure good treatment of waste water with the help of sensors • Ventilation around the STP • Proper arrangements for sludge handling and disposal	Project Proponents/ Society/ Facility Management system	--
	3.	Increment in Runoff (0.06 m^3/sec) from site	• Minimizing the incremental runoff from the site with the help of rain water harvesting tanks of total capacity 40 KL. • Proper management of channelization of storm water from site by using proper internal SWD system and two discharge points of having adequate capacity • Use of screens and silt traps to SWD • Proper maintenance of storm water drainage to avoid choking of drains	Project Proponents/ Society/ Facility Management system	SWD NOC from M.C.G.M.

			and flooding on site • Ensure discharge of storm water from the site is clear of sediment and pollution • Provision of sump pumps • External drain of adequate capacity		
	4.	Power demand	Provision of energy saving measures: • Provision of 2 solar powered lights and one fan shall be provided in each flat and solar lighting for common area • Provision of solar water heating system • Provision of electronic ballast • High efficiency pumps & motors • Use Low wattage LED fixtures in common area **Energy saving: 16 %**	Project Proponents/ Society/ Facility Management system	ECBC norms
	5.	Use of DG sets may lead to air and noise pollution	• Stack height as per CPCB norms • Transplantation of trees (29 Nos.) • Good Landscaping with retention of existing trees (34 Nos.) • DG sets with inbuilt acoustic enclosures	Project Proponents/ Society/Facility Management system	CPCB specification
	6.	Vehicular movement • Increase in traffic • Air emissions & Noise • Contamination of soil (if any) leads to Oil leaks	• Provide adequate traffic signs and signages to notify residents • Install safety mirrors to aid visibility in conflict points • Prevent parking near the Entry and Exit Gate • Provide speed humps to regulate speed of vehicles • Provide pedestrian crossings and dedicated footpath to cater to the walking population • Assign traffic wardens to regulate flow of project traffic during peak hours	Project Proponents/ Society/Facility Management system	--
	7.	Odour and unsanitary conditions due to STP and Composting of biodegradable garbage	• Ventilation around STP and OWC area • Proper housekeeping and maintenance	Project Proponents/ Society/ Facility Management system	Air act 1981, as amended

	8.	Municipal waste & other solid waste generation	• Informing and educating occupants for solid waste management • Provision of adequate space for solid waste management • Proper segregation on site to biodegradable and non-biodegradable. • Recyclable waste (47 kg/day): To recyclers • Non-recyclable waste (95 kg/day): To M.C.G.M. • Biodegradable waste (322 kg/day) Treatment in Organic Waste Convertor (OWC) • End product from OWC and sludge generated from STP shall be used as manure on site • Quarterly monitoring of manure	Project Proponents/ Society/ Facility Management system	--
	9	Disasters like Fire, lightning, Earthquake etc.	• Preparation of Disaster Management Plan • Provision of Safety officer, Security and First aid team • Regular review of DMP and mock drill • Effective implementation of DMP	Safety Officer	CFO NOC from M.C.G.M.

List of Enclosure

Sr. No.	Enclosures
1.	DP Remarks and Plan
2.	Geotechnical Investigation Report
3.	Disaster Management Plan
4.	Site Location Map
5.	Surrounding features of the proposed site (within 500 meters)
6.	Contour Plan
7.	Conceptual Plan
8.	Services plan
9.	Air Modeling Dispersion Report
10.	Traffic Report
11.	ECBC Compliance
12.	Disclosure of Consultants
13.	Compliances pertaining to observation raised by SEAC-II

ENCLOSURE - 1

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the Chief Engineer (Development Plan)
Municipal Head Office, 5th Floor, Extn. Building,
Mahapalika Marg, Fort,
Mumbai 400 001

To,
Mr./Mrs. : AAKAR ARCHITECTS CONSULTANTS
Gr. Floor, Satyanarayan Prasad Commercial Centre, Dayaldas Road, Vile parle

No CHE. : SRDP201608111123945

Report Date : 20/08/2016

Sub : Sanctioned Revised Development Plan remarks for the land bearing C.T.S. No(s)51 of MANDPESHWAR Village

Ref : Your Application u/no. DPR111123974 and payment of certifying charges made under Receipt no. 20160631460 dated 20/08/2016

Gentleman/Madam,

Sanctioned Revised Development Plan Remarks for the land shown bounded on the accompanying plan are as under:

Description of the land: C.T.S.No(s) 51 of MANDPESHWAR

Sanctioned Revised Development Plan referred to ward: R

Reservations affecting the land[as show on plan]: PUBLIC HOUSING/HIGH DENSITY HOUSING

Reservations abutting the land[as show on plan]: NO

Designations affecting the land[as show on plan]: NO

Designations abutting the land[as show on plan]: NO

D.P. Roads affecting the land[as show on plan]: EXISTING ROAD 18.30 M

Existing Road: Present

Widening of the existing road to be confirmed from the office of the Executive Engineer (Traffic and Co-ordination)/Assistant Engineer (Survey).

Zones [as shown on plan]: RESIDENTIAL ZONE

Remarks from other Departments/Offices:

Demarcation:

The boundaries of the reservations are subject to the actual Demarcation on site by this office staff along with the representative of A.E. Survey

Note:

If the land under reference is a part of amalgamation/sub division/layout, then specific remarks shall be obtained from the concerned Building Proposal office and development thereof shall be as per the terms and conditions of the approved amalgamation/sub division/layout.Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference.

Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference. Status of the existing road, if any, shall be confirmed from the concerned Ward Office.

The boundaries shown in the accompanying plan are as per the available records with this office. However the boundaries shown in the records of City Survey Office shall supersede those shown in the D. P. Remarks Plan.

The separate remarks as per Draft Development Plan (2034) shall be obtained from the office of Town Planning Officer, 5th Floor, Annexe Building, Municipal Head Office, Mahapalika Marg, Fort, MUMBAI - 400 001.

Validity of this Report is for One Year starting from the report generation date: 20/08/2016

No CHE. : SRDP201608111123945

Note: This is electronically generated report. Hence personal signature is not required. Development Plan,Department R Ward.

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the Chief Engineer (Development Plan)
Municipal Head Office, 5th Floor, Extn. Building,
Mahapalika Marg, Fort,
Mumbai 400 001

To,
Mr./Mrs. : AAKAR ARCHITECTS CONSULTANTS
Gr. Floor, Satyanarayan Prasad Commercial Centre, Dayaldas Road, Vile parle

No CHE. : SRDP201608111123945

Report Date : 20/08/2016

Sub : Sanctioned Revised Development Plan remarks for the land bearing C.T.S. No(s)51 of MANDPESHWAR Village

Ref : Your Application u/no. DPR111123974 and payment of certifying charges made under Receipt no. 20160631460 dated 20/08/2016

Gentleman/Madam,

Sanctioned Revised Development Plan Remarks for the land shown bounded on the accompanying plan are as under:

Description of the land: C.T.S.No(s) 51 of MANDPESHWAR

Sanctioned Revised Development Plan referred to ward: R

Reservations affecting the land[as show on plan]: PUBLIC HOUSING/HIGH DENSITY HOUSING

Reservations abutting the land[as show on plan]: NO

Designations affecting the land[as show on plan]: NO

Designations abutting the land[as show on plan]: NO

D.P. Roads affecting the land[as show on plan]: EXISTING ROAD 18.30 M

Existing Road: Present

Widening of the existing road to be confirmed from the office of the Executive Engineer (Traffic and Co-ordination)/Assistant Engineer (Survey).

Zones [as shown on plan]: RESIDENTIAL ZONE

Remarks from other Departments/Offices:

Demarcation:

The boundaries of the reservations are subject to the actual Demarcation on site by this office staff along with the representative of A.E. Survey

Note:

If the land under reference is a part of amalgamation/sub division/layout, then specific remarks shall be obtained from the concerned Building Proposal office and development thereof shall be as per the terms and conditions of the approved amalgamation/sub division/layout.Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference.

Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference. Status of the existing road, if any, shall be confirmed from the concerned Ward Office.

The boundaries shown in the accompanying plan are as per the available records with this office. However the boundaries shown in the records of City Survey Office shall supersede those shown in the D. P. Remarks Plan.

The separate remarks as per Draft Development Plan (2034) shall be obtained from the office of Town Planning Officer, 5th Floor, Annexe Building, Municipal Head Office, Mahapalika Marg, Fort, MUMBAI - 400 001.

Validity of this Report is for One Year starting from the report generation date: 20/08/2016

No CHE. : SRDP201608111123945

Note: This is electronically generated report. Hence personal signature is not required. Development Plan,Department R Ward.

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the
Chief Engineer (Development Plan)
Municipal Head Office
4th Floor, Extn. Building
Mahapalika Marg, Fort
Mumbai - 400 001

To
M/s. GEE ARCH,
34, ROSHAN APPSAR,
ROSHAN NAGAR,
BORIVALI (W),
MUMBAI-

No: CHE/800/DPWS/R/N

Date: 7 OCT 2013

Sub: Sanctioned Revised Development Plan Remarks for the land bearing C. T. S. No 51 of MANDPESHWAR-M Village

Ref: Your Application u/no. 0011076 and payment of certifying charges made under Receipt no. 1556673 dated 01/10/13

Sir/Madam,

Sanctioned Revised Development Plan Remarks for the land shown bounded blue on the accompanying plan are as under:-

Description of the Land	:	C. T. S. No 51 of MANDPESHWAR-M Village
Sanctioned Revised Development Plan referred to Ward	:	R
Reservations affecting the land [as shown on plan]	:	PUBLIC HOUSING/HIGH DENSITY HOUSING (part of larger reservation)
Reservations Abutting the land [as shown on plan]	:	NIL
Designations affecting the land [as shown on plan]	:	NIL
Designations Abutting the land [as shown on plan]	:	NIL
D.P. Roads affecting the land [as shown on plan]	:	D. P. ROAD (18.30 M)
Existing Roads [as shown on plan]	:	Present

The widening if any, of the existing Road shall be as per the regular lines prescribed by the office of the Executive Engineer (Traffic & Co-ordination)/Assistant Engineer (Survey).

Zone [as shown on plan]	:	RESIDENTIAL ZONE (R)

Remarks from other Departments/Offices:

Demarcation: The Alignment of the proposed road & the boundaries of the reservation is

Further, if there is existing well on the land u/r then specific remarks shall be obtained from Assistant Commisioner R/North ward before any development.

Further, if there is existing Nalla on the land u/r then specific remarks shall be obtained from E. E. (SWD) WS before any development.

Note:

If the land under reference is a part of amalgamation/sub-division/layout, then specific remarks shall be obtained from the concerned Building Proposal office and development thereof shall be as per the terms and conditions of the approved amalgamation/sub-division/layout.

Remarks are offered only from the zoning point of view without reference to ownership and without carrying out actual site inspection and without verification of the status of the structures if any on the land under reference. Status of the existing road, if any, shall be confirmed from the concerned Ward Office.

The boundaries shown in the accompanying plan are as per the available records with this office. However the boundaries shown in the records of City Survey Office shall supercede those shown in the D. P. Remarks Plan.

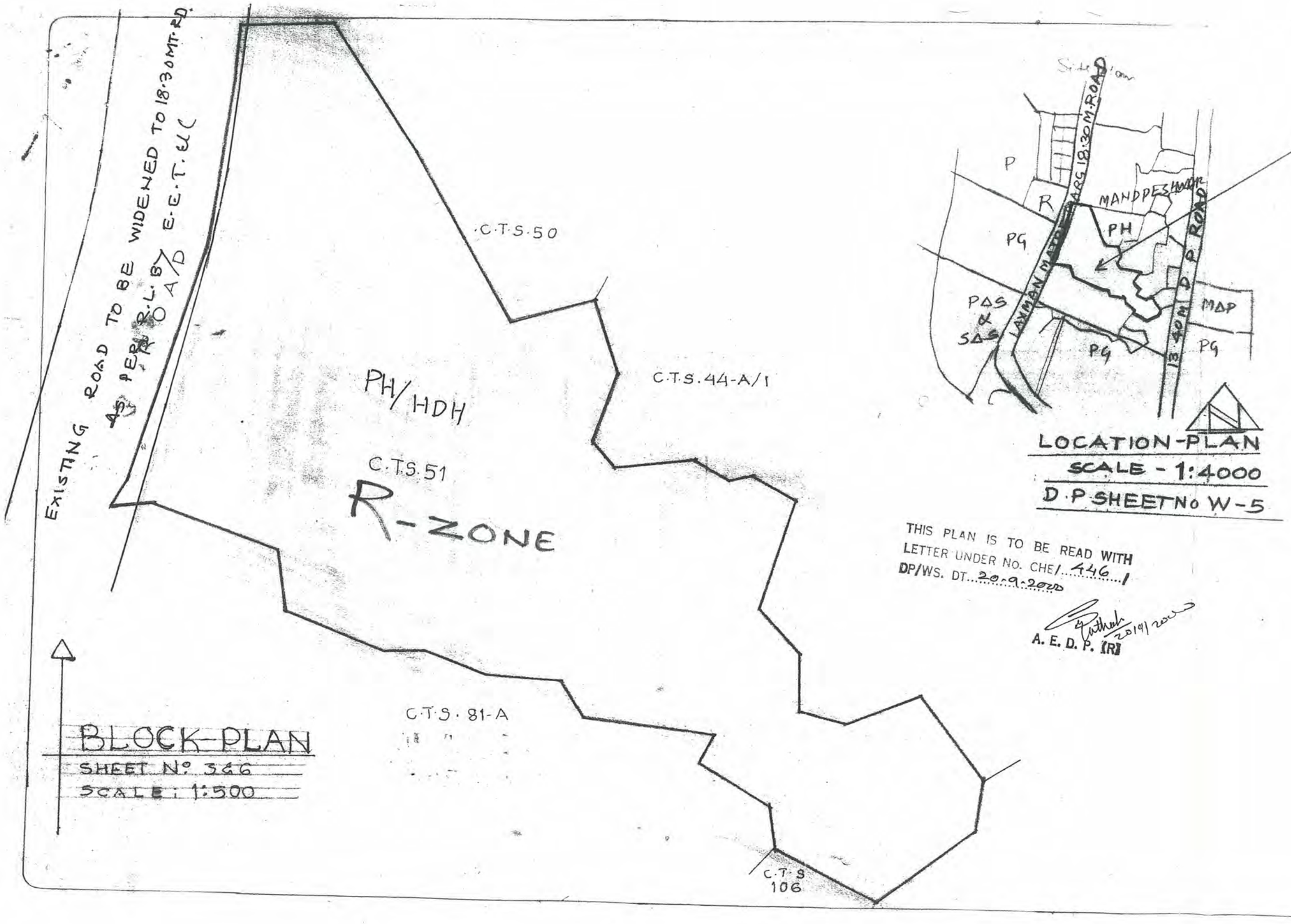
Yours Faithfully

05.10.2017

Acc~1 plan

Assistant Engineer,
Development Plan
(R/N Ward)

~~D.P.~~ Plan.
Block P



THIS PLAN IS TO BE READ WITH LETTER UNDER No. CHE/ 446 / DP/WS. DT. 20-9-2000

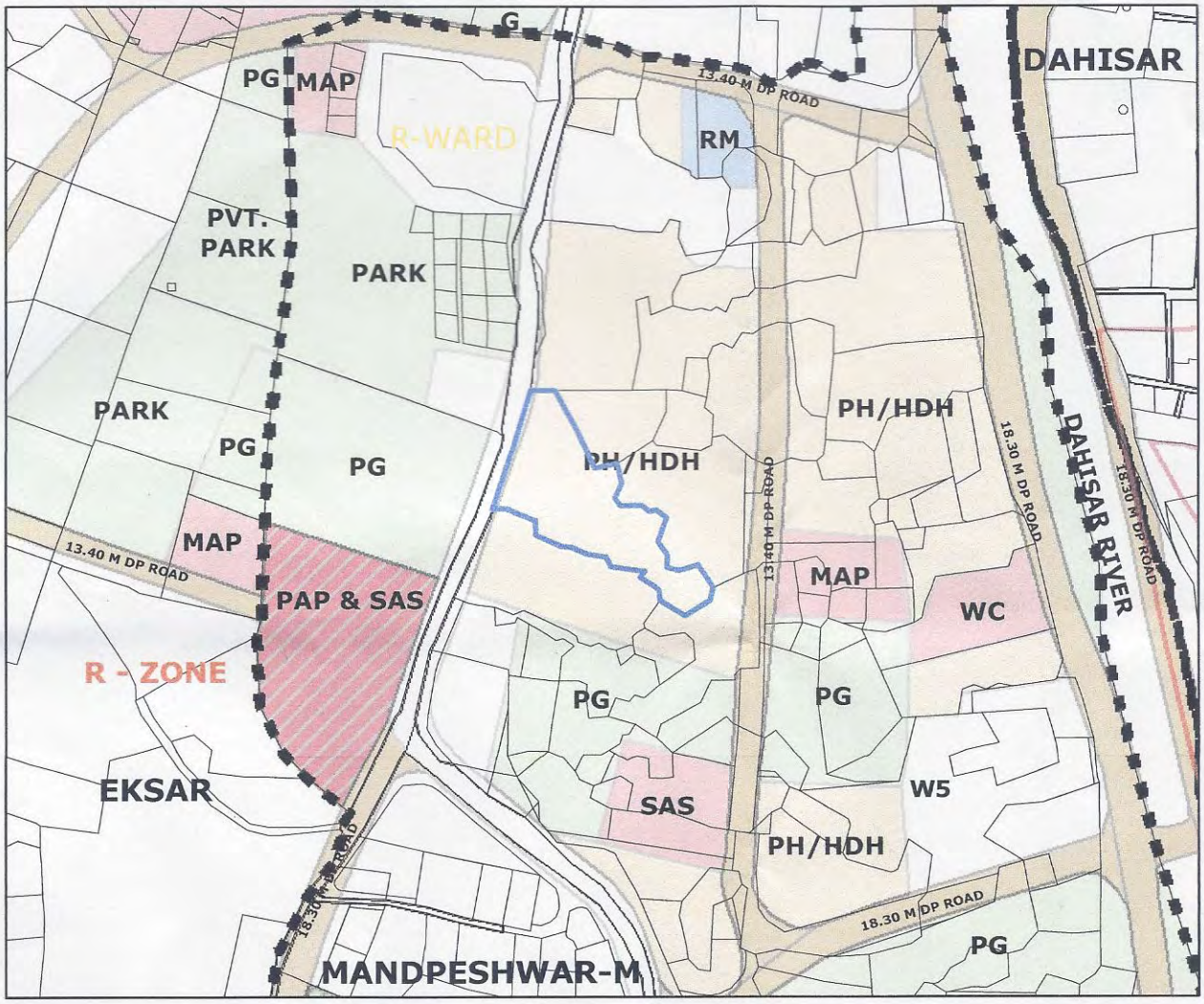
A. E. D. P. (R) 20/9/2000

DESCRIPTION OF PROP
PLAN SHOWING T
PROPERTY BEAR
C.T.S. No 51 OF VIL
MANDPESWAR BOR
MUMBAI 400068

NAME OF THE OWNE
M/S SAGAR VAIBHA CO
HOUSING SOCIETY L

NAME OF THE ARCHITE
Ar. sadanand mhaddalk
Reg. Architect & Regd.
12/3 Parul, Vishwa Bharti S Off. V. P. Road, Andheri (W Mumbai 400 058.

DRN BY	DRG



LOCATION PLAN

Scale 1:4000

GEOCON
Foundation Solutions

Geocon International Pvt. Ltd.

45 Casa Luna Bldg, 1st Floor
L. J. Road No.1, Mahim (W)
Mumbai 400 016, India

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E: geocon@geoconinternational.com
W: www.geoconinternational.com

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RESIDENTIAL BUILDING
AT SAGAR VAIBHAV, DAHISAR
FOR KOLTE PATIL DEVELOPERS LTD.

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GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RESIDENTIAL BUILDING
AT SAGAR VAIBHAV, DAHISAR
FOR KOLTE PATIL DEVELOPERS LTD.

1.0 INTRODUCTION

Kolte Patil Developers Ltd. plans construction of a residential building at sagar vaibhav, Dahisar. The proposed building will consist of 4 Podium + G + 21 upper floors. The work of geotechnical investigation was awarded to Geocon International Pvt. Ltd. The field work and laboratory tests for the geotechnical investigation were completed by Geocon International Pvt. Ltd. in April 2016. This report prepared by Geocon International Pvt. Ltd. presents results of the geotechnical investigation along with foundation recommendations for the proposed building.

2.0 EXPLORATION PROGRAM

2.1 Exploration Scope

Five boreholes (BH-1 to BH-5) were completed at the site as illustrated on the Borehole Location Plan in the Annexure.

2.2 Subsurface Conditions

Subsurface profile at this site consists of fill overlying residual soils underlain by basalt bedrock. Encountered soil/rock layers are described below;

LAYER I: FILL

Fill, consisting mostly of clay with boulders were encountered at the ground surface in the boreholes. The lower boundary of this layer was encountered at depths of 1.0m to 2.0m below ground surface in the boreholes.

LAYER II: RESIDUAL SOILS

Residual soils, consisting mostly of clay and boulders were encountered below fill layer in the boreholes. Based on Standard Penetration Tests (SPT) conducted within this layer, consistency of cohesive soils (clay) varied from stiff to very stiff. The lower boundary of this layer was encountered at depths of 2.6m to 3.0m below ground.

LAYER III: COMPLETELY WEATHERED ROCK

Completely weathered bedrock was encountered at depths of 2.6m to 3.0m below ground surface. This layer is formed by the complete in-place disintegration of parent bedrock material, but still partially retains the original rock mass structure. SPT tests conducted in

this layer encountered refusals. Core recoveries were typically less than 30%. The lower boundary of this layer was encountered at depths 2.0m to 5.0m below ground surface.

LAYER III: BASALT BEDROCK

Greyish basalt bedrock was encountered at depths of 2.0m to 5.0m below ground surface. The bedrock was completely weathered to sound, generally improving with depth. Core Recoveries varied between 36% and 100%, while Rock Quality Designation (RQD) ranged between Nil and 100%. Compressive strength from rock samples ranged between 731kg/cm^2 and 953 kg/cm^2. The boreholes were terminated in this layer at a depth of 10.0m below ground surface.

2.3 Ground water Levels

Groundwater accumulation in boreholes was monitored during and after completion of drilling activities. Groundwater was observed at depths of 1.5m and 1.7m below ground surface. Seasonal and annual fluctuations in ground water levels can be expected.

3.0 FOUNDATION RECOMMENDATIONS

Hard Bedrock was encountered at depths of 2.0m to 5.0m below ground surface. Spread/raft foundations for proposed building supported on the hard bedrock, can be designed for a maximum net allowable bearing capacity of up to150 t/m^2. Founding strata can be identified as it offers complete refusal to bucket excavators. Depths to hard rock are given in Table A below.

TABLE A
DEPTHS TO HARD ROCK

BOREHOLE NUMBER	DEPTHS TO HARD ROCK
BH-1	5.0m
BH-2	5.0m
BH-3	4.0m
BH-4	2.1m
BH-5	2.0m

Maximum settlement of foundations will be less than 10mm. Modulus of subgrade reaction of 10000 t/m3 can be utilized for design of foundations. Excavation sides should be sloped at a maximum slope of 1:1 (horizontal: vertical) or flatter, within the top 3.0m and 1:2 (hor:vert) below this depth.

3.1 Foundation Protection

Results of chemical analysis on groundwater samples enclosed in the Annexure, indicate that the site falls under Class 1 for sulphate concentrations and chloride concentrations (As per IS456 and as per CIRIA Sp. Publication No. 31). A 'moderate' Exposure Condition was assigned to this site. Therefore only following normal precautions are recommended to protect subsurface concrete and reinforcement.

Type of Cement:	OPC or PPC
Minimum Grade of Reinforced Concrete:	M25
Minimum Cement Content for spread footings:	300 kg/m^3
Maximum Water Cement Ratio:	0.50
Minimum Cover to Reinforcement:	50mm

4.0 FIELD EXPLORATION PROCEDURES

The sub-surface investigation was completed generally as per IS: 1892-1979. The field investigation was carried out using a rotary machine. Casing was used to support sides of borehole until sufficiently stiff strata was encountered. Standard Penetration Tests (i.e. SPT) were carried out in soil in accordance with IS 2131-1981. Using this procedure, a 2" outside diameter split-barrel sampler is driven into the soil by 63.5 kg. weight falling through 75 cm height. After an initial set of 15cm, the number of blows required to drive the sampler an additional 30 cm, is known as the "penetration resistance" or "N value".

When SPT refusal was obtained in hard strata, rock coring was done using diamond bit and double tube core barrel to obtain rock samples. Percent Rock Core Recovery and Rock Quality Designation (%RQD) were determined. % RQD = 100 x Sum of length of rock pieces in cms, each having lengths greater than 10cms/Total length of core run.

Sincerely,

GEOCON INTERNATIONAL PVT.LTD.

JaydeepWagh
B.E., M.S., P.E. (Geotechnical)

REFERENCES

1) IS 456: 2000, Plain & Reinforced Concrete – Code of Practice, Fourth Revision

2) IS 12070: 1987, Code of Practice for Design and Construction of Shallow Foundations on Rocks

3) Foundation Analysis and Design, J.E. Bowles, McGraw Hill Publication, 5th Edition, 1996.

4) IS 8009: 1976, Code of Practice for Calculation of Settlement of Shallow Foundations, Part-I Shallow Foundations Subjected to Symmetrical Static Vertical Loads.

SAMPLE CALCULATION OF ALLOWABLE BEARING CAPACITY FOR FOUNDATIONS ON HARD BEDROCK

GL +0.0m

Layer I, Fill

-1.0m to -2.0m

Layer II, Residual Soils

-2.0m to -5.0m

Layer III, Basalt Bedrock

Allowable bearing capacity = (Nj) x Qu (Ref. 2, Clause 6.2, pg. 7)

Where,
Nj = Joint condition factor = 0.1 to 0.4 (Ref. 2, Table 4, clause 6.2, pg. 9)
Assumed as 0.1 for slightly weathered rock

Qu = Rock Compressive strength = minimum of 7310 t/m^2 (Annexure, Laboratory Test Result)

Therefore, Allowable Bearing Capacity = (0.1) x 7310 = 731 t/m2

Conservatively restricted to 150 t/m2

B) SETTLEMENT OF FOOTINGS (3mx3m) EXERTING PRESSURE OF 150 T/M2.

Settlement = $S = q_0 B' \frac{1-\mu^2}{E_s} m I_s I_f$ (Ref. 3, 5.16a, pg. 306)

Where,
q_0 = Footing Pressure = 150 t/m2
B' = B/2 (Where B is the width of footing)
U = Poisson's ratio
E = Modulus of Elasticity
I_s = Influence Factor
I_f = Depth Factor

From Reference No. 1:
E value for Basalt bedrock = 17,00,000 t/m^2 (Ref. 3, Table 4-11, pg. 278)
Using 1/10th of this value for weathered bedrock, E = 170,000 t/m^2

L' =3/2 =1.5, B' = 3/2 = 1.5, H=15m, and D=2.0m
Therefore, M=L/B=1; and N=H/B'=10 and D/B=0.67
Corresponding, I_s = 0.53 (Ref. 3, Table 5.2, pg. 304 & 305)
I_f = 1.0 (Ref.3, Fig. 5.7, pg. 303)

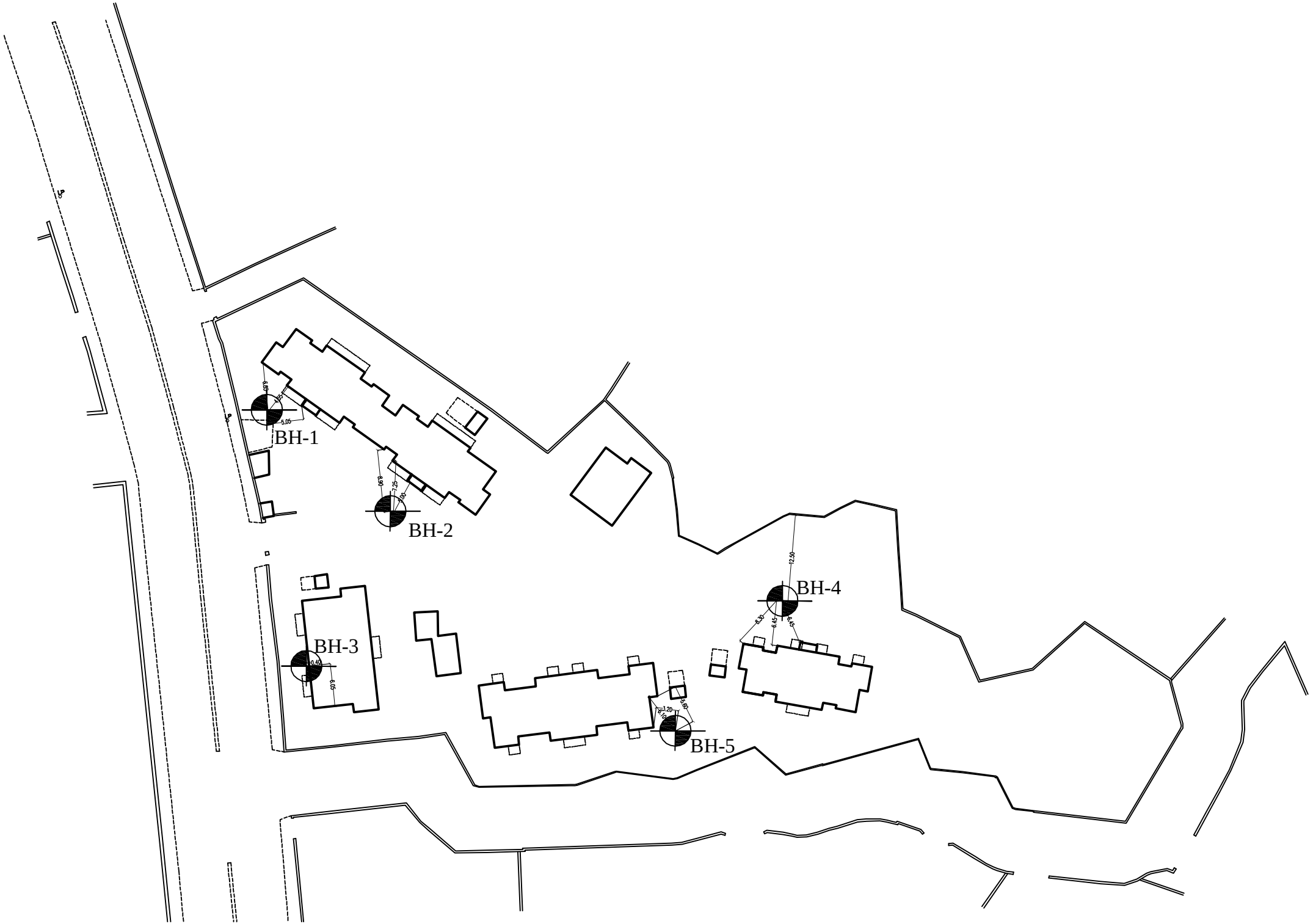
Settlement of Layer = $S_1 = 150x1.5x\frac{1-0.25^2}{170{,}000}x4x0.53x1.0$

Settlement of Layer = S_1= 0.0026m = 2.63mm

TOTAL SETTLEMENT = 2.63mm

ANNEXURE

LOCATION PLAN


BH-1
BH-2
BH-3
BH-4
BH-5

BOREHOLE LOGS

GEOTECH

CLIENT :- KOLTE PATIL DEVELOPERS LIMITED

EXPLORATION :- SOIL INVESTIGATION WORK FOR PROPOSED BUILDING AT SAGAR VAIBHAV, DAHISAR.

BORE HOLE NO :- 1(ONE)

FINAL DEPTH :- 10.00 M

METHOD OF BORING :- ROTARY WASH METHOD

R.L.

LOCATION :- REFER LOCATION PLAN

DATE OF COMMENCEMENT :- 03-04-2016

CH .

GROUND WATER LEVEL :- 1.50 M BELOW G.L.

DATE OF COMPLETION :- 04-04-2016

BORELOG

CASING	DEPTH (M)	R.L. (M)	THICKNESS OF LAYER	LOG	VISUAL DESCRIPTION OF STRATA	FIELD TEST	TYPE OF SAMPLE	CORE DRILLING: CORE PIECES	CORE DRILLING: RECOVERY % (25 50 75 100)	CORE DRILLING: R.Q.D. % (25 50 75 100)	REMARKS === WASH WATER COLOUR
100MM Ø B	0.00										
	1.00		1.00		FILLING		DS1				
	2.00		2.10		YELLOWISH BROWN SILTY CLAYEY GRAVELS	SPT1 2.00 TO 2.20 M CMS 15 05 BLS 15 50 N >50	WS1 SPT1				
	2.20										
	3.00					SPT2 3.00 TO 3.10 M CMS 10 BLS 50 N >50	WS2 SPT2				
	3.10				YELLOWISH BROWN COMPLETELY WEATHERED ROCK						ROCK STARTED AT 3.10 M
	4.00					SPT3 4.00 TO 4.12 M CMS 10 BLS 50 N >50	WS3 SPT3				
	4.12								10		
	5.00		1.90		BROWNISH GREY HIGHLY WEATHERED JOINTED AMYGDALOIDAL BASALT		SP	SP	36		
	6.00						C.P.	1-5	46		
	7.00		2.00				C.P.	6-12	75	18	
	8.00				DARK GREY MODERATELY WEATHERED TO SLIGHTLY WEATHERED JOINTED AMYGDALOIDAL BASALT		C.P.	13-19	75	28	
	9.00						C.P.	20-26	84	42	
	10.00		3.00				C.P.	27-33			

A:- 75 MM Ø **B:-** 'NX' DOUBLE TUBE CORE BARREL

LOG: GRAVEL, SAND, SILT, CLAY, FILLING, BOULDERS, WEATHERED FORMATIONS, SOFT ROCK, HARD ROCK

ABBRV

DS :- DISTURBED SAMPLE
WS :- WASH SAMPLE
WO :- WATER SAMPLE
UDS :- UNDISTURBED SAMPLE
CP :- CORE PIECES
SP :- SMALL PIECES
SPT :- STANDARD PENETRAITION TEST
VST :- VANE SHEAR TEST

SCALE :- VER :- 1:100 HOR :- N.T.S.

DATE :- 18-04-2016

DRN BY :- RAJESHREE

CHKD BY :- RAJIV

Agency :- M/s Zed Geotechnics & Const. **(Geotechnical Engineers)**

We Undertake :- Soil Investigation (Land & Marine), Piling/Rotary Piling, Micropiling, Drilling & Grouting, Rock Anchoring

Address :- 4/8, Kamana CHS., K. Gadgil Marg, Prabhadevi, Mumbai 400 025.

Tel.Nos:- **022-24221574, 4315305** Fax:- **91-22-24221574** Mobile:- **09821065636** E-mail:- **prasad_zantye@yahoo.com**

REFERENCE NO- .

6545

LABORATORY TEST RESULTS

SOIL TEST DATA SHEET

PROJECT : PROPOSED RESIDENTIAL BUILDING AT SAGAR VAIBHAV, DAHISAR

Client: KOLTE PATIL DEVELOPERS LTD.

DATE: 25.04.16

Bore Hole No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits				Shear Strength Test			Unconfined Compression Test Kg/cm^2	free swell index	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Shrinkage Limit %	Shrinkage Ratio	Cohesion C_u kg/cm^2	Degree ϕ			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH-01	3.00-3.10	SPT2	-----	-----	-----	SM	6	80	14		-----	-----	NP		-----	-----	-----	-----	-----	-----	-----	-----	
BH-02	2.00-2.60	SPT 1	-----	-----	-----	CI	0	44	56		42	20	23		-----	-----	-----	-----	-----	-----	-----	-----	
BH-03	2.00-2.60	SPT 1	-----	-----	-----	SC	0	65	35		40	20	20		-----	-----	-----	-----	-----	-----	-----	-----	
BH-04	1.50-2.10	SPT 4	-----	-----	-----	SC	0	58	42		41	21	20		-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> Combined Silt + Clay

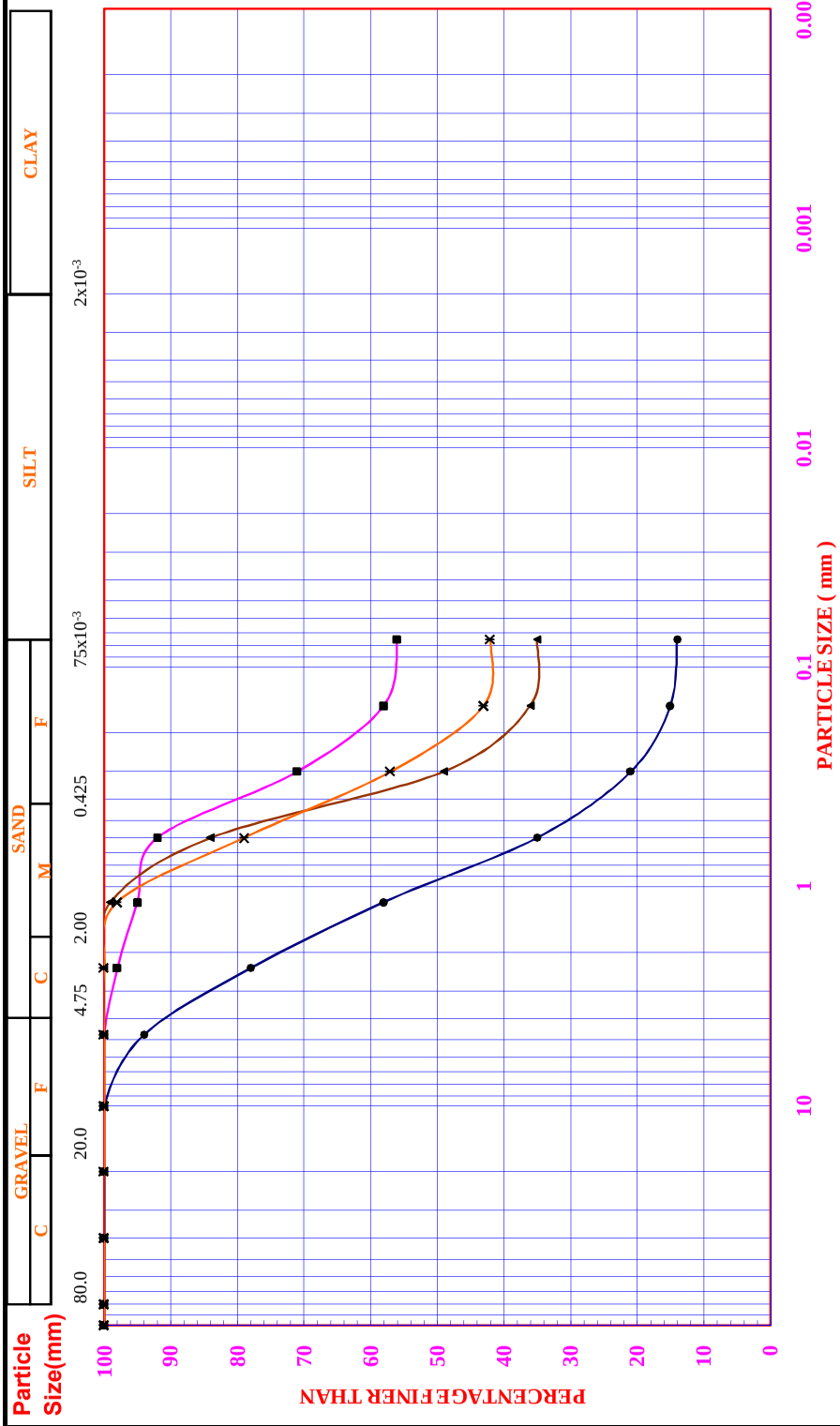
GEOTEK CONSORTIUM

Job. No. : **L-16/107**

GRAIN SIZE DISTRIBUTION ANALYSIS

PROJECT: PROPOSED RESIDENTIAL BUILDING AT SAGAR VAIBHAV, DAHISAR

CLIENT: KOLTE PATIL DEVELOPERS LTD.



Symbol	Bore Hole No.	Depth in m.	Classification (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●	BH-01	3.00-3.10	SM	6	80	14		-----	-----	-----	-----	-----	-----	-----	NP	SPT2
■	BH-02	2.00-2.60	CI	0	44	56		-----	-----	-----	-----	-----	42.3	19.5	22.8	SPT 1
▲	BH-03	2.00-2.60	SC	0	65	35		-----	-----	-----	-----	-----	39.5	20.0	19.5	SPT 1
✱	BH-04	1.50-2.10	SC	0	58	42		-----	-----	-----	-----	-----	41.3	21.0	20.3	SPT 4
◆																

GEOTEK CONSORTIUM

Job No. : L-16/107

ENCLOSURE - 3

DISASTER MANAGEMENT PLAN

Redevelopment Of "Sagar Vaibhav Co-op Housing Society Ltd."

At

CTS. No 51 at Mandapeshwar,
Dahisar(w) , Mumbai

M/S. KOLTE-PATIL DEVELOPERS LTD.

Prepared by

Ultra-Tech Environmental Consultancy & Laboratory
(Gazetted By MoEF)

Unit No. 224, 225, 206 Jai Commercial Complex, 463, Eastern Express Highway, Opp. Cadbury Factory, Khopat, Thane (W) .400601.

REVISION NO. 0 **COPY No.: 1**

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DISASTER MANAGEMENT PLAN

1. 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.

2. DISASTER MANAGEMENT PLAN

Disaster management is defined as the discipline of avoiding and dealing with natural risks. The whole process involves a preparation plan for the impending disaster, action in response to a disaster, and support and strength to rebuild a community after the occurrence of a disaster. Disaster management is very important for any building. It makes the occupant aware of the various disasters possible in a building, prevention & procedures, training in disaster management, and after-disaster procedures for building objects.

In general, disaster management is a continuous process that aims to manage and minimize hazards. Under disaster response, there are a variety of actions to take like evacuation quarantine, mass decontamination, and the like. Disaster management has its own advantages. Some of these are:

- Reduces the effects of a disaster's aftermath
- Gives the chance to survive, no matter what kind of a disaster occurs and irrespective of when it occurs
- Gives you peace of mind from the uncertainties of close encounters to unexpected and dangerous natural events
- Minimize the effects of the accident on people and property
- Initiate the rescue and medical treatment of casualties;
- Bring the incident under control
- Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency
- Investigate and take steps to prevent recurrence of similar incidents
- Inform and collaborate with statutory local and state authorities

DMP follows the Basic structure as shown in Figure 1

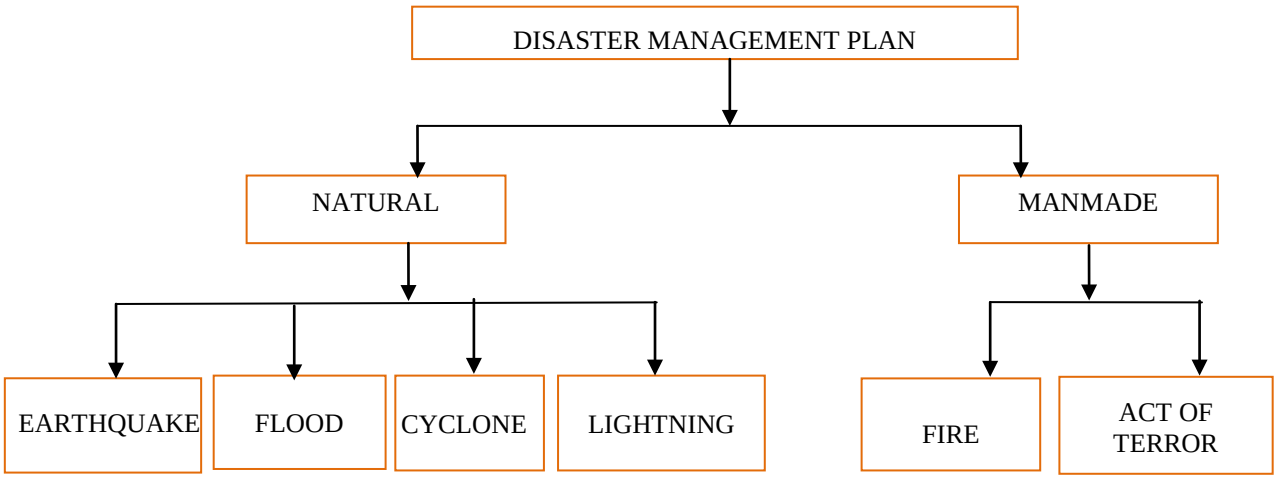


Figure 1: Basic Structures of DMP

3. CONSTRUCTION PHASE

i. Risk assessment and Vulnerability Analysis of Possible Disasters

Risk assessment study deals with identifying and evaluating the magnitude of impending risks to which the neighboring population is exposed due to occurrence of accidents involved in the project construction and development.

Hazard Identification: Physical, Chemical, Mechanical, Electrical, Vibration & Occupational health hazards during construction phase

Risk of body injury, Injury to eyes, fatal accident, Fire and explosion, Hearing loss etc.

- ***Are you using (Tick Boxes)***

[√] Plant/Equipment
[√] Portable electrical equipment
[√] Hazardous substances
[√] Scaffolding
[√] Ladders
[√] Lifts/Hoists/Cranes/Load shifting machinery

- ***Does the project/task involve (Tick boxes)***

[√] Using tools/equipment with moving part(s)
[√] Using tools/equipment that vibrate
[x] Working with x-rays or lasers
[√] Electrical wiring
[x] Asbestos removal
[√] Welding
[√] Hazardous waste
[√] Excavation / Trenches (>1.5m)
[√] Working around electrical installations
[x] Working near traffic
[√] Working at a height (>3m)
[√] Working in isolation
[√] Working in a confined space
[√] Manual handling
[√] Repetitive or Awkward movements
[√] Lifting or Moving awkward or Heavy objects
[√] Demolition work

- ***Is there (Tick boxes)***

[√] Noise
[√] Dust/Fumes/Vapours/Gases
[√] Extreme températures
[√] Risk of fire/explosion
[√] Slippery surfaces/Trip hazards
[x] Poor ventilation/Air quality
[x] A poorly designed work area for the project/task

- **Risk Assessment:**

The details are explained below:

The calculation involves following 4 steps to complete the assessment:
Step-1 Consider how likely a risk is encountered and what might happen (Likelihood-L)
Step-2 Use the risk level calculator to determine the likely risk level to persons who may be exposed to the hazards.
Step-3 Determination of Risk level outcome.
Step-4 Identify & develop effective control measures.

1. ***Livelihood of event occurring***

Livelihood of event occurring	
Almost certain	**Event is expected to occur in most circumstances**
Likely	**Event will probably occur in most circumstances**
Possible	**Event might occur at some time**
Unlikely	**Event could occur at some time**
Rare	**Event may occur only in exceptional circumstances**

2. Consequences level of Event occurring

Level of consequences	
Catastrophic (C)	**Fatality or permanent disability: toxic releases of chemicals, long term environmental impact; loss of facilities: very high financial loss**
High (H)	**Long–term illness or serious injury; serious medium –term environmental effects; major property damage; loss of production; high financial loss**
Moderate (M)	**Medical treatment requiring up to several days off works; spillage contained with outside assistance; significant property damage; med-high financial loss.**
Low (L)	**Minor injury requiring First-Aid; spillage contained on site; moderate property damage; low- mined financial loss.**
Insignificant (I)	**No injuries; minor property or environmental damage; very low financial loss**

3. Determination of Risk level Outcomes.

Livelihood / *Consequences*	*Almost certain*	*Likely*	*Possible*	*Unlikely*	*Rare*
Catastrophic (I)	**E**	**L**	**E**	**E**	**H**
High(H)	**E**	**E**	**E**	**H**	**M**
Moderate(M)	**E**	**H**	**M**	**M**	**L**
Low (L)	**H**	**H**	**M**	**M**	**L**
Insignificant (I)	**H**	**M**	**L**	**L**	**L**

Where
E-Extreme
H-High
M-Medium
L-Low

4. Determination of Risk Control Actions

No.	Risk level Outcome	Action Required
1.	Extreme-E	URGENT- Immediate action required to control risk
2.	High-H	Highest management decision required urgently
3.	Medium-M	Follow management instructions regarding risk
4.	Low-L	These risks may not require immediate attention- monitor

Table 1: Risk Assessment during Construction Phase

Assessment / *Disaster*	*Livelihood of event occurring*	*Level of consequences*	*Risk level Outcomes.*	*Risk Control Actions*
Earthquake	*Unlikely*	*Moderate*	*Medium*	*Follow management instruction/Follow SOP*
Flood	*Possible*	*High*	*high*	*These risks may require immediate attention monitor/Follow SOP*
Fire	*Unlikely*	*High*	*High*	*Follow management instructions /Follow SOP*

Lightning	***Unlikely***	***Moderate***	***Medium***	***These risks may require immediate attention monitor/Follow SOP***
Power Failure	***Rare***	***Low***	***Low***	***These risks may require immediate attention monitor/Follow SOP***
Fall from Height	***Almost Certain***	***High***	***Extreme***	***Immediate action required to control risk / Follow management instructions regarding risk/Follow SOP***

Table 2: Vulnerability Analysis

	Air Pollution	**Water Pollution**	**Noise Pollution**	**Soil Pollution**	**Occupational Hazard**
A. Material Handling:					
Cement	**+M**	**+L**	**-**	**+M**	**+M**
Steel	**-**	**-**	**+**	**-**	**+M**
Sand	**+L**	**-**	**-**	**-**	**+M**
Stone	**-**	**-**	**+M**	**-**	**+L**
Plywood dust	**-**	**-**	**+M**	**-**	**+L**
Glass	**-**	**-**	**-**	**-**	**+M**
Hardware	**-**	**-**	**-**	**-**	**+L**
Paint /Varnish Color	**-**	**+H**	**-**	**+M**	**+M**
B. Construction Machinery					
Excavation	**+M**	**-**	**+H**	**-**	**+L**
Tower crane	**+L**	**-**	**+L**	**-**	**+H**
Material Lift	**-**	**-**	**+L**	**-**	**+H**

Risk Factor:

+ : Positive
- : Negative
L : Low
M : Medium
H : High

ii. Mitigation Measures & preparedness

For any projects/tasks that present a high or extreme risk, a Safe Work Method statement must be completed.

- ***Note how you will control the risk following the priorities listed to the right. This may include controls like redesigning the workplace, using guards or barriers, ventilation, using lifting equipment or personal safety equipment.***

1. Eliminate the hazard
2. Installing Safety net for height fall
3. Keep the people away from the hazard
4. Change work methods
5. Conducting induction training, safety training & mock drills.
6. Use of Personal protective equipment at work.

- ***Note any specific risk assessments required for high-risk hazards. Check whether any hazards noted in step 2 require further assessment or action***

[√] Hazardous substance risk assessment
[√] Confined spaces risk assessment
[√] Test and Tag electrical equipment
[√] Sound level test

[√] Inspection of scaffolding

- ***Note Permits/Licenses/Registration required***

[√] Demolition work
[√] Electrical wiring
[√ **]** RMC pumps
[x] Friable asbestos removal
[x] Ionizing radiation sources
[√] Registers for Personal protective equipment, training, ladders, lifting gear etc

- ***Note certificates of competency/licenses for operators***

[√] Scaffolding
[x] Rigging
[√] Load shifting machinery operation
[x] Pesticide application
[x] Crane operation
[√] Hoist operation

- ***Note emergency systems required***

[√] First aid kit
[√] Extended first aid kit
[√] Emergency stop button
[√] Additional emergency procedures
[√] Fire control
[x] Remote communication mechanism
[x] BMS System

Table 3: Risk and Mitigation Measures

Sr. No.	Operations	Risk	Mitigation Measures
1.	Tower Crane	➢ Injury ➢ Fatal Accident ➢ Contact with high voltage live wires	➢ Inspected by Competent person. ➢ Operated by Trained & Certified person. ➢ Use of work permit system ➢ Use of PPA/PPE and Safe Operating Procedures (SOP).
2.	Construction/material Hoists	➢ Personal Injury ➢ Accidents	➢ Only approved hoist to be used by trained employees with safe area demarcation ➢ Inspection by competent person. ➢ Safe work instruction ➢ Testing before use for SWL ➢ Use of PPE/PPA and Fencing
3.	Passenger lift	➢ Fatal /Major accident	➢ Certified/approved passenger lifts to be used by trained employees with safe area demarcation. ➢ Use of PPA/PPE
4.	Portable electrical equipment	➢ Burns/Fatal	➢ To be checked before use by approved electrical safety official. ➢ Use of PPA/PPE
5.	Rock breaking machine	➢ Permanent disability ➢ Respiratory diseases ➢ Twists and sprains ➢ Electrocution	➢ Wear proper PPE ➢ Place the compressor as far as possible from the work area to reduce the level of noise. ➢ Use water suppression and/or respiratory equipment to limit exposure levels. ➢ Proper inspection
6.	Pressure Vessels	➢ Blast effects ➢ Suffocation ➢ Fire explosion ➢ Chemical Burns	➢ Operating at threshold pressure ➢ Inspection by Authorized and Competent persons ➢ Providing safety training for employe

Sr. No.	Operations	Risk	Mitigation Measures
		➢ Permanent injuries	
7.	Hazardous substances	➢ Fire explosion ➢ Toxic release ➢ Unhygienic dust	➢ Always review the Material Safety Data Sheet (MSDS) before using. ➢ Store as per HAZMAT Rules. ➢ Use of PPA/PPE. ➢ Avoid direct contact with hazardo substances.
8.	Scaffolding	➢ Fall from Height ➢ Fatal accident	➢ Only Trained and Skilled person should be allowed. ➢ Check the straightness of wood ➢ Ensure all rope joints are properly tightened. ➢ Scaffolds must use full body harness and should be properly hooked where possible.
9.	Ladders	➢ Accident. ➢ Lifting Injury ➢ Unstable base ➢ Fall from ladder	➢ Training on Ladder selection and setup. ➢ Inspection program. ➢ Require 3 Points of contact. ➢ Basket/Belt for tools and materials.
10.	Material Lift	➢ Accidental ➢ Injury even fatal	➢ Inspection by competent person ➢ Details of the load to be lifted must be entered in Risk assessment form. ➢ Following Emergency Procedures relating to lifting equipment. ➢ Use of PPEs and Safety Guards
11.	Material handling cranes	➢ Accidental ➢ Injury even fatal	➢ Inspection by competent person ➢ Ergonomic training ➢ Use of PPE/PPA and Safety guards
12.	Using tools/equipment with moving part(s)	➢ Nipping ➢ Injury to Hand ➢ Electrical Shocks ➢ Leg Injury	➢ Proper selection of Hand tool ➢ Periodic Inspection ➢ Use of PPE/PPA ➢ Safety guard in case of Grinder
13.	Using tools/equipment that vibrate ➢ Electrical wiring ➢ Welding	➢ Vibration hazard ➢ Electrical shocks ➢ Asbestosis ➢ Eye and Body burns ➢ Toxic gases inhalatio	➢ Work permit only to authorized person. ➢ Remove all flammable material, such as cotton, oil, gasoline, etc. from the vicinity. ➢ Wear Safety Goggles ➢ Use of PPE ➢ Keep a suitable fire extinguisher nearby at all times.
14.	Working around electrical installation / working at a height (>3m) / Working in isolation. Working in a confined space	➢ Electrical shocks ➢ Injury ➢ Fatal accident ➢ Hazard of toxic gases inhalation	➢ Work permit only to authorized person. ➢ Uses of work permit system. ➢ Use of PPE/PPA ➢ Indian electrical safety rules to be followed
15.	Work environment ➢ Noise ➢ Dust/Fumes	➢ Accidental injury ➢ Occupational hazards	➢ Enclose noise source ➢ Lubrication ➢ Min time exposure

Sr. No.	Operations	Risk	Mitigation Measures
	➢ Extreme températures ➢ Slippery surfaces/ trip hazards ➢ Poor ventilation/ air quality ➢ A poorly designed work area for the project/ task	➢ Burn and Rashes ➢ Skin diseases	➢ Use of PPE/PPA ➢ Good Housekeeping ➢ Illumination survey ➢ Trainings

a) Prepare SOP's for each disaster and for evacuation when necessary: All SOP's are attached to DMP.

❖ **EXCAVATION ACTIVITY**

➢ **Excavation Risks:**

- The most common hazard at any work site is the threat of cave-in. A cave-in occurs when walls of an excavation collapse
- Accidental contact with utility lines
- Crushing and striking hazards posed by mechanized equipment
- Materials/Equipment falling into excavation site
- Dust inhalation
- Asphyxiation
- Faulty equipment
- Explosion
- Fall Hazard

➢ **Mitigation:**

- Re-route traffic whenever possible, and keeping only the heavy; Construction equipment needed near the excavation
- All excavations shall be inspected daily by the Competent Person
- Spoil piles will be placed a minimum of 2 feet away from the edge of the excavation/trench
- All excavations shall be properly sloped, benched, or shielded.
- If the excavation is 2m or more deep, provide substantial barriers, e.g. guard rails etc
- Emergency evacuation drill will be carried before monsoon
- Workers shall not enter excavations, if water has accumulated.
- Fence off all excavations in public places to prevent pedestrians and vehicles falling into them
- An emergency rescue plan should be in place before work begins inside an excavation.
- All excavations must be suitably lighted during the hours of darkness
- Trenches 4 m or more feet deep need a safe means of egress
    - Stairway
    - Ladder
    - Ramps
- Metal ladders may not be used, if they may come in contact with electrical lines.
- No worker is allowed underneath loads handled by lifting or digging equipment.
- Means of egress shall kept fixed and secure
- High visibility vest/waistcoat including protective boots, Ear protection and Protective helmets must be worn while working in the excavation.
- Means of egress shall kept fixed and secure

❖ **OTHER CONSTRUCTION ACTIVITIES**

➢ **Other Risk & Hazard area during construction activities:**

- Tower crane lifting
- Gas cutting & welding
- Bar Bending & Bar cutting
- Plywood cutting & drilling
- Height working
- Material storage

➢ **Mitigation for other risk & hazard area:**

- After safety officer inspection tower crane shall be operated under the direction of EHS engineer. Electrical cables &its condition & working shall be examined by competent person periodically. Fork and sling will be examined by engineer and worker before operating. Certified employee will be appointed for job
- Trained & experienced employee will be appointed for gas cutting & welding activities. Appropriate safety measures will be taken for cylinder storage and its equipments. Pressure regulator valve, nozzles, blow pipe, flexible hose and flash back arrester shall be checked by safety officer before workers operating. Appropriate PPE's shall be given to employee & also will ensure its use. Hand held helmet with filter lens shall be provided to welding/cutting operator to prevent his eye vision
- Trained & experienced employee will be appointed for bar bending & cutting activities. Sufficient space will be provided for job. Appropriate PPE's shall be given to employee & also will ensure its use
- Trained & experienced employee will be appointed for Ply cutting & drilling. Sufficient space will be provided for job. Appropriate PPE's shall be given to employee & also will ensure its use
- Safety belt, harness and lifeline with PPE's shall be provided to workers working at height. Such activities will be carried out under safety supervisor's supervision
- All noise creating machines shall be installed with insulation & rubber padding
- All the materials should be stacked on the leveled ground, all the materials should be stacked, providing good aisles between them for receiving the materials
- Diesel & Petrol above 1000 litres or 32 litres shall be stored as per The Petroleum Act

Initially with first preference Safety team had been formed to control & reduce the possible hazards and risk which may occur. A detail of safety committee is been described below:

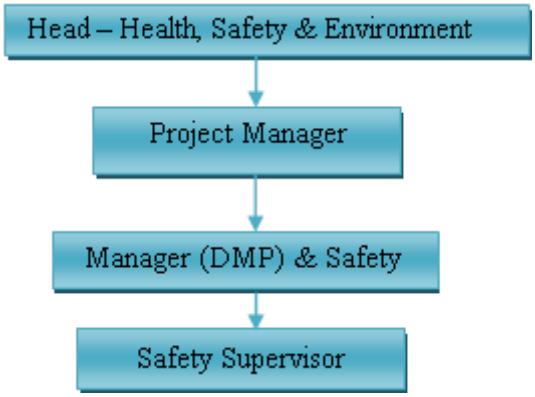


Figure 2: Organization Chart of Safety Committee

➢ **Roles & Responsibilities:**

Position: Project Manager

The responsibilities and duties shall include the following:

- Responsible for completion of the project with the relevant statutory rules and regulations.
- Responsible to ensure that all staff & workmen are competent to perform their tasks safely in Disaster

- Ensuring that workmen is effectively implemented engineers solutions during evacuation process
- Establishing adequate control measures for the employee's fitness in order to avoid fatigue, stress, extended working etc.
- Make arrangement and ensure that required inventory resources are available or not to tackle disaster
- Make arrangement of fund from the management to purchase required equipment for tacking any disaster.

Position: Manager (DMP) & Safety

The responsibilities and duties shall include the following:

- Take necessary actions and decisions during an excavation
- Allotting an certified contractors for an job
- Ensure the quality and durability of all necessary equipment and aids required for construction
- Ensure the quality and durability of all necessary equipment required to tackle any disaster
- Should contact outer bodies, police, fire brigade & emergency rescue team for evacuation during any disaster
- Should prepare a team and allot the roles & responsibilities to team members for an evacuation during any Disaster
- Go through the checklist filled by an HSE Engineer to maintain the safe working

Position: Safety Supervisor

The responsibilities and duties shall include the following:

- Disseminate and Communicate HSE Policy, HSE Management System requirements to site personnel.
- Provide necessary advice, information and support in the effective implementation of the HSE Management System requirements and this HSE plan.
- Updating the HSE Plan to the requirements of the activities being carried out when there is a revision.
- Plan and conduct Internal HSE training programs, initiate drive to promote HSE awareness and performance
- Dangerous occurrences & recommend appropriate corrective measures.
- Convene HSE Committee meeting & minute the proceedings for circulation & follow-up action
- Advice & co-ordinate for implementation of Work Permit System
- Plan procurement of PPE & safety devices and inspect before use as per laid down norms.
- Facilitate screening of workmen and conduct HSE induction
- Monitoring administration of First Aid.
- Conduct Fire Drill, Procure, inspect and arrange to maintain Fire Extinguishers.
- Organize campaigns, competitions & other special emphasis programs to promote HSE in the workplace
- Record, First Aid Cases, Near Miss Cases & Accidents to all project personnel
- Maintain all HSE related documents
- Update HSE training records

Position: Section / Area In-charges

- Ensure that all the workmen engaged under him are selected through the screening system & have undergone site HSE Induction before assigning any task at site
- Ensuring compliance of basic HSE rules and applicable specifications by
    - Taking prompt action of site inspection and hazard findings
    - Closing all the points identified in inspection reports
    - Ensure HSE Risk Assessment is done for all the jobs under him

All Employees

The responsibilities and duties shall include the following:

- Report all unsafe acts and condition to the immediate supervisor
- Start work only when conditions are safe and stop work when it is unsafe
- Operate equipment only when authorized and prescribed manner.(If applicable)
- Report any injury or accident immediately

Sub-Contractors

All Subcontractors/Vendor/Supplier/Third Party performing services at the Project site shall be subject to this plan requirement

- Shall understand the HSE code of conduct for subcontractors and sign the same as a token of acceptance before starting the activity
- Subcontractor, his Supervisor and his workmen shall adhere all the laid down HSE rules & Regulations while working at site, follow the instruction / advice of Safety Supervisor Manager (DMP) & Safety from time to time

b) Prepare Inventory of Resources (Rescue equipment, medical equipment for emergencies, ambulances, hospitals, NGOs and disaster management related material and personnel

- Rescue equipment's / Safety Equipment's
  - Fall arrestor system
  - Safety belts
  - Safety Helmets
  - Safety shoes
  - Safety Net
  - Agro Safety Net
  - Barricading tape
  - Barricading Steel poles
  - Fire Extinguishers
  - Sand Buckets
  - Fire Jackets
  - Reflective Jackets

- Emergency Contact Numbers

  Fire brigade (Control Room) -101 Dahisar Fire Station- +91 22 2897 7702

  Shanti Ghar Maternity: - +91 22 2892 4242, Chamunda Hospital: - +91 22 2893 2938

  Anand Hospital: - +91 22 28482776, Navdurga Hospital: - +91 22 2895 3049

c) Maintenance of systems/equipment necessary for tackling disasters

- Maintenance of systems/ equipment necessary for tackling disaster will be done periodically by an competent person after getting checked during mock drill

d) Warning System

- Security will do the announcement by fan horn or reflex horn speaker in the guidance of Manager (DMP) & Safety.

e) Organize extensive training for disaster managers and assistants

- In every three months training will be arranged by Certified Contractor for disaster managers & assistants, also for all the workers. Disaster manager such as Manager DMP & Safety, Safety Supervisors and Section In-charge.

iii. Response Plan

❖ **Emergency Preparedness and response plan for construction phase**

An emergency having medium risk (cautionary risk) to high risk (critical risk) associated with it needs to be treated as **non-tolerable** or **unacceptable**. Projects use *Periodic Management Attention* and *Continuous Management Attention* as a strategic tool to manage cautionary risk and critical risk respectively.

Accordingly, Project Specific Emergency Response Plan is evolved incorporating five components;

- Prevention
- Preparedness
- Response
- Recovery
- Mitigation

Table 4 : Components of Emergency Preparedness and Response Plan

Components	Explanation/Associated Elements
Prevention	Prevention may not be always practical in case of natural disasters. But certain planning consideration help to minimize the impacts during emergency situation. Contrary, towards man-made emergency, prevention can be quite effective. Example- incidents and occupational diseases can be prevented by applying various controls; elimination, substitution, engineering, administrative & personal
Preparedness	It involves developing mechanism towards emergency preparedness a. Defining EPR team structure at project level b. Demarcation of roles, responsibility & authority c. Determining line of command and control d. Allocation of resources including training e. Developing & maintaining inventory of emergency management equipment's Preparedness also involves periodical testing through planned **Mock Drill & Table Top exercises**
Response	Response is execution of preparedness plans and typically involves, a. Put preparedness plan in execution b. Evaluate its effectiveness i.e. determine the gap between the plan and the execution c. Revisit plan and improve it in view of gap analysis (as part of Mitigation) d. Incorporate the learning's for continual improvement
Recover	Response is followed by **recovery** wherein projects need to take steps to bring back normalcy as soon as possible. The focus should be to maintain **continuity of business** by minimizing / eliminating disruptions and delays. Typically recovery involves the following (but not limited to) a. Clear up from the incident or help the people involved overcome their mental trauma b. Consultation and coordination with contractors, suppliers and internal functions to streamline the work and the supply c. Repair/renovate offices, Labour camps, stores, work fronts, machinery/equipment d. Sanitization of entire area including canteen and utilities- water supply, wash rooms, & toilets/urinals e. Pest Control f. Preventive Health Check-up & consultation g. Reorganizing workforce and re-inducting them
Mitigation	Mitigation involves taking steps to ensure no re-occurrence if possible, or putting additional plans in place to ensure less damage is done next time. This should feedback in to the preparedness stage, with updated plans in place to deal with future emergencies.

Emergency Preparedness & Response Plan (EPRP)

In consideration with components of EPRP, project specific EPRP is developed by the project team in a particular format as given in **Table 4**.

Tips for preparing plan:

- Have one plan sheet for one emergency scenario. Every emergency having cautionary or critical risk need to be covered
- Emergency Preparedness & Response Team can be the same for all emergency situations. Project should take a call to have one or more team for emergency situation management.

<table>
<tr><th>Plan Components</th><th>Incident</th></tr>
<tr><td>Prevention</td><td>• PPE shall be mandatory on site for all. Edge barricading to all openings on the floor, ducts and excavated places.
• Safety and warning signage shall be placed at hazardous areas. Safety induction and TBT (Tool-Box Talks) shall be carried out on site for all workforces.</td></tr>
<tr><td>Preparedness</td><td>• Continuous supervision of safe working environment.
• Special training shall be conducted on site to deal with any type of incident.
• Sufficient stretcher shall be kept on site for immediate response during incident. Availability of first aider, first aid box and medical health center.
• Preparedness for mention incident types as per below table:
<table>
<tr><th>Type of Incident</th><th>Mock Drill</th><th>Table Top Exercise</th><th>Audit</th></tr>
<tr><td>Fall of person from height.</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Structure collapse.</td><td>Yes</td><td>NA</td><td>NA</td></tr>
<tr><td>Fall of any material from height.</td><td>No</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Excessive bleeding.</td><td>NA</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Failure material hoist or any lifting equipment.</td><td>NA</td><td>NA</td><td>Yes</td></tr>
<tr><td>Electrical shock / Electrocution.</td><td>NA</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Unconscious victim within a confined space.</td><td>Yes</td><td>NA</td><td>NA</td></tr>
</table>
Mock Drill (Frequency & methodology):
Incident evacuation drill shall be carried out quarterly.
Line of Method :-
• Emergency siren will be blown.
• Head Count
• Rescue the victims.
• First Aid for minor injury.
• Victim will be moved to hospital.
• Emergency stopped up siren will be blown.</td></tr>
<tr><td>Response</td><td>• As to see the effectiveness of the Preparedness plan for an Incident it shall be executed at site as per the plan.
• Its effectiveness shall be evaluated to understand the gap between the plan and the execution on the basis of timelines, roles and responsibilities given to EPRP team members.</td></tr>
<tr><td>Recovery</td><td>• The sufferer of the incident shall be provided with adequate medical facilities to recuperate from the incident.</td></tr>
<tr><td>Mitigation</td><td>• Additional plans will be put up in place to avoid any kind of incidents on site during work.</td></tr>
</table>

Identify site disaster manager for handling disasters with clearly enumerated functions	• Manager (DMP) & Safety will handle disaster with his safety team with clearly enumerated functions during construction phase • Manager for (DMP) & Safety will be appointed for handling disaster by keeping in view of his knowledge, fire safety exposure, communication skill and his contact with public & local NGO's

Plan Components	**Fire**
Prevention	• All the flammable material shall be kept at a designated place. • Fire extinguishers, buckets etc. Shall be put up all across the site. • Operational Training for fire extinguishers will be given to all.
Preparedness	• Fire prevention accessories shall be maintained at site. • Installation of Fire hydrant & sprinkler systems on site. • Assembly point and fire exit shall be notified at a specific place for all to gather whenever the fire takes place on site. • Fire exit shall be away from debris. Contact nos. of local Fire brigade and Fire Marshalls as well as nearest hospitals shall be displayed all over the site. • The site shall be having its own First Aid Center.
	Mock Drill (Frequency & methodology) for Class A, B and C Emergency evacuation drill shall be carried out quarterly. • Emergency siren will be blown. • All workers will be gathered at Assembly point. • Head Counting • Rescue the victims. • Fire will be put out by fire Marshalls or fire brigade. • Emergency stopped up siren will be blown.
Response	• As to see the effectiveness of the Preparedness plan for Fire it will be executed at site as per the plan. • Its effectiveness shall be evaluated to understand the gap between the plan and the execution on the basis of timelines, roles and responsibilities given to EPRP team members.
Recovery	• To recover from the Fire; Immediate renovation shall be done for offices, Labor camps, stores, work fronts, machinery/equipment, also all this will be recovered with the help of insurance. • Immediate reorganizing of work force will be done to maintain continuity of business without any delay.
Mitigation	• Additional plans will be put up in place to ensure less destruction and losses should occur during fire. • And for this additional insurance plan will be introduced. Fire Drill will be reorganized time to time to compact with future emergencies.
Plan Components	**Earthquake**
Prevention	• Inspect every item that could fall, spill, break or move during an earthquake. • Follow safety codes & building codes for building earthquake resistance structure when constructing a project. Project should be inspected by structural engineer. • Heavy items shall be moved away from where people work. • Fixed equipment and heavy machinery shall be secured to the floor.
Preparedness	• Disaster management accessories shall be maintained at site. • Assembly point shall be notified at an open specific place for all to gather whenever the earth quake takes place on site. • Emergency contact nos. shall be displayed all over the site. • All workforces shall follow the EPRT member's instruction.

	Mock Drill (Frequency & methodology): Emergency evacuation drill shall be carried out quarterly. Line of Method :- • Emergency siren will be blown. • All workers will be gathered at Assembly point. • Head Counting • Rescue the victims. • Emergency stopped up siren will be blown.
Response	• Preparedness plan effectiveness shall be evaluated to understand the gap between the plan and the execution on the basis of timelines, roles and responsibilities given to EPRT members.
Recovery	• To recover from the Earthquake incident Check with insurance bodies for life & property damages and Immediate Repair/renovation shall be done for site offices, Labor camps, stores, work fronts, machinery/equipment. • Immediate reorganizing of work force shall be done to maintain continuity of business without any delay. • Moral support shall be given to workmen to come out from the Confrontation.
Mitigation	• Additional plans shall be put up in place to ensure less damage and losses should occur during earthquake. • Earthquake and other EPRP shall be updated time to time to deal with future emergencies.

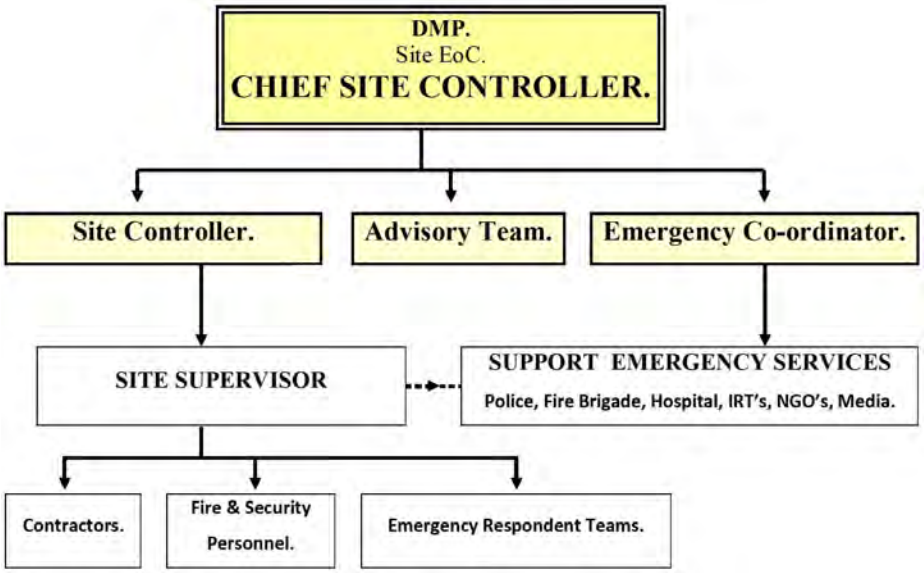
Plan Components	**Monsoon (Flood conditions)**
Prevention	• Proper dewatering and drainage system shall be implemented on site to avoid flooding. • Site is under flood area or not, this shall be confirmed through the local emergency management office. • To avoid electrical hazard during monsoon ELCB system shall be used. In addition to this, all the electrical cable joints shall be properly insulated.
Preparedness	• Monsoon preparedness checklist shall be circulating to all concern contractor & internal site team • Dewatering pumps shall be purchased and placed all over the site during monsoon. • Drainage system shall be specially designed for flooding so that water log jam is avoided. • All construction equipment/machinery/official documental records shall be ready to shift at a safe place where flood could damage the same. • All Electrical Distribution equipment shall keep under weather proof shade on proper elevated platform. • Emergency lighting arrangement shall be in place.
	Mock Drill (Frequency & methodology): Emergency evacuation drill will be carried before monsoon. Line of Method :- • Emergency siren will be blown. • All workers will be gathered at Assembly point. • Head Counting • Rescue the victims. • Emergency stopped up siren will be blown
Response	• As to see the effectiveness of the Preparedness plan for monsoon it shall be executed at site as per the plan. • Its effectiveness shall be evaluated to understand the gap between the plan and the execution on the basis of response timelines, roles and

	responsibilities given to EPRP team members.
Recovery	• To recover from the monsoon disaster Immediate Repair/renovation shall be done for Site offices, Labor camps, stores, work fronts, machinery/equipment. • Pesticides shall be used all over the flooded or water logged area to avoid any health contamination on site. • Medical check-up for all workforces shall be done to ensure and control epidemic situation on site.
Mitigation	• Additional plans (as per observation during mock drill) shall be put up in place to ensure less damage and losses should occur during monsoon. • Monsoon prevention plans shall be updated time to time to deal with future emergencies.

Plan Components	**Occupational Diseases**
Prevention	• Respiratory PPEs, hand gloves, face shield, ear plug etc. and other safety precautions shall be taken care of to avoid the occupational diseases. • Adequate information shall be given to all workers regarding occupational hazards and its prevention. • Educate workers to understand the importance of PPE's • Special training sessions shall be conducted on site to ensure that occupational hazards are eliminated through use of proper means of safety.
Preparedness	• Adequate information shall be given to all workers regarding occupational hazards and its prevention. • Special training sessions shall be conducted on site to ensure that occupational hazards are eliminated through use of proper means of safety.
	Mock Drill (Frequency & methodology): NA
Response	• As to see the effectiveness of the EPRP for Occupational Diseases it shall be executed at site as per the plan. • Its effectiveness shall be evaluated to understand the gap between the plan and the execution on the basis of timelines, roles and responsibilities given to EPRP team members.
Recovery	• To recover from the occupational diseases continuous improvement on site safety conditions shall be observed. • Periodical health checkup shall be done for specialized worker who are exposed to hazards material on daily basis.
Mitigation	• Awareness programme will be placed time to time to reduce the effect of occupational diseases.

❖ DISASTER MANAGEMENT ORGANIZATION

HIERARCHY OF LEVELS



❖ ROLES AND RESPONSIBILITIES

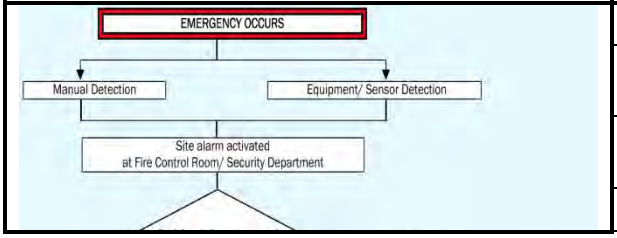
Roles and responsibilities for all the emergency respondents are detailed in respective SOP's of this report

❖ EMERGENCY RESPONSE GUIDE

EMERGENCY RESPONSE GUIDE TABLE

Sr. No.	Emergency Respondent → / ↓ Hazards	Chief Site Controller	Site Incident Controller.	Emergency Co-Ordinator	Supervisor	Emergency Response Teams	All Other Site Personnel
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	S.N	Task
	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	Mobiliz 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	Feedback 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

❖ DISASTER MANAGEMENT ORGANIZATION FOR CONSTRUCTION PHASE:

Sr. No.	Designation for DMP	Construction Phase
		Designation /Agency /Group
1	**Site Main Controller**	Head-Health & Safety Environment
2	**Site Incident Controller**	**Project Manager**
3	**Emergency Coordinator**	Safety Manager
4	**Supervisor**	Site & Safety Supervisor, Contractor supervisor
5.1	**SAR Team**	Security guards ,First aiders , Fire fighters, staff & workmen, External IRTS
5.2	**Engineering Team**	Electricians , Operators
5.3	**Advisory Team**	Architect , Consultants
6	**All others at site**	Contractors, Staff, Workers, Visitors, Drivers, construction workers colony

iv. Control Room

a) Earmark a specific area to function as control room for disaster management

- Security Control Room during Construction phase is at the main entry gate:
- The traffic in the area comprises

- Regular workers
- Vendors

Table 5: Details of Entries

i)	Regular workers	•	Recognition
		•	Distinct ID Card
		•	ID through card reader
ii)	Vendors	•	Temporary pass with time validity (with the consent of Site Supervisor/Project Manager)

b. Display proper maps-Telephone nos. of disaster controlling authorities showing firefighting equipment's

- Fire Brigade contact number is provided above and all contact nos. will be displayed during construction by safety committee

c) Prepare & disseminate pamphlets on each disaster for occupants covering Do's and Don'ts for each type of disaster

- Do's and don'ts for each type of disaster is been provided in SOP's which is attached as an enclosure to DMP.

v. On-Site Disaster during Construction Phase

a) Site disaster manager to take charge and give guidance over public address system

- Project manager will take charge and give guidance over public address system
- Assembly point shall be identified and marked. Mega phone shall be used to address the emergency to employees.

b) Call for outside assistance of fire brigade, Hospital, ambulance

- Manager (DMP) & Safety will call for outside assistance of fire brigade, Hospital, ambulance.
- In absence of Manager (DMP) & safety, project manager will call outside for assistance.

c) Network with State, district and ward level control rooms

- Ward level details are provided below in operation phase. Contact shall be done to ward control room during emergency.

d) Ensure adequate warning before switching off power

- All announcements will be done with good quality equipment's
- Manager (DMP) & Safety will ensure with Safety Supervisor that all workers are stopped working and shut downed the machines & equipment's before switching off emergency control switch.
- The main electrical switch during Construction Phase will be placed at the site office.

e) Assure workers of continuous communication and take all measures to keep up their morale

- Project manager will do continuous announcements by various methods to keep up workers morale

f) Guide workers on the steps being taken for evacuation in a systematic manner

- This requirement will be handled by dedicated trained staff/volunteers.

g) Take steps to reduce/ eliminate panic

- Periodical training to internal Volunteers &Officers.
- Periodical mock drills to all Workers, Officers, volunteers and staff in every three months.

h) Liaise with Law & order Machinery

- Project manager will liaise with police Fire Brigade, Civil Defense, BEST etc.

vi. Preventive Maintenance

a) Regular maintenance of Equipment's& Systems

- Periodical maintenance will be carried by certified, competent and skilled employed contractors at regular intervals.

4 .OPERATION PHASE

i. Risk Assessment & Vulnerability Analysis of Possible Disaster

❖ **Hazard Identification And Safety Assessment**

➢ **Identification of potential structural hazards existing in the area**

- Structural safety of the building needs to be assessed with regards to its safety from hazards like earthquakes, floods and fire.

➢ **Identification of potential non-structural hazards existing in the area**

- DMC plan should be in that position to identify the potential hazards that frequently occur in that area. It is therefore necessary for us to identify potential hazards to which the building might be exposed. For this a hazard assessment shall be conducted by taking into account the history of disasters that have occurred in that area for the last 20 - 25 years. Based on the hazard assessment, the members of the DMC will prepare the Disaster Management Plan.
  Source: http://www.karmayog.com
  (For identification of history of any disaster during the last 20-25 years)

➢ **Points to remember while coordinating a survey**

- Check low lying area, Nallah, pitch hill, Choking site or any municipal tank etc. nearby or surrounding of the site.
- The areas which would cause problems in an earthquake, flood, and fire are identified.

❖ **Possible disasters**: Fire/ Flooding/ Earthquake/ Bomb Explosion/ Structural Problems/ Lightning/ Power Failure/ Fire – Smoke/Electrical Fires/ Manmade Emergency.

Table 6 : Risk Assessment during Operation Phase

Assessment / **Disasters**	*Livelihood of event occurring*	*Level of consequence*	*Risk level Outcomes.*	*Risk Control Actions*
Earthquake	***Unlikely***	***Moderate***	***Medium***	***Follow management instructions /Follow SOP***
Flood	***Possible***	***High***	***High***	***These risks may require immediate attention monitor/Follow SOP***
Fire	***Possible***	***High***	***High***	***Follow management instructions /Follow SOP***
Terror Attack	***Rare***	***Low***	***Low***	***These risks may require immediate attention monitor/Follow SOP***
Lightning	***Rare***	***Low***	***Medium***	***These risks may require immediate attention monitor/Follow SOP***
Power Failure	***Possible***	***Insignificant***	***Low***	***Follow management instructions regarding risk/Follow SOP***
Structural Problem	***Unlikely***	***Low***	***Low***	***These risks may require***

				immediate attention monitor/Follow SOP

❖ **Disaster Response Team**

Initially the Disaster Management Committee will be formed by the developer/society members. The Project Manager will be competent enough to handle various disasters, and will be In-charge to look after the complete process of DMC (Disaster Management Committee). DMC will be divided into three groups namely: Co-ordination group, Disaster Awareness group, and Disaster Response group. The roles and responsibilities of various groups are defined in subsequent paragraphs.

The building will have one Security In-charge/Facility Manager (and alternate), one assistant Security guard (and alternate) who will direct the evacuation of persons from their respective areas as quickly as possible in a safe and controlled manner. The list of building evacuation team members is maintained by Disaster management committee.

The given figure 3 demonstrates the structure of organization structure of the Disaster Management Committee

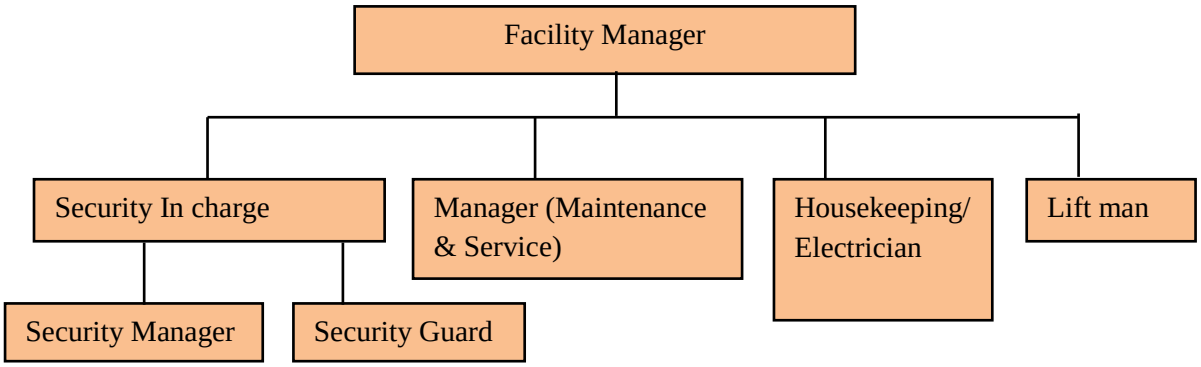


Figure 3 : Organization Chart of Disaster Management Committee

Roles and Responsibilities of Disaster Management Committee

- Look into the structural safety requirements of the building for various hazards (earthquake, fire, floods, etc.) Get the buildings assessed for the hazards identified and take prompt remedial measures, as required
- The members of the DMC shall have an understanding of the disaster management policy and planning principles
- Evaluation of the Disaster Management plan
- Carrying out the mock drill twice a year
- Updating of the plans at regular intervals (at least once a year, and after any significant disaster) to ensure that the plan is workable
- Earmark fund arrangements for carrying out preparedness and mitigation measures in the building
- Declaring emergencies and implementing the emergency plan
- Implementing evacuation procedures
- Contacting emergency services (fire, police, ambulance) and utilities
- Establishing a command post, chain-of-command and reporting procedures
- Assessing and obtaining emergency services, supplies and equipment
- Arranging for off-site storage and work facilities
- Arranging the transfer of collections to a safe site
- Recording the movement of collections
- Implementing and supervising salvage procedures for collections
- Contacting, training and supervising volunteers
- Documenting all aspects of the response / recovery procedures

- Meeting with the press
- Preparing post-emergency reports

➢ **Facility Manager**
- Ensures that the appropriate outside emergency agencies have been notified
- Coordinates all occupant notification and makes sure that any necessary evacuation or relocation begins
- Ensures adequate monitoring and control of all building life safety systems and equipment
- Confirms that any investigation of the fire or source of the fire alarm, or initial suppression of a fire, is performed
- Arranges for responding emergency personnel to be met at the designated entrance of the building and give an up-to-date report on the incident (including its location and any reported injuries), the status of security and building fire life safety systems and the location and status of all evacuees addressing the incident (building information forms, notification of specific hazards, floor plans, essential keys and access cards, etc., also should be readily available)
- Ensures that every incident is thoroughly documented and that required notifications and reports to the appropriate authorities are carried out

Table 7: Responsibility Matrix

Goal: To keep the disaster management plan up to date 24X7		
Objectives: To safeguard the occupants and neighbors in the event of disaster		
Scenario	**Who is responsible**	**When to contact and how**
Lift failure	Facility Manager/Security In-charge/lift man	When trapped inside a lift, Press the alarm button. If outside use phone (internal) or reverse alarm system (not running on electricity or battery backup
Fire in building (limited area)	Security In-charge, Facility Manager	Press the nearby fire alarm or call to control room
Fire in large area (floor)	Security In-charge, Facility Manager	Press the on floor and down floor fire alarm or call to control room
Fire in utility areas	Security In-charge	Press the utility area fire alarm or call to control room
Electrical failure	Electrician	If power goes off only of your floor then call to the control room for electrician
Water supply interruptions	Security In-charge, Maintenance & Service manager	If water don't come to only your home then contact control room
Building damage (minor)	Security In-charge, Maintenance & Service manager	If any leakages to your floor or home then contact control room and note complaint and also raise the point in general society meeting
Building damage (major)	Facility Manager	If any fall of plaster to your floor or outside home, major cracks then contact control room and note complaint and also raise the point in general society meeting
Audible and Visible Alarms	Facility Manager	If alarm doesn't work during periodical checkup then call control room and note complaint
Emergency Staff	Security In-charge	If any disaster occurs then call control room for help

ii. Mitigation& preparedness

a) Prepare SOP's for each disaster and for evacuation when necessary

All SOP's for each Disaster and for evacuation is been prepared, attached as an Enclosure to DMP.

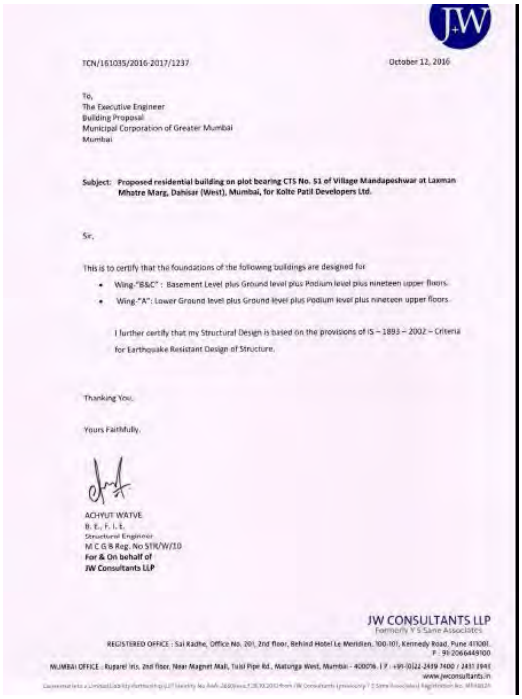
I. NATURAL DISASTER:

❖ Earthquake: Seismic Environment & Precautions

Mitigation Measure:

As per the Seismic Zoning Map of India, Mumbai region falls under Seismic Zone-III. The structural design is based on Indian Standard Codes of practice and shall render the buildings safe and stable.

IS-1893-2002- Criteria for Earthquake Resistant Design of Structures.



TCN/161035/2016-2017/1237 October 12, 2016

To,
The Executive Engineer
Building Proposal
Municipal Corporation of Greater Mumbai
Mumbai

Subject: Proposed residential building on plot bearing CTS No. 51 of Village Mandapeshwar at Laxman Mhatre Marg, Dahisar (West), Mumbai, for Kolte Patil Developers Ltd.

Sir,

This is to certify that the foundations of the following buildings are designed for

- Wing-"B&C" : Basement Level plus Ground level plus Podium level plus nineteen upper floors.
- Wing-"A": Lower Ground level plus Ground level plus Podium level plus nineteen upper floors.

I further certify that my Structural Design is based on the provisions of IS – 1893 – 2002 – Criteria for Earthquake Resistant Design of Structure.

Thanking You,

Yours Faithfully,

ACHYUT WATVE
B. E., F. I. E.
Structural Engineer
M C G B Reg. No STR/W/10
For & On behalf of
JW Consultants LLP

JW CONSULTANTS LLP
Formerly Y S Sane Associates

REGISTERED OFFICE : Sai Radhe, Office No. 201, 2nd floor, Behind Hotel Le Meridien, 100-101, Kennedy Road, Pune 411001.
P : 91-2066449100

MUMBAI OFFICE : Ruparel Iris, 2nd floor, Near Magnet Mall, Tulsi Pipe Rd., Matunga West, Mumbai - 400016. T : +91-0022-2419 7400 / 2431 1941
www.jwconsultants.in

Figure 4: Structural Stability Certificate

❖ Floods:

Particularly in Mumbai, areas having poor drainage characteristic get flooded by accumulation of water from heavy rainfall.

Mitigation measures would be taken by Proponents to manage flood disasters:

- Minimizing the incremental runoff from the site with the help of rain water harvesting tank (40 KL)
- Proper management of channelization of storm water from site by using proper internal SWD system and discharge points of adequate capacity (0.27 m^3/sec)
- Use of screens and silt traps to SWD
- Proper maintenance of storm water drainage to avoid choking of drains and flooding on site
- Ensure discharge of storm water from the site is clear of sediment and pollution

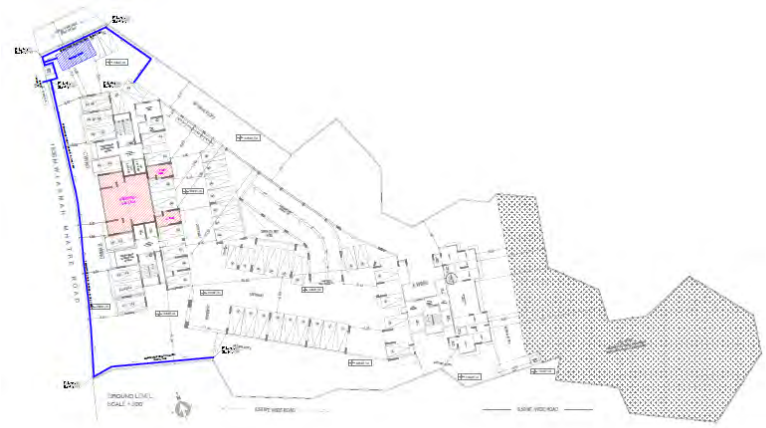


Figure 5: SWD Layout (Ground)

Figure 6: SWD layout (Lower Ground/Basement)

❖ **Cyclones:**

Cyclones are caused by atmospheric disturbances around a low-pressure area distinguished by swift and often destructive air circulation. They are usually accompanied by violent storms and bad weather.

There is no history of any cyclone in this area. However in such an instance the occupants should be advised to stay in the shelter in tightly secured windows and doors. The glass of windows etc. should be covered with paper/cardboards to avoid glass breaking due to flying objects outside.

❖ **Lightning:**

Lightning is an atmospheric electrostatic discharge accompanied by thunder which typically occurs during thunderstorms and sometimes during volcanic eruptions or dust storms. It often leads to physical damage to the building and occupants. It can also lead to short circuits, failure of power supply and fire

Mitigation measure:

- Lightning arrestor systems shall be provided for entire project to abate the impact of lightning hazard.

Figure 7: Lightning Arrestor Plan

II. Man Made Disaster

❖ Bombs & Other Terrorist Activities

Bombs can be constructed to look like almost anything and can be placed or delivered in any number of ways. The probability of finding a stereotypical- looking bomb is almost nonexistent. The only common denominator among bombs is that they are designed to explode. Most bombs are homemade. Only the imagination of and the resources available to the bomber limit their design. When searching for a bomb, suspect anything that looks unusual. Let the trained technician determine what is or is not a bomb. Follow the checklist given below:

- Addressee unfamiliar with name and address of sender
- Improper or incorrect title, address, or spelling of name of addressee
- Handwritten or poorly typed address
- Return address and postmark are not from same area
- Excessive postage or unusual stamps used versus metered postage
- Special handling instructions on package (special delivery, to be opened by addressee only, foreign mail, and air mail, etc)
- Restrictive markings (personal, confidential, etc)
- Excessive securing material such as wrapping, tape, or string
- Oddly shaped or unevenly weighted packages
- Bulky, lumpy, or rigid envelopes
- Protruding wires or metal, strange odors
- Mail arrives before or after a telephone call from an unknown person who asks whether the recipient has opened it or who requests that he or she opens it

This is only a general checklist. When an item is in question, the best protection is to make personal contact with the sender of the package or letter but not to open it.

Mitigation Plan

➢ Safety Procedure

To cope with a bomb incident, it is necessary to develop two separate but interdependent plans. The bomb incident plan provides the detailed procedures to be implemented when a bombing attack is threatened or executed. A physical security plan, which is covered in detail in the next section, provides protection of property, personnel, facilities, and material against unauthorized entry, traces pass, damage, or other illegal or criminal acts.

To carry out these plans, a definite chain of command must be established to instill confidence and avoid panic. This is easy if there is a simple structure, or one business, in the building. However, in a multiple-tenant building a representative from each tenant should attend a planning conference. A leader—the Facility Manager, Security In-charge—should be appointed and a clear line of succession delineated. This chain of command should be printed and circulated to all concerned parties. There should also be a command center to act as a focal point for telephone or radio communications. The management personnel assigned to operate the center should have the authority to decide what action is to be taken during the threat. Only those with assigned duties should be permitted in the center, and alternates need to be appointed in case some-one is absent when a threat is received. In addition, an updated blueprint or floor plan of the building should be obtained and kept in the command center.
Contact the police department, fire department, or local government agencies to determine if any assistance is available for developing a physical security plan or bomb incident plan. If possible, have police or fire department representatives and building and tenant staff inspect the building for areas where explosives are likely to be concealed; make a checklist of these areas for inclusion in command center materials.

- **Other Security Mitigation Measures to Reduce the Threat of Bombs**

Controls should be established to positively identify personnel who have authorized access to critical areas and to deny access to unauthorized personnel. These controls should include inspection of all packages and materials being taken into critical areas, as well as the following:

- Security and maintenance personnel should be alert for people who act in a suspicious manner, as well as objects, items or parcels that look out of place or suspicious. Surveillance should be established to include potential hiding places (e.g., stairwells, restrooms, and any vacant space) for unwanted individuals. Designated patrols of such areas will assist in this endeavor.
- Doors or access ways to certain areas—mechanical rooms, switchboards and elevator control rooms— should remain locked when not in use. It is important to establish a procedure to keep track of keys. If keys cannot be accounted for, locks should be changed.
- Good housekeeping also is vital. Trash or dumpster areas should remain free of debris. A bomb or device can easily be concealed in the trash. Combustible materials should be properly disposed of, or protected if further use is anticipated.
- Detection devices may be installed at entrances to high-risk tenant areas, and CCTV should be used in areas identified as likely places where a bomb may be placed. This, coupled with posting signs indicating that such measures are in place, is a good deterrent.

- **Responding to Bomb Threats**

Instruct all personnel, especially those at telephone switchboards, on what to do if a bomb threat call is received. It is always best if more than one person listens in on the call. To do this, a covert signaling system should be implemented, perhaps by using a predetermined signal to a second reception point.
A calm response to the bomb threat caller could result in obtaining additional information. This is especially true if the caller wishes to avoid injuries or deaths. If told that the building is occupied or cannot be evacuated in time, the bomber may be willing to give more specific information on the bomb's location, components, or method of initiation.

- **Vital Actions**

The person making the threat is the best source of information about the bomb. When a bomb threat is called in, the person taking the call should do the following:

- Keep the caller on the line as long as possible. Ask him or her to repeat the message. Record every word spoken by the person. (Some building managers and individual tenants may provide audio recorders for this purpose; others by policy do not)
- Pay particular attention to background noises such as motors running, music playing, and any other noise that may give a clue as to the location of the caller

- Listen closely to the voice (male or female), voice quality (calm or excited), accent, and any speech impediment. Immediately after the caller hangs up, report the threat to the person(s) designated by management to receive such information
- Report the information immediately to the police department, fire department, and other appropriate agencies. The sequence of notification should be established in the bomb incident plan
- When a written threat is received, save all materials, including any envelope or container. Once the message is recognized as a bomb threat, further unnecessary handling should be avoided. Every possible effort must be made to retain evidence such as fingerprints, handwriting or typewriting, paper, and postal marks. These will prove essential in tracing the threat and identifying the writer. Although written messages usually are associated with generalized threats and extortion attempts, a written warning about a specific device may occasionally be received. It should never be ignored.

❖ **Aircraft Collisions: Manmade disaster**

A building is vulnerable to the remote possibility that an aircraft flying off-course could collide with it or aircraft collide chances may occur. Obviously, the additional height, as compared with other structures, makes them more susceptible. To prevent such collide aircraft warning light shall be installed.

➢ **Aircraft Warning Lights**

- Aircraft warning lights are high-intensity lighting devices that are attached to tall structures that are used as collision avoidance measures. Such devices make structures more visible to passing aircraft and are usually used at night, although they may be used during the day as well. These lights need to be of sufficient brightness in order to be visible for miles around the structure.

➢ **The lights generally come in two forms:**

- Red lamps that are either constantly illuminated or turn on and off slowly in a cycle of a few seconds.
- The luminaries will have an effective intensity of required candelas
- All luminaries will be supplied with minimum capacity required Volt A.C. powers connected to the emergency maintained system.

b) Prepare Inventory of Resources (Rescue equipment, medical equipment for emergencies, ambulances, hospitals, NGOs and disaster management related material and personnel

- All the resources available in the building need to be listed out like: Fire Control System.

Table 8-List of Inventory of Resources- Operation Phase

Sr. No.	Description	Resource	Location
1.	Rescue Equipment	Steel ropes, ropes, chains, harness, torches, radium signal & symbol sign boards, Walky talky, dust masks, tyres, Hammer, shovel, spade, mud pan etc.	At Society Office shall be provided.
2.	Medical Equipment's for emergencies	First aid box containing general medicines and equipment's	At Society Office , First aid box also provided in Security room.
3.	Other emergency tools	Spare Fire extinguishers	At Fire control room at ground floor
4.	Other basic	Plastic bucket, plastic glass, plastic	At Fire control room and Society

Sr. No.	Description	Resource	Location
	utilities and needs	plates, blankets, some utensils and required food grains	office room
5.	Other details of the building configuration	Total number of floors in the building The total number of rooms in the building Open areas where evacuation is possible Stairs and lifts locations and uses Open verandas and roof tops	Appropriate info will be displayed at each floor and same sheets will also be kept in Fire control room &Society office for use during emergency. Appropriate signs and symbols will be displayed on each floor for evacuation & exit

- **Document Inventory:**

1) Safe work manual for electrical repairs 2) SOP for inspection of Gas pipe line 3)Periodic checks of Active fire protection systems 4) Ambulance and Hospitals contacts nos. will be maintained in register

c) Maintenance of systems/ equipment necessary for tackling disaster

- All the life-saving appliances such as Fire extinguishers, Alarm & Public address system to be maintained properly and effectiveness of these should be checked during Mock Drill.

d) Warning Systems

- Facility Manager will announce audio warning in case of fire, lightning or likely flood situation. Each Officers/ Occupants will be informed by Security section for preparation by telephone.
- Sirens would be tested at noon on the first Saturday of each month. If you hear the sirens at any other time, than following steps should be taken:

Shelter	Go to nearest shelter to avoid exposure
Shut	Shut doors and windows. Building ventilation systems should be shut off if possible
Listen	Go to near the information source for building emergency information

Fire, Warning system & Mitigation measures

- Fire shall be caused mainly due to negligence, short circuits and malfunctioning of gas regulator, tube and such related products. Hence, all the electrical works and material of the building would adhere to the standards. Fire extinguisher equipment would be evaluated periodically to ensure that it is in working conditions by security manager. If any faulty equipment is observed then it would be repaired or replaced by Society. The map for the evacuation plan would be provided to all the occupants.

Fire Alarm & Detection System (warning System)

- The Building shall be provided with intelligent analog addressable fire alarm system with microprocessor based main control panel at ground floor and addressable call points and hooters at each floor level. The design of fire alarm system shall be in accordance to relevant I.S. specification.
- The addressable fire alarm system shall be equipped with the latest evacuation features such as Digital voice evacuation capabilities, firefighting telephone system, directories etc. The main entry / exit shall be provided with fire fighters interactive interface to enable viewing of critical information in event of fire.
- Appropriate fire detection system shall be installed in kitchen area.

e) Devise system for two-way communication with the affected persons in the building especially in lifts and rooms

- The entire building shall be provided with the public address system as per the rules.

- Internal Phone in Lift will be available.

f) Organize extensive training for disaster managers and assistants

- **Training Program:** Regular mock drill will be conducted and same will be reported to Disaster Management Committee

Table 9 : Safety Drills and Maintenance Needs updates

Sr. No.	Types of Drills	Frequency of drill	Who must attend	Date of drill and any issues : Log book
1	Earthquake safety	6 months	All occupiers	Log book
2	Fire safety	3 months	All occupiers	Log book
3	Fire and any other equipment maintenance	3 months	Security	Must report to Security In-charge and maintain a log book
4	Lift security	3 months	Security, Maintenance & Service manager	Must report to Security In-charge and maintain a log book
5	Water management	3 months	Security, Maintenance & Service manager	Must report to Security In-charge and maintain a log book
6	Safety kit check	6 months	Security, Maintenance & Service manager and Members.	Maintain Log book

Mock drills are conducted to train building occupant and to test the various elements of your response plan in order to evaluate and revise it. During a disaster, life-protecting actions must be taken immediately. There will not be time to decide what to do next; everyone must already know how to react appropriately. After a disaster, further life protecting actions such as emergency evacuation or first aid administration may be necessary. Drills and exercises are an extremely important part of the preparedness plan because they

- Teach the occupants of a building how to respond to the complications of an actual disaster
- Helps to evaluate how well all parts of the emergency plan work together and how well the occupants have been trained

➢ **Earthquake**

- Follow the mitigation plan as given in Earthquake section of this DMP
- Practice drop, cover, and hold
- Evacuate building in less than 4 minutes using different exits
- Look out for colleagues, friends, etc.
- Stay away from weak areas
- Help those who need assistance

➢ **Fire / Chemical Accident / Drill**

- Follow the mitigation plan as given in Fire & Fire Alarm section of this DMP
- The need to prepare for sudden accidents needs awareness and sufficient knowledge
- To know Why and how to handle an accident is important
- Information
- Practice mock drills every month

➢ **Flood Drill**

- Follow the mitigation plan as given in Flood section of this DMP
- Listen to flood warning and recognize changes in weather

- Make announcements about precautionary measures
- Provide food, water, sheets, and beds in the place where people will assemble
- Explain how to remain safe outdoors
- Shift money and other valuables
- Put off electricity
- Remove or close down gas connections

iii. Response Plan

a) Identify site disaster manager for handling disaster with clearly enumerated functions

- Facility Manager will operate building with clearly enumerated functions during operation phase form Society office room located at Ground Floor

Facility Manager will select a Site disaster manager for handling disasters with clearly enumerated functions by keeping in view the following qualification

Qualification required for Disaster Manager (Facility Manager) to be selected and appointed

- Must be trained in civil defense
- Should have knowledge about human management
- Should have Technical knowledge about Fire Fighting
- He should know local language to contact mutual help from Fire, MSEDCL. Police Hospital, Nearby NGO, Industries etc Officials

Sr. No	Designation for DMP	Operation Phase
		Designation /Agency /Group
1	Site Main Controller	Facility Manager
2	Site Incident Controller	Security In charge
3	Emergency Coordinator	Security Manager
4	Supervisor	Fire & Safety staff
5.1	SAR Team	Watch & ward personnel, Police, fire brigade; Agencies sent by district disaster control room such as Civil defense, NDRF, Medical team, Home guard etc.
5.2	Engineering Team	Manger (Maintenance & Services) Pump operators Electricians
5.3	Advisory Team	Active past committee members
6	All Others At Site	Residents ,Shops Occupants ,Visitors

iv. Control Room

a) Earmark a specific area to function as control room for disaster management

- Provision of Society Office room shall be provided.
- Provision of Security room at entry/exit of building& watchman cabin at entry/exit gate of building.

Surveillance Security System (SSS):

At project site CCTV at common areas & lobby with 24 hour DVR backup, will be provided. The controlling & processing of CCTV in common areas should be performed through a web based management system on a separate Ethernet network in the building. Main operation work space shall be in the back building Society office room.

b) Display proper maps Telephone nos. of disaster controlling authorities showing firefighting equipment's, refuge floors, sprinklers system etc.

- **Safeguard Requirements for Natural and Manmade Disasters:**

- List of nearest clinics and hospitals shall be maintained for medical emergency as also any other eventuality. The table below will be ready and will be distributed to all members within the building and later for off-site plan to neighborhood. These information need to be updated every six months before safety drills. The information thus updated should also be shared with occupants.

Table 10: Emergency Number Surrounding Project Site

Hospital		
Shanti Ghar Maternity & Housing Home	Approx.0.50km	+91 22 2892 4242
Chamunda Hospital	Approx 4.00 km	+91 22 2893 2938
Anand Hospital	Approx 1.00 km	+91 22 28482776
K. K. Hospital	Approx 1.00 km	--
Navdurga Hospital	Approx 1.00 km	+91 22 2895 3049
Karuna Hospital	Approx 1.00 km	+91 22 2893 4698
Police Station		
Dahisar Police Station	Approx.2.5 km	+91 22 2828 4024
M.H.B. Colony Police Station	Approx. 4.00 km	+91 22 2867 7401
Fire Station		
Brha Mumbai Mahanagar Palika Dahisar Fire Station	Approx.3.00km	+91 22 2897 7702
Railway station		
Dahisar Railway Station	Approx. 1.00 km	--
(Transport)		
Navagaon Bus Stop	Approx.0.5 km	--
Mary Immaculate School Bus Stop	Approx.0.5 km	--
MTNL		
Kandiwali MTNL Exchange,(w)	Approx. 5.00 km	+91 22 2865 0802

➢ **Firefighting equipment, fire extinguishers, sprinklers system etc.**

Hazard occurrence may result in on-site implications like:

- Fire and/or explosion through electric fire;
- Leakage of flammable material and leading to fire;

The following are the types of fire protection system proposed for all building premises as per NBC 2005 - Part IV Fire and Life Safety &Local Fire Authority Norms.

- Adequate drinking water facility shall be provided in the refuge floor.
- Adequate emergency lighting facility shall be provided.
- An alternative source of L.V/H.V supply from separate substation as well as from a diesel generator with change over switch shall be provided for fire pumps, booster pump, sprinkler pump, jockey pump, staircase and corridor lighting circuits manual fire alarm system. It shall be housed in a separate cabin
- Self-glowing/fluorescent exit in greens color shall be provided showing the means of escape for entire building.
- The lift shall not be permitted to open into the refuge area.
- The entrance door to the refuge area shall be painted or fixed with a sign painted in luminous paint mentioning “Refuge area- In case of emergency”.
- The building shall be provided with manual fire alarm system with main control panel at main security cabin on ground floor level and pill-boxes and hooters at each upper floor level. The layout of fire alarm system shall be in accordance with I.S. specification.

➢ **Type of Systems Proposed:**

Following are the various Fire Protection systems proposed:

- **Fire Fighting Tank:**
  - An Underground water storage tank of than 300 KL capacity shall be provided as per design specified in the rules with baffle wall and fire collecting breaching. The design shall be got approved from H.E's department prior to erection. The tank shall be connected to Sprinkler system.
  - An Overhead water storage tank of 30 KL capacity shall be provided on each staircase shaft at the terrace level, the layout shall be got approved from H.E's department prior to erection. The tank shall be connected to wet riser through a booster pump through N.R valve & gate valve.
- **Wet-Riser cum Down**
  - Wet-riser of internal diameter of 15 cms of G.I. "C" class pipe shall be provided with twin hydrant outlet & hose reel at each floor in such a way to reduce the width of the common corridor.
  - Pressure reducing discs or orifices shall be provided at lower level, so as not to exceed the pressure of 5.5 kgs. / sq. cms.
  - A fire service inlet on the external face of the building near the tank directly fronting the front side courtyard shall be provided to connect the mobile pump of fire service to the wet riser-cum down comer and sprinkler system.

- **Fire Service inlet**
  - A fire service inlet on the external face of the building near the tank directly fronting the courtyard shall be provide to connect the mobile pump of the fire service to (a) The wet riser (b) Sprinkler system
  - Breeching connection inlet shall be provided to refill U.G tank
  - Operating switches of fire pumps shall be provided in glass fronted boxes at ground floor.
- **Pumping System :**
  - Wet- riser of building shall be connected to a fire pump at ground level of capacity of not less than 2400 liters/min capable of giving pressure of not less than 3.2 kg/ sq.cm at top most hydrants.
  - Booster pump of 900liters/min capacity giving a pressure of not less than 3.2 kg /sq.cm at the topmost hydrant outlet of the wet riser shall be provided at the terrace level of each building.
  - Sprinkler pump of suitable capacity along with jockey pump shall be provided for automatic sprinkler system.
  - Electric supply (normal) to these pumps shall be on independent circuit.
  - Operating switches for booster pump shall be provided in glass fronted boxes in terrace floor as well as ground floor at prominent place.
  - Operating switches of fire pump shall be provided in glass fronted boxes ta ground floor
  - All above pump provided should be surface mounted or vertical turbine type(submersible pump not permitted)pump along with the adequate size of pump room.
- **External Hydrant System:**
  - Courtyard hydrants shall be provided at distance of every 30.00mtrs. all around the building each within the confines of the site on the wet riser –cum-down comer. Hose box with two non-percolating BIS marked hoses (length not less than 15 mtrs.) & branch shall be equally distributed on ground floor near the hydrant outlet.

- **Fire Drills/Evacuation Drills**

  Fire Drills and evacuation drills shall be conducted regularly in accordance with fire safety plan of building at least once in six month in consultation with Mumbai Fire Brigade and log of the same shall be maintained.

- **Fire Sprinkler Systems**

  Automatic Sprinkler system shall be provided in lift lobby/common corridor at each floor level in each wing and car parking area covering each car parking level at basement, Lower ground

floor , stilt & fitness center at both level as well as in each flat at each floor level in each wing i.e. wing: 'A', 'B' & C as per standards laid down by T.A.C or relevant I.S specfications.

- **Automatic Smoke Detection system**
  Automatic smoke detection system shall be provided in electric meter room/panel, electric shaft, each lift machine room & fitness center as per IS specifications.

- **Portable Fire Extinguishers**
  Portable fire extinguishers are intended as a first line of defense to cope with fires of a limited size. They are needed even if the property is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment. The fire protection guidelines are general in nature and are not intended to abrogate specific requirements of other codes and/or policies and procedures. The following general rules apply to most facilities:
  - A fire extinguisher must be within 75 feet travel distance to any area of a building (does not have to be in a room). Travel distance cannot include stairs, steps, or locked doors
  - Fire extinguishers must be of the appropriate type for the area. For this reason, fire extinguishers must be removed, relocated, purchased, serviced, and installed by the building's fire equipment technicians
  - Fire extinguishers must be visible or signs posted to identify location. Access to fire extinguishers cannot be obstructed

  Portable fire extinguishers are provided at locations mentioned below
  - One dry chemical powder type fire extinguishers of 09 kg capacity having ISI certification mark and two bucket filled with dry, clean sand shall be kept in electric meter room and in each lift machine room and at car parking area at every 100 sq.mtrs. area.
  - One dry chemical powder type fire extinguishers of 09 kg capacity having B.I.S certification mark shall be kept on each floor level at prominent place & refuge area.
  - All above fire extinguishers should be placed on each floor level as per IS: 2190 of 1992.

- **Emergency escape route plan**
  - Suitable signages shall be provided in the basement showing 'Exit direction', Ways to exits etc.
  - The escape route shall be lighted to have a minimum luminance of 2.5 lux.
  - Smoke check lobby, Staircase, Common passage & Escape route of the entire building shall be painted with fire retardant paint.

Figure 8: Typical refuge floor evacuation layout

- **Staircase & Fire escape lifts**

Building No	Staircase	Staircase width
Residential	03 nos.	1.50 m

- **Leakage of LPG without fire:**
  Cordon off the area around 30 m radius so that no vehicle or source of ignition approaches the area. Attempt must be made to close the control/ manual valve.
  - Open all windows to increase ventilation and hence prevent buildup of vapor cloud. Avoid getting entrapped in the cloud vapor
  - Water sprays should be used to disperse the vapor cloud
  - Warn the surrounding areas to put off all naked flames

➢ **Power Failures**

Failure of electrical power to building will have a serious impact on operations, particularly if the failure occurs during normal operating hours when the building if fully occupied. A power failure may be a brownout (a partial reduction in service) or a total blackout.
Power failure can be caused either by man-made or natural events. Man- made causes may include drivers who collide with utility poles or power transformers, human error in operating equipment within the building or outside it (such as at the utility company supplying the power), or malicious tampering. Natural events include storms, floods, and earthquakes.

Power failures also can cause computer memory loss and equipment damage. If the power loss is anticipated, computers and computer systems can be shut down before it occurs. If no prior notice is received, the equipment should still be turned off as quickly as possible to avoid potential serious damage to the electrical system from the sudden surge of power when it is first restored. Computer systems, particularly mainframes, often are equipped with an uninterruptible power supply (UPS); and personal computers often are equipped with surge protectors to reduce the chance of damage when power fluctuates, surges, or is lost.

Buildings have emergency and standby power systems to provide safety and comfort to building occupants during interruptions in their normal power supply. These systems also provide power to operate building communication systems and to provide a minimum number of elevator functions. Both functions are critical to buildings during power failures.

- **Power failure backup**
  Emergency power systems are a type of system, which may include lighting, generators, fuel cells and other apparatus, to provide backup power resources in a crisis or when regular systems fail. Emergency power systems can rely on generators, deep cycle batteries, and flywheel energy storage or hydrogen fuel cells.

- **Emergency Power Backup:**
  1 nos. of diesel generator sets of capacities 500 kVA has been proposed at site. The diesel generator will backup common area lighting, lobbies, staircase & lifts etc. Emergency backup for the (Common loads, Environmental management facilities) essential load will be provided.
  The generating capacity to be installed will provide Essential power requirements of all systems/services. Auto Mains Failure (AMF) scheme is proposed for DG Sets.

- **Note:**
  Ratings of D.G. sets will be reviewed after finalization of all designs and before inviting tenders.
  It is proposed to install emergency backup only for Essential loads using Diesel Generating Sets for supply of power when mains power is not available.

- **Maintenance of the DG:**

The vendor will provide the AMC for 3-5 Years as a part of contract. On expiration, the AMC will be renewed on annual basis.

- **Uninterruptible power supply (UPS)**
  An uninterruptible power supply, also uninterruptible power source, UPS or battery/flywheel backup is an electrical apparatus that provides emergency power to a load when the input power source, typically the utility mains, fails. A UPS differs from an auxiliary or emergency power system or standby generator in that it will provide instantaneous or near-instantaneous protection from input. This will be used to backup important server and computer system.

c) Display evacuation plan in times of disaster

- **Evacuation**
  - Stay calm; do not rush or panic
  - Safely stop your work
  - If safe, gather your personal belongings; take prescribed medications with you
  - If safe, close doors and window but do not lock them
  - If in parking lot, immediately park your car so that the access to other vehicles as well as people are not hampered and proceed to the nearest exit by staircase or as guided.
  - Location of all exit corridors, exit stairs and exit serving the building would be marked and provided during commissioning stage.
  - An evacuation team consisting of building management, the building Facility Manager, security, Security In-charge, and floor response personnel should be organized and trained. This should be coordinated with all building tenants and designed in conjunction with developing the bomb incident plan. The team will be trained in how to evacuate the building during a bomb threat. The order in which to evacuate—for instance, by floor level should be established.
  - Evacuate the floor levels above and below the danger area to remove occupants from danger as quickly as possible. Training in such an evacuation usually is made available by building management, with advice supplied by local law enforcement and the fire department.
  - The evacuation team also may be trained in search techniques, or there may be a separate search team. Volunteers should be sought for this function; however, Security In-charge, search monitors, and the like could be assigned to the task. To be proficient in searching the building, search personnel must be thoroughly familiar with all hallways, restrooms, false ceiling areas, and other locations in the building where an explosive or incendiary device could be concealed. Thus it is extremely important for the evacuation or search team to be thoroughly trained and familiar with both the inside of the building and immediate outside areas. When a room or particular area has been searched, it should be marked or sealed with a piece of tape and reported as clear to the appropriate supervisor.
  - The team will be trained only in evacuation and search techniques and not in the techniques of neutralizing, removing, or otherwise having contact with the device. If a device is located, it should not be disturbed. However, its location should be well marked and the route to it noted.

Table 11: Refuge Floor

Building		Location of refuge floor
Residential	Wing A	6th & 13th Floor
	Wing B	6th & 13th Floor
	Wing C	

In addition to that, terrace above 19th floor (part) of wing A and Wing B & C will be treated as refuge floor.

- **Fire Engine Access Movement**
  The site layout & Fire Engine Movement has been shown, for the site.

An adequate space has been provided to escape and access for fire-fighting equipment and vehicle.

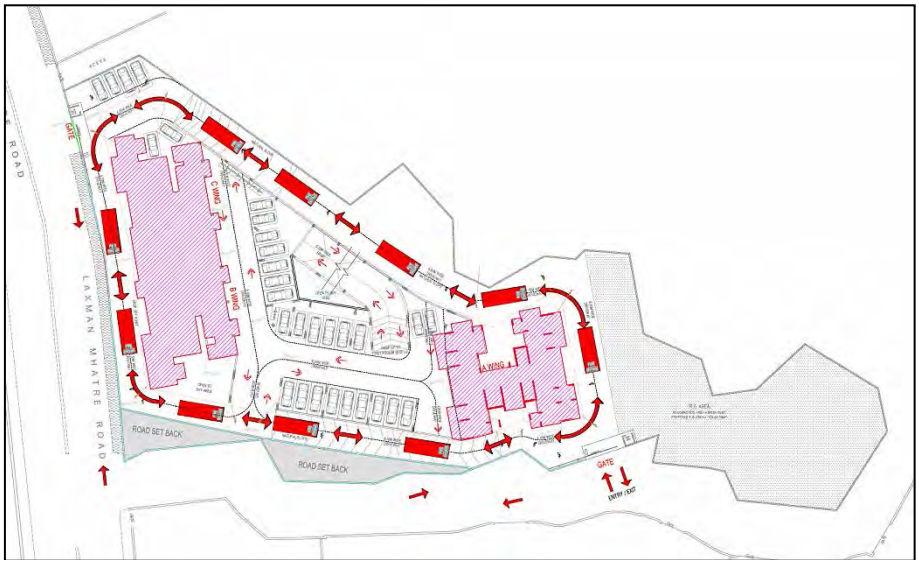


Figure 9 : Fire Tender Movement layout

- **Demonstration/ Civil Disturbance Procedures**

  Most demonstrations are peaceful and if one is conducted near or in your building, carry on work as usual. Avoid provoking or obstructing demonstrators. Should a disturbance occur, call Police for assistance.

  If protestors enter your building, let them. Try to carry on work as usual. If the noise becomes too loud, or the crowd too large, feel free to close and lock your podium gate– this decision needs to be taken by society manager or managing committee of society in conjunction with local police authority only. Proceed to the EAA and wait for additional instructions.

d) Prepare and disseminate pamphlets on each disaster for occupants covering Do's and Dot's for each type of disaster

- Do's & don't in Flood/Earthquake /fire are given in Standard Operation Procedure attached as an enclosure to DMP.

v. On-Site Disaster during Operation Phase

a) Site disaster manager to take charge and give guidance over public address system

- Facility Manager will take charge and give guidance over public address system during operation phase from Fire control room.

b) Call for outside assistance of fire brigade, Hospitals, ambulances

Table 12: Emergency number of Hospital, Fire station & Ambulances

Hospital		
Shanti Ghar Maternity & Housing Home	Approx.0.50 km	+91 22 2892 4242
Chamunda Hospital	Approx 4.00 km	+91 22 2893 2938
Anand Hospital	Approx 1.00 km	+91 22 28482776
K. K. Hospital	Approx 1.00 km	--
Navdurga Hospital	Approx 1.00 km	+91 22 2895 3049

Karuna Hospital	Approx 1.00 km	+91 22 2893 4698
Fire Station		
Brha Mumbai Mahanagar Palika Dahisar Fire Station	Approx.3.00 km	--
Ambulance		
Life line Cardiac Ambulance	Approx. 10.00 km	+91 98695 09090

c) Networks with state, district and ward level control rooms

- The response structure given in the ward plan essentially limits itself to micro-level intervention. When more than one ward are affected, BMC control room which is the co-ordinating authority, would expect the ward officers to co-ordinate the activities at the ward level with the line agencies such as Fire Brigade, Police etc. The responsibilities for all the ward level functionaries have been identified by M.C.G.M.

➢ **Details of 'R ward officer's responsibilities are given on MCGM website:** http://www.karmayog.com/floods/mumbai_'r ward'_plan.htm

d) Ensure adequate warning before switching off power

- All announcements will be done with good quality equipment's.
- Switching off power will be done only after having current status of the all building facilities from concern In-charge.
- With the help of CCTV camera will confirm that if any trapped in basement & lift during the disaster.
- Parking In-Charge and lift man will ensure that no occupants is trapped inside the building and Security In-charge will confirm with Parking In-Charge and lift man
- Emergency Electrical switch is at the meter room will be operated by only authorized person under instruction of Security In-charge

e) Assure occupants of continuous communication and take all, measures to keep up their morale

- Periodical mock drill will be arranged by the Facility Manager / Security In-charge
- Through training & info will be given to occupants about the available rescue sources, rescue plans
- Assurance will be given to occupants that evacuation will be done by trained volunteers, so occupants will be trained that how to co-operate with volunteer during disaster

f) Guide occupants on the steps being taken for evacuation in systematic manner

- This requirement will be handled by dedicated trained volunteers

Procedures for people during emergencies:

- By law building occupant may be required to evacuate when the fire alarm is raised
- For floors beyond 10, evacuation has to be done to the nearest refuge area through staircase exit only
- The floor diagram will be provided to every floor which can show the entry and exit during evacuation
- Proper sign showing the exit route, Primary evacuation routes leading to the designated assembly point (solid lines) would be provided
- Use the nearest stairs and proceed to the nearest exit. Do not use the elevator
- If in parking lot, immediately park your car so that the access to other vehicles as well as people are not hampered and proceed to the nearest exit by staircase or as guided
- Duck under the nearest sturdy object and hold onto it until tremors stops. If you are not near a sturdy object, make yourself as small as possible and cover your head and neck when earthquakes occurs

- In case of fire, move away from fire and smoke. Close doors and windows if time permits. Touch closed doors. Do not open them if they are hot

Procedures for people with disabilities during emergencies:
In all emergencies, after an evacuation has been ordered:

- Evacuate people with disabilities if possible
- Do not use elevators, unless authorized to do so by police or fire personnel. Elevators could fail during a fire or a major earthquake
- Check on people with special needs during an evacuation. A "buddy system", where people with disabilities arrange for volunteers (neighbors) to alert them and assist them in an emergency, is a good method
- Attempt a rescue evacuation ONLY if you have had rescue training or the person is in immediate danger and cannot wait for professional assistance
- Always ask someone with a disability how you can help BEFORE attempting any rescue technique or giving assistance. Ask how he or she can best be assisted or moved, and whether there are any special considerations or items that need to come with the person

g) Take steps to reduce/ eliminate panic

- Periodical training to internal volunteers & members.
- Periodical mock drills to all occupants, members, volunteers
- Evacuation assurance to occupants by trained personals or external force volunteers during emergency

h) Liaise with law and order machinery

- Facility Manager after occupancy of project will liaise with police Fire Brigade, Civil Defense, BEST etc.

vi. Preventive Measures

- Arrangement of periodical training for each disaster & equipment
- Provided Fire detection & fighting systems
- Automation will be there for warning system
- 24x7 fully trained Security staff
- One Copy of SOP to all Occupants
- Do's & Don'ts template at designated location of each buildings
- Preventive maintenance to all machineries & equipment
- Tagging of date for last preventive maintenance on every emergency equipment

a) Regular inspection of equipment and systems mandated by Chief Fire Officer in the NOC granted

- Regular inspection will be carried out by competent and dedicated engineer of O&M employed contractors at regular intervals for all kinds of equipment & system
- Preventive maintenance will also be carried out after checking equipment during a mock drill.

b) Scrupulous adherence to approved plan of building and protection of system put in place to handle disaster

- No violation or changes will be done
- In Operation stage at the time of entry, emergency preparedness plan's training shall be conducted and reoriented after every drill conducted

c) Regular maintenances of equipment and systems

- Periodical maintenance will be carried by certified, competent and skilled employed contractors at regular intervals.

- Maintenance of lift will be done at regular intervals by the lift company who will install the lift.

Cost towards Disaster management Plan:
During Construction Phase: Rs. 42.95 Lakh
During Operation Phase:
Set up Cost: Rs. 295.00 Lakh and
O&M cost: Rs. 10.3 Lakh/yr.

Summary:
Prepare occupants in your building ahead of time for emergency evacuations. Know your building occupants. Awareness of the needs of people with disabilities and to know how to offer assistance. Hold evacuation drills in which occupants participate, and evaluate drills to identify areas that need improvement. Plans must cover regular working hours, after hours, and weekends. Everyone needs to take responsibility for preparing for emergencies. People with disabilities should consider what they would do and whether they need to take additional steps to prepare. "Emergency Guidelines for People with Disabilities" may be available from your Building Coordinator.

Conclusion
M/s. Kolte-Patil Developers Ltd. will appoint the certified contractor who will periodically review and update the Disaster Management 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.)

Annexure:

Table 13 : Cost during Construction Phase

No	Disaster	Mitigation measures during construction phase	Cost (Rs. In Lakhs)
1.	Site Health & Safety	**H & S Workers**	
		Safety Shoe, Cover All, Goggles, Gloves - Cotton, Gloves - Rigger, Safety Jacket, Safety Helmet, Safety Harness	8.00
		H&S Room	1.00
		H&S for Staffs	
		Safety Helmet	0.10
		Safety Shoe	0.50
		Safety Jacket	0.10
		Safety Harness	0.20
		First Aid (Staffs & Workers)	0.50
		Welfare	2.00
		Safety Training	1.00
		Safety Certificates	2.00
		Safety Signboard, Warning Tapes & Paints	0.50
		Fire Extinguisher DCP 4.50kg	0.50
		Fire Extinguisher CO2 10Lbs	0.30
		Perform Maintenance	0.20
		Safety nets for Podium	8.00
		Safety nets for Tower Area	2.00
		Outside green net	4.00
		Life Line Rope & Clamp	2.00
		12mm Wire Rope	1.00
		Heavy Duty Clamp	0.50
2	Tower crane	Periodic check & 3rd party certification	0.30
3	Man and Material Hoist	Certified/approved hoist to be used by trained employees for access and evacuation.	8.25
		Total Costing	42.95

Table 14 : Cost during Operation Phase

No.	Disaster	Mitigation Measures During Operation Phase	Set up Cost (Rs. In Lakhs)	O&M Cost (Rs. In Lakh/annum)
1	Flood	Dewatering pump system (2 Nos.)	2.00	0.06
		SWD system with oil and grease traps	2.00	0.06
2	Lightning	Lightning Arrester	3.50	0.105
3	Fire	D.G. Sets (500KVA) 1 Nos.	50.00	2.5
		Fire Fighting System all pumps	20.00	0.6
		Fire Fighting System Wet Risers	35.00	1.05
		Fire Fighting System External Hydrant System	35.00	1.05
		Fire Fighting System Sprinkler System	50.00	1.5
		Fire Fighting System Fire Extinguishers	10.00	0.03
		Fire Fighting System Signages	3.00	0.09
		Fire Fighting System FHC doors	13.00	0.39
		Fire Alarm System	49.00	1.47
4.	Rescue Equipment	Steel Ropes	0.4	0.012
		Ropes	0.4	0.012
		Chains	0.29	0.0087
		Harness	0.75	0.0225
		Torches, radium signal & symbol sign boards	0.25	0.0075
		walky talky	0.16	0.0048
		Dust masks	0.15	0.0045
		Tyres, Hammer, Shovel, Spade, Mud pan etc	0.10	0.003
5.	Medical Equipment For Emergencies	Wheel chairs and Stretchers	0.2	0.006
		Stretchers	0.1	0.003
		First Aid box containing general medicines	0.2	0.006
		Equipment	0.5	0.015
6.	Other Tools	CCTV camera	18.00	1.26
7.	Aircraft Collision	Aircraft Warning Lights	1.00	0.03
		Total Costing	295.00	10.3

SOP NO. 1: FIRE/ EXPLOSION & EVACUATION

I	CHIEF SITE CONTROLLER
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 emrgency co-ordibnator 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.

II	SITE INCIDENT CONTROLLER
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.
II	**SITE INCIDENT CONTROLLER**
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.

III	**EMERGENCY CO-ORDINATOR**
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 fire fighting 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.

IV	**SUPERVISOR**
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.

IV	SUPERVISOR
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.

V	EMERGENCY RESPONDENT TEAMS – (SAR) TEAM
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	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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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.

VII	EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM
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.

VIII	ALL OTHER AT SITE
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

I	CHIEF SITE CONTROLLER
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.

II	SITE INCIDENT CONTROLLER
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 fire fighting and evacuation operations, keep communication with emergency teams and the affected persons in the building especially in lifts and rooms.

II	SITE INCIDENT CONTROLLER
10	Account for all occupants at the assembly area and give head count, missing persons feed back 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.

III	EMERGENCY CO - ORDINATOR
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 fire fighting materials, rescue materials.

III	EMERGENCY CO - ORDINATOR
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.

IV	SUPERVISOR
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 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.

V	EMERGENCY RESPONDENT TEAMS – (SAR) TEAM
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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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.

VII	EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM
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.

VIII	ALL OTHER AT SITE
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

I	CHIEF SITE CONTROLLER
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 emrgency co-ordibnator 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.

II	SITE INCIDENT CONTROLLER
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 especailly in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinary.
9	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team.

II	SITE INCIDENT CONTROLLER
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.

III	EMERGENCY CO - ORDINATOR
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 contineous communication and take all measures to keep up their morale high.
8	Liaise with the law and order machinary.
9	Call for participating in the emergency response and coordinate between all emergency respondants 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.

IV	SUPERVISOR
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.

V	EMERGENCY RESPONDENT TEAMS – (SAR) TEAM
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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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 equpiments (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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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 dranage, 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.

VII	EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM
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.

VIII	ALL OTHER AT SITE	
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

I	CHIEF SITE CONTROLLER
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.

II	SITE INCIDENT CONTROLLER
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 especailly in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinary.
9	Account for all occupants at the assembly area and give head count, missing persons feed back to SAR team.

II	SITE INCIDENT CONTROLLER
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.

III	EMERGENCY CO-ORDINATOR
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 respondants 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.

IV	SUPERVISOR
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.

V	EMERGENCY RESPONDENT TEAMS – (SAR) TEAM
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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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 equpiments (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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
6	Ensure adequate warning to Emergency Co-Ordinator before stopping power to lifts, bring the lifts to safe position.
7	Ensure working of dranage, 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.

VII	EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM
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.

VIII	ALL OTHER AT SITE
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

I	CHIEF SITE CONTROLLER
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.

II	SITE INCIDENT CONTROLLER
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 especailly in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.

II	SITE INCIDENT CONTROLLER
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 machinary.
11	Carry out fire fighting and evacuation operations, keep communication with emergency teams and the affected persons in the building especailly 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.

III	EMERGENCY CO-ORDINATOR
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'.

III	EMERGENCY CO-ORDINATOR
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.

IV	SUPERVISOR
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.

V	EMERGENCY RESPONDENT TEAMS – (SAR) TEAM
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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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.

VII	EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM
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.

VIII	ALL OTHER AT SITE
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

I	CHIEF SITE CONTROLLER
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.

II	SITE INCIDENT CONTROLLER
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 especailly in lifts and rooms.
7	Guide occupants on the steps being taken for evacuation in a systematic manner.
8	Assist the law and order machinary.

II	SITE INCIDENT CONTROLLER
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.

III	EMERGENCY CO-ORDINATOR
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 respondants 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.

IV	SUPERVISOR
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.

V	EMERGENCY RESPONDENT TEAMS – (SAR) TEAM
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.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
1	On receiving emergency alert proceed to respective work places or as directed from ECC.
2	Restore power supply in case affected to emergency equpiments (Loss of power will mean loss of fire systems if prolonged).
3	Restore Power supply to emergency lighting.

VI	EMERGENCY RESPONDENT TEAMS – ENGINEERING TEAM
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 dranage, 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.

VII	EMERGENCY RESPONDENT TEAMS – ADVISORY TEAM
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.

VIII	ALL OTHER AT SITE
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.

ANNEXURE 1: DO'S & DON'T

FIRE /EXPLOSION	
DO'S	**DON'TS**
▪ **On noticing fire emergency actuate nearest fire alarm button and/ or inform the Supervisor and follow further instructions and proceed to assembly point.** ▪ **Supervisor to inform fire brigade and mobilize fire fighting trained persons,** ▪ **Cordon off the area, move upwind and evacuate the area.** ▪ **Keep the gas cylinder cool with water spray.** ▪ **Use AFFF (Aq. Film Forming Foam)to blanket the oil ,diesel spill area.** ▪ **If there's a lot of smoke, crawl along the floor where the air will be cleanest.** ▪ **In case cloth on fire lie on ground and cover in blanket.** ▪ **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.**	▪ Do not enter the site unless instructed if you are outside and disaster alarm is heard. ▪ No smoking ▪ Avoid use of lift during fire at building. ▪ Do not panic. Avoid running all over the place prevent others from doing so. ▪

BOMB THREAT	
DO'S	**DON'TS**
▪ **Cordon off the area.** ▪ **Evacuate the area** ▪ **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.** ▪ **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.** ▪ **Consideration should be given to suspicious vehicles/packages at the ECC and Assembly points also.** ▪ **Follow the rule "DO NOT TAKE THE BOMB AWAY FROM THE PUBLIC. TAKE THE PEOPLE AWAY FROM THE BOMB".**	▪ Do not panic. ▪ 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. ▪ Do not switch on any electric line, if the room is dark. Use hand torch for illumination. ▪ 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.
LETTERS/ PACKET/ PARCELS/ BOOKS BOMB	
Do follow those instructions intelligently and closely.	**Don't** bend or press hard.
Do examine all closed covers, thin or bulky, against a source of a strong light, if cover is not uniformity translucent, suspect.	**Don't** open a closed cover which is more than 3 mm thick until you have examined it according to the instructions.
Do handle object gently, carefully and cautiously.	**Don't** hastily pull out content of closed cover until you have examined them.
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.	**Don't** pull out contents of a closed cover if it does not come out smoothly.

EVACUATION

DO'S	DON'TS
• **Remain calm.** • **Walk out of the building quietly and orderly manner.** • **Follow the evacuation route only.** • **Follow instruction from guides on any confusion about the route and assembly area.** • **Switch off the machinery and power supply before leaving the area.** • **Help ladies and old people to safe area.** • **Remain in the assembly area until further instructions are given.** • **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.** • **Use staircase during evacuation** • **While Evacuation keep clear of buildings and glass in particular**	• Do not run. Walk calmly. • Do not argue or try to obtain details about the bomb from anybody leading to time loss. • Do not obstruct the flow of evacuation. • Do not leave any personal belongings. • Do not obstruct passage to anybody. • Do not make noise at the assembly area. • Do not spread rumors. • Do not use lift during evacuation .

Cyclone

DO'S	DON'TS
BEFORE THE CYCLONE SEASON • **Check your building and roof are in good condition.** • **Trim tree branches well clear of your house.** • **Clear property of loose material that could cause injury and damage during extreme winds.** **UPON A CYCLONE WARNING** • **Listen to local radio/TV for further information** **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.**	**UPON A CYCLONE WARNING** • Don't ignore warnings and don't go sightseeing. **WHEN THE CYCLONE STRIKES** • 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. • If driving, stop - clear of trees, power lines 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	**DON'TS**
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.**	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 •
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.** • **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.** • **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.** • **Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.** • **Let younger children, elderly and disabled people leave first.**	• 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. .
OUTDOORS • **Stay there if safe.** • **Move away from buildings, streetlights, and utility wires.** • **You must keep the roads free for movement of rescue and relief teams**	OUTDOORS • 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.
IN A MOVING VEHICLE • **Move to side of the road and stop. Stop as quickly as safety permits and stay in the vehicle.** • **Proceed cautiously once the earthquake has stopped, watching for road and bridge damage.**	IN A MOVING VEHICLE • Avoid stopping near or under buildings, trees, overpasses, and utility wires.
TRAPPED UNDER DEBRIS • **Cover your mouth with a handkerchief or clothing.** • **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.** • **Rescue operation - Let the unconscious person lie on side position. Check for injuries and first treat yourself, then help others.**	TRAPPED UNDER DEBRIS • Do not light a match. • Do not move about or kick up dust.

1. **During earthquake**

झुको [Drop]	ढको [Cover]	पकड़ो [Hold]

2. **Escape. When your are inside building.**

If you are in structurally sound building stay there.	If you are inside an old weak structurally take the fastest and safest way out.

Do not use elevators.	After the shaking stops, take the staircase to reach open space.

3. **When your are outside building.**

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.	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.

Move away from power lines, posts, walls, false ceiling, parapet, falling flower pots and other elements that may fall or collapse.	Stay away from building with glass panes.

4. **When on the road.**

If you are near hillside, move away –in case land slide or falling rocks.	While driving vehicle pull to the side of the road and stop.	Do not attempt to cross bridges / flyovers which may have been damaged.

FLOOD	
DO'S	**DON'TS**
▪ **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.**	▪ 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

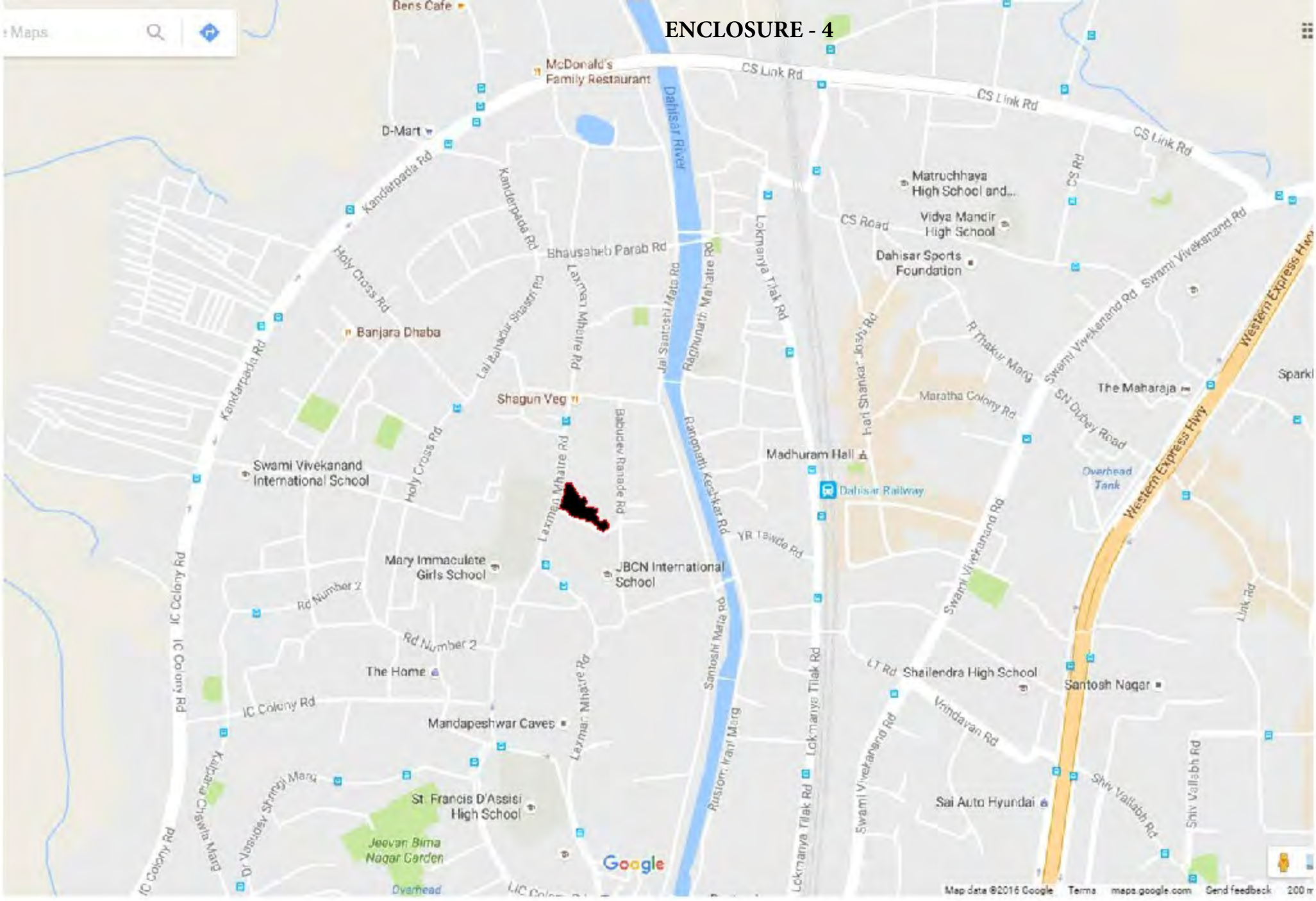
Aftershock	**An earthquake of similar or lesser intensity that follows the main earthquake.**
Bomb	A device or any size or shape, which can look obvious or be camouflaged, may vary in its sophistication, and may not necessarily explode (i.e incendiaries, toxic/noxious substances, sharps, animals/reptiles). May be referred to as an Improvised Explosive Device (IED).
Bomb Threat	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.
Cyclone	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 convention 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.
Depression (low pressure area)	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).
Disaster	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."
Doppler Radar	A 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.
Earthquake	A sudden slipping or movement of a portion of the earth's crust, accompanied and followed by a series of vibrations.
Emergency	An emergency is a dangerous event or circumstance that normally can be managed at the local level.
EMERGENCY RESPONSE TEAM (ERT)	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.
Epicenter	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.
Evacuation	The orderly movement of people from a place of danger.
Evacuation	Organized, phased and supervised dispersal of people from dangerous or potentially dangerous areas.
Explosion	A sudden release of energy characterized by accompaniment of a blast wave.
Eye of the Cyclone	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.
Fault	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.

Fire	**A process of combustion characterized by heat or smoke or flame or any combination of these. Hazard - any situation that has fire potential.**
Gale	Wind with a speed between 34 and 40 knots (Beaufort scale wind force 8).
Hazard	A hazard is a dangerous event or circumstance that has the potential to lead to an emergency or disaster.
Knot	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 kilometres per hour.

Landfall	A point on the land where a cyclone just crosses the coast.
Magnitude	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.
Mitigation	Activities taken to reduce the severity or consequences of an emergency.
Mitigation	Mitigation means measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation.
Personal Emergency Evacuation Plan (Peep)	An individualized emergency plan designed for an occupant with a disability who may need assistance during an emergency.
Physically Challenged Person	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.
Preparedness	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.
Probability (P)	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.
Recovery	Efforts to return to normal life and protect against future hazards.
Refuge	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.
Response	Immediate and ongoing activities, tasks, programs, and systems to manage the effects of an incident that threatens life, property, operations, or the environment.
Response	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.
Seismic Waves	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.
Severity (S)	The expression for the consequence seriousness associated with each deviation.

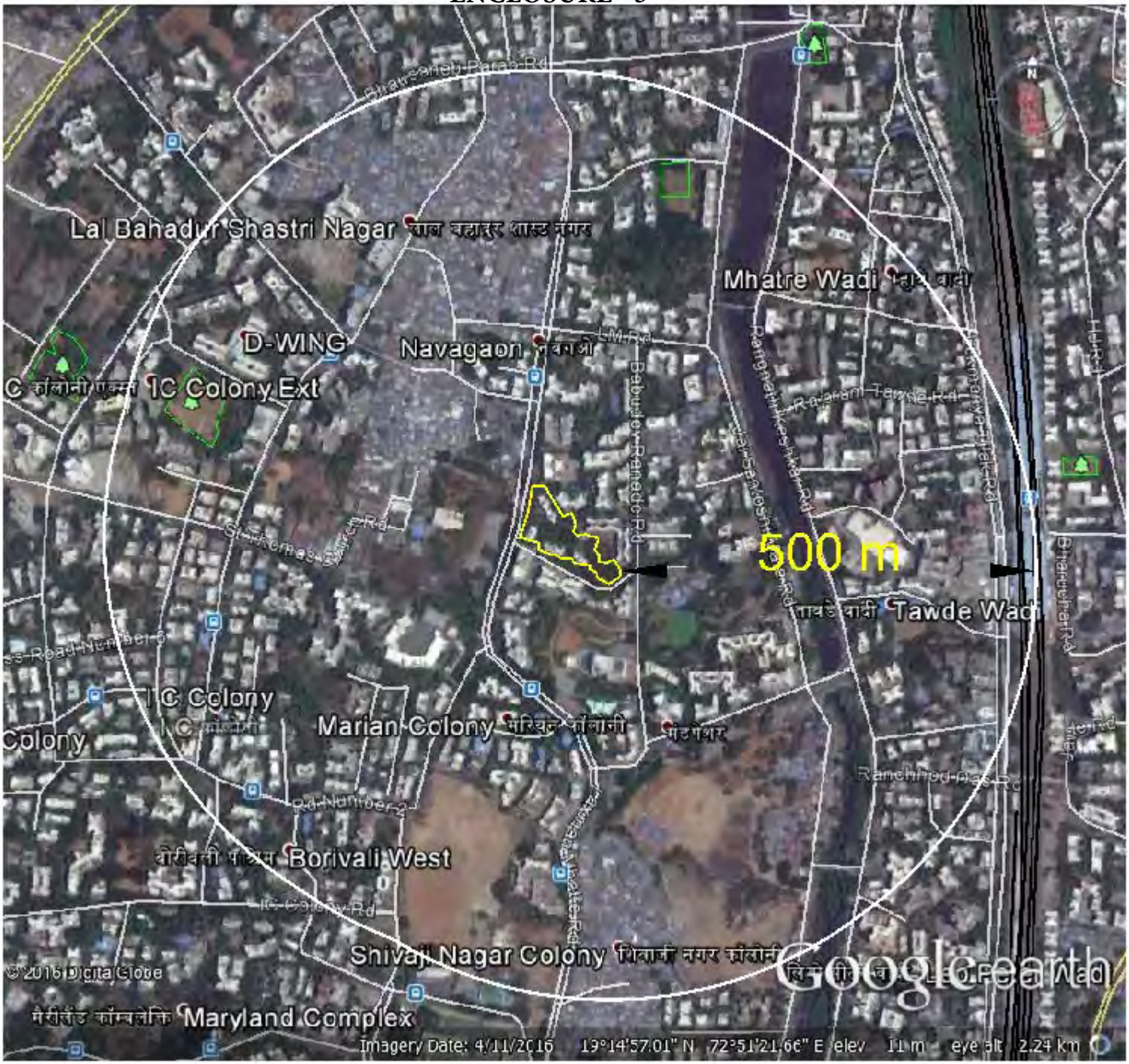
Smoke	**Smoke is defined as a mixture of hot vapors and gases produced by the combustion process along with unburned decomposition, condensation matter and the quantity of air that is entrained or otherwise mixed in to the air**
VISITOR	A person who is within a facility who is temporarily visiting the 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.
Vulnerability	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.

ENCLOSURE - 4

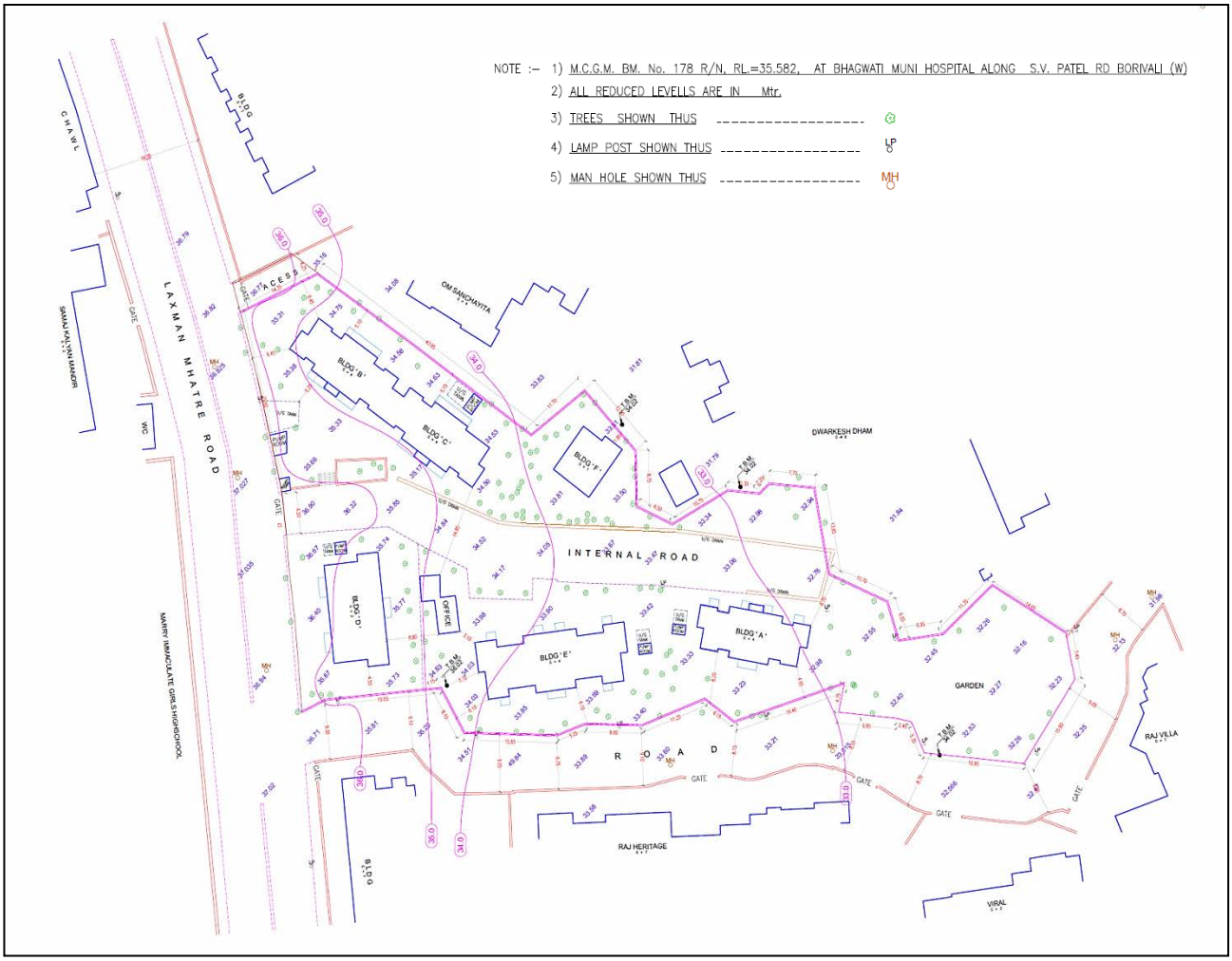


Bens Cafe
McDonald's Family Restaurant
CS Link Rd
CS Link Rd
CS Link Rd
D-Mart
Kanderpada Rd
Kanderpada Rd
Dahisar River
Matruchhaya High School and...
CS Rd
CS Road
Vidya Mandir High School
Dahisar Sports Foundation
Swami Vivekanand Rd
Bhausaheb Parab Rd
Holy Cross Rd
Lal Bahadur Shastri Rd
Laxman Mhatre Rd
Jai Santoshi Mata Rd
Raghunath Mahatre Rd
Lokmanya Tilak Rd
Hari Shankar Joshi Rd
R Thakur Marg
Swami Vivekanand Rd
Western Express Hwy
Banjara Dhaba
Kanderpada Rd
Shagun Veg
Maratha Colony Rd
SN Dubey Road
The Maharaja
Sparkl
Swami Vivekanand International School
Holy Cross Rd
Laxman Mhatre Rd
Babudev Ranade Rd
Ranganath Keshkar Rd
Madhuram Hall
Dahisar Railway
Overhead Tank
Western Express Hwy
YR Tawde Rd
Mary Immaculate Girls School
JBCN International School
Rd Number 2
Rd Number 2
IC Colony Rd
IC Colony Rd
Swami Vivekanand Rd
Link Rd
The Home
Santoshi Mata Rd
LT Rd
Shailendra High School
Santosh Nagar
IC Colony Rd
Mandapeshwar Caves
Laxman Mhatre Rd
Rustom Irani Marg
Lokmanya Tilak Rd
Vrindavan Rd
Kalpana Chawla Marg
Dr Vasudev Shringi Marg
St. Francis D'Assisi High School
Lokmanya Tilak Rd
Swami Vivekanand Rd
Sai Auto Hyundai
Shiv Vallabh Rd
Shiv Vallabh Rd
Jeevan Bima Nagar Garden
Overhead
IC Colony Rd
Google
Map data ©2016 Google
Terms
maps.google.com
Send feedback

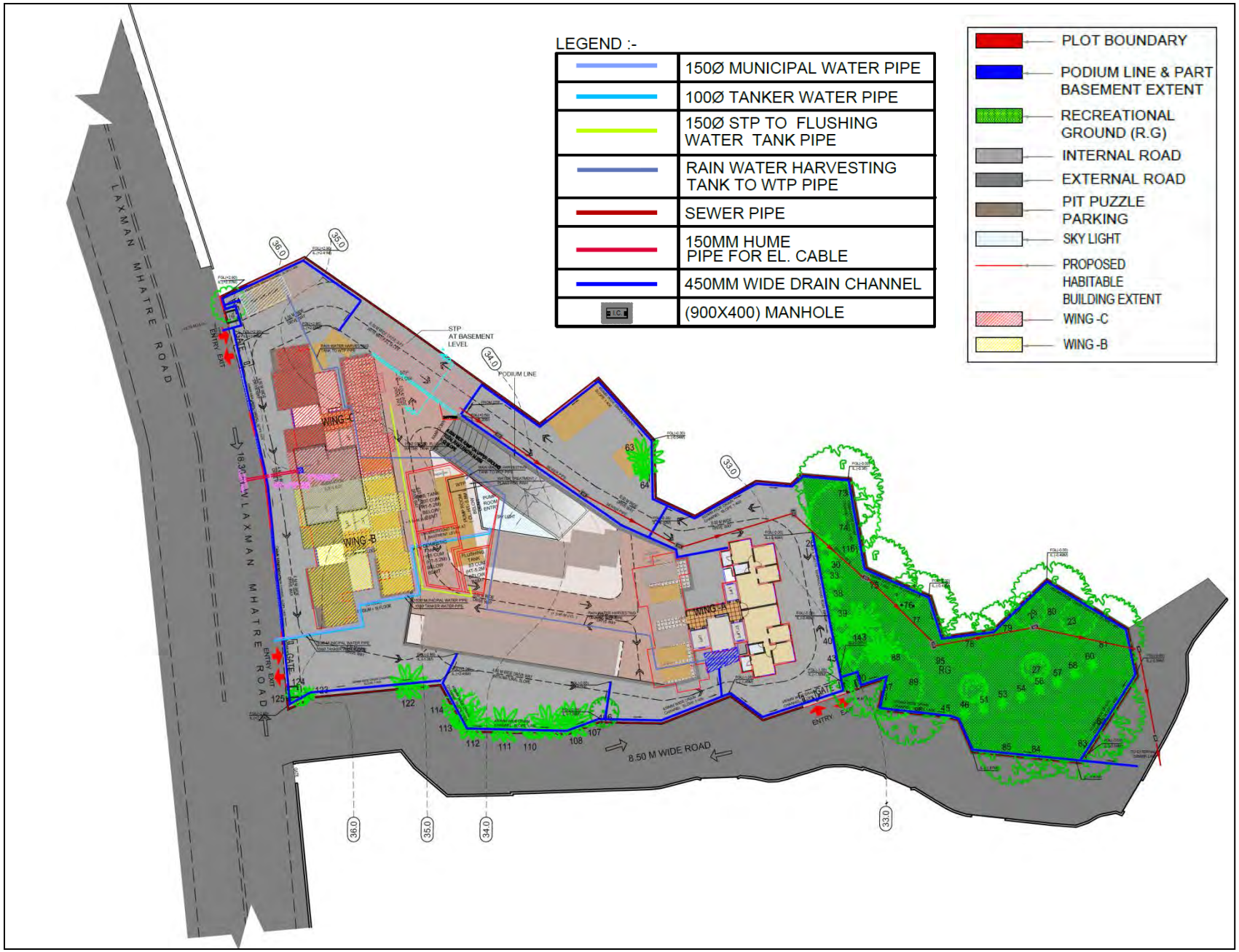
ENCLOSURE - 5


Lal Bahadur Shastri Nagar
Mhatre Wadi
D-WING
Navagaon
C Colony Ext
500 m
Tawde Wadi
C Colony
Marian Colony
Borivali West
Shivaji Nagar Colony
Maryland Complex
Imagery Date: 4/11/2016 19°14'57.01" N 72°51'21.66" E elev 11 m eye alt 2.24 km

ENCLOSURE – 6: CONTOUR PLAN

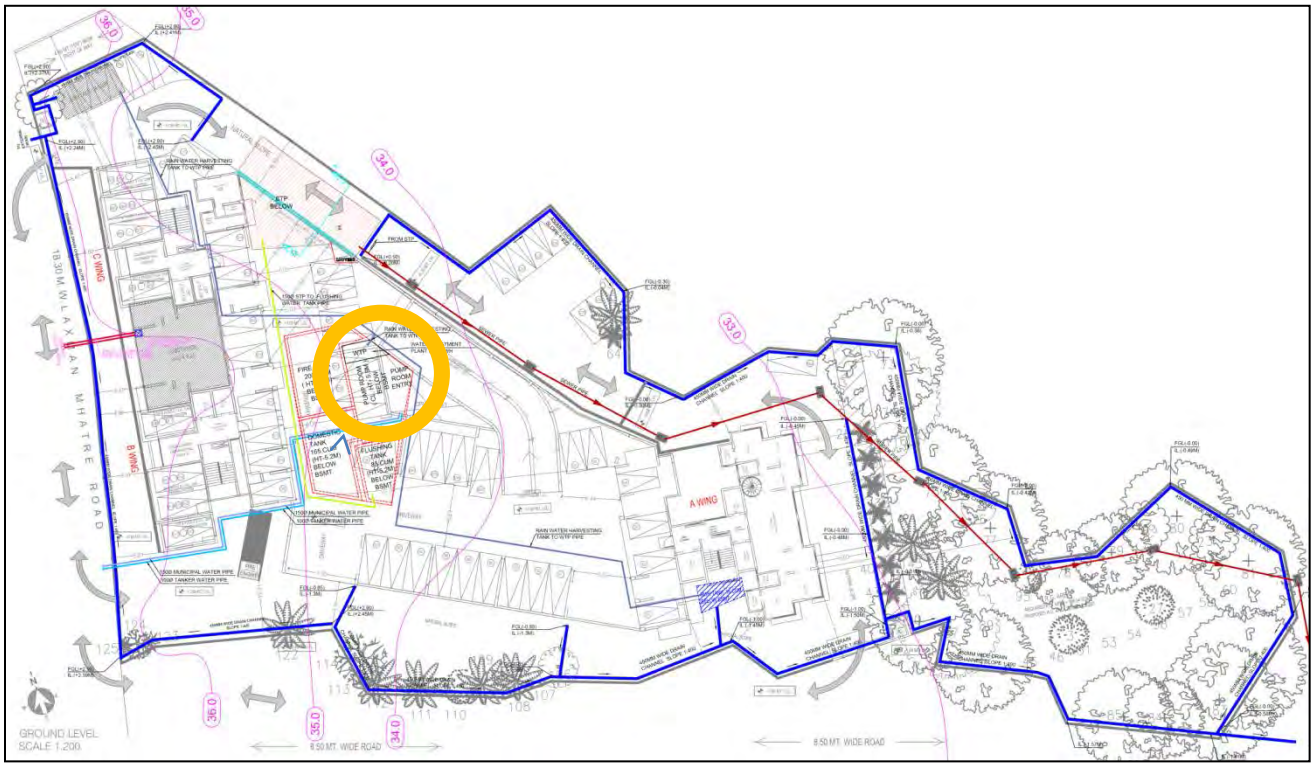


ENCLOSURE - 7: COORDINATED LAYOUT PLAN

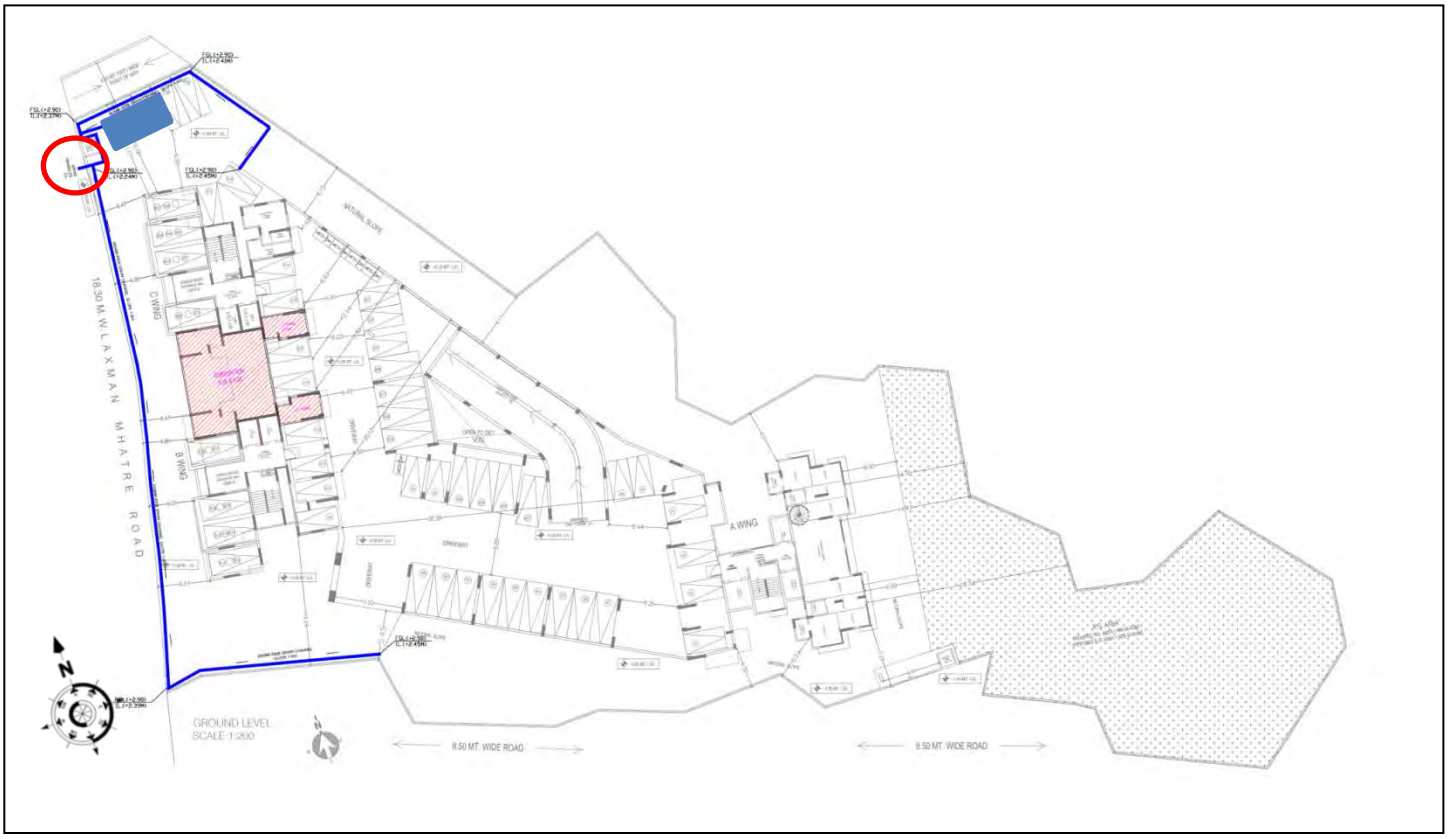


ENCLOSURE - 8

COORDINATED SERVICES LAYOUT



SERVICES PLAN – GROUND LEVEL PLAN

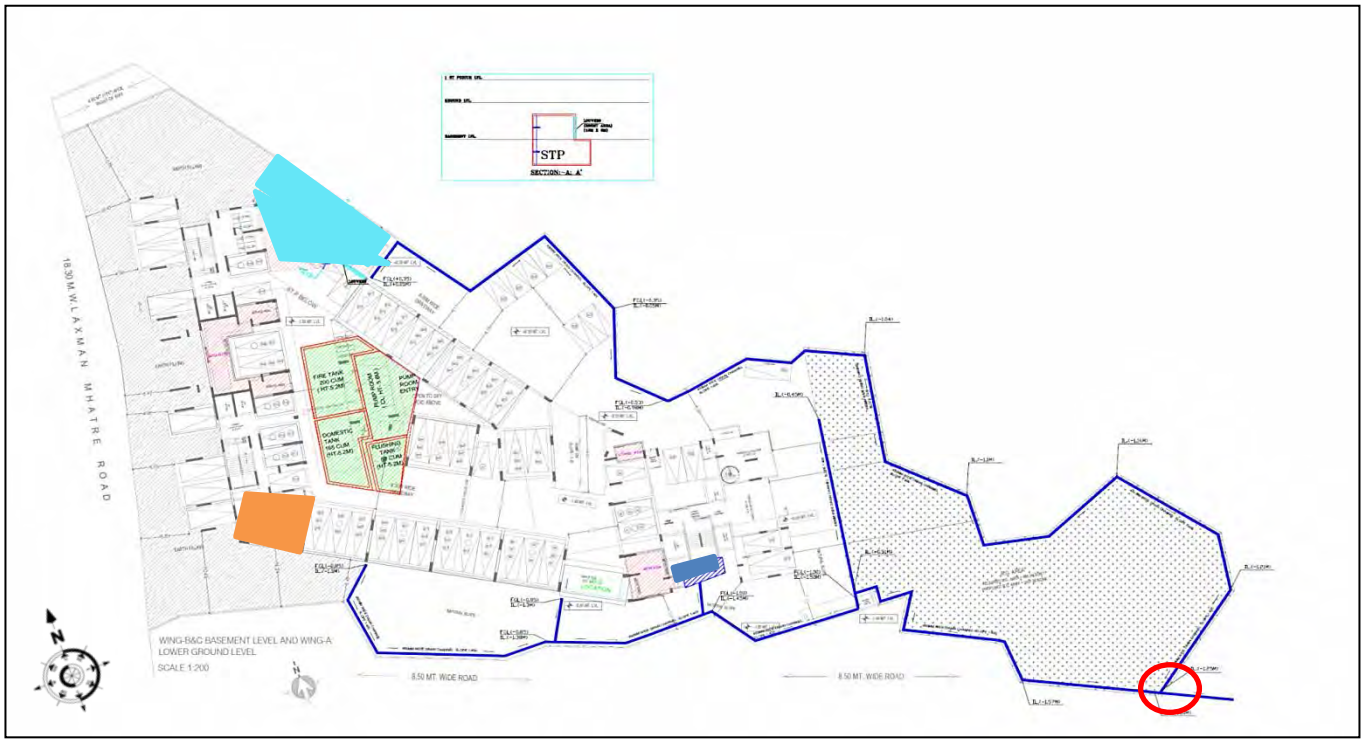


2 Nos RWH tank of capacity 24 KL

Connection to External Drain

RWH Tank

SERVICES PLAN – LOWER GROUND/BASEMENT LEVEL PLAN



1 No. RWH tank of capacity 16 KL

SWM Area

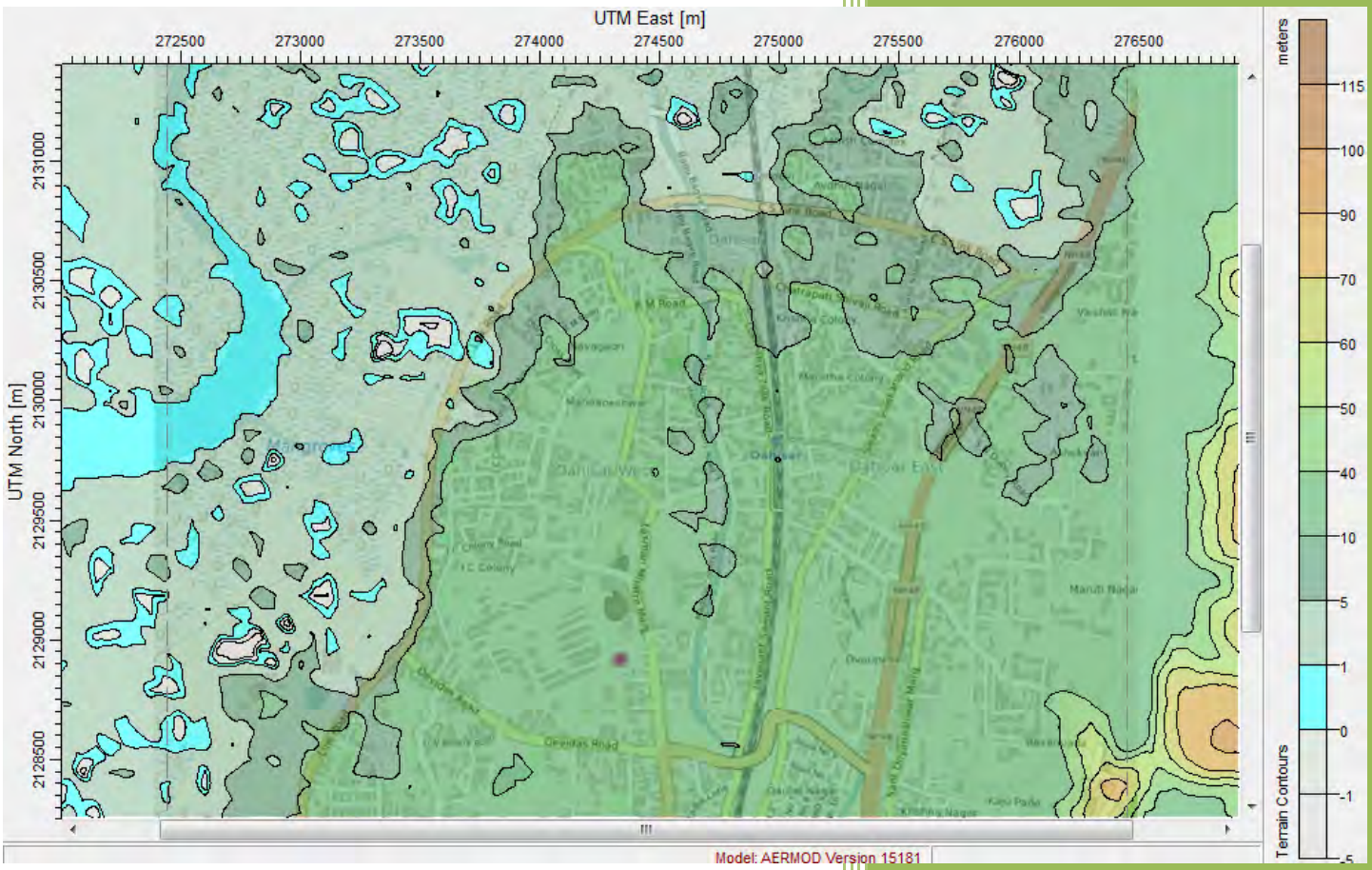
RWH Tank

STP LOCATION

Connection to External Drain

ENCLOSURE - 9

Air Dispersion Modeling Report M/s Kolte-Patil Developers Ltd. Dahisar



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AIR EMISSION AND DISPERSION MODELING

1.1. Introduction

M/s. Kolte-Patil Developers Ltd. is developing a residential complex at plot adjacent to Laxman Mhatre Road. The process of determining power backups along with future traffic levels generated and attracted to the whole development involves the identification of suitable assumptions. Proposed development will have 209 four wheeler parking. Approximate completion time will be three years. The impact on ambient air quality was assessed hereunder in view of the following activities:

- ✓ Analysis and plots as per present traffic
- ✓ Construction source emissions
- ✓ Vehicular re-suspended dust
- ✓ Wind erosion from stockpiling of earlier excavated material and back filling
- ✓ Future analysis considering 25yr traffic projection

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

1.2. Analysis details

1.2.1. 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™ model. This model enables analysis with respect to PM_{10}, $PM_{2.5}$, NOx and CO and gives results in easy to understand graphical format.

The following steps are involved in the analysis:

I. Inputs are entered into the software as per the general modeling parameters.

II. Information on the roadway network, traffic volume, excavated and stockpiled soil, construction activity, generator set and receptor is added to the software.

III. The analysis process is done by the model.

1.3. Input(s) needed and assumption

Table 1 illustrates series of input and some of assumptions gone into the model.

Table 1: Input and Assumptions

Sr. 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^2/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

1.4. 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 researches. 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).

Heavy construction activity and construction of haul road dust emissions were represented as gm/m^2/sec (Ref: USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.3.3). Emission factor for traffic on dusty ground referred from "USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.2". Fugitive dust emission calculations were done with wind erosion emission factor of activity was taken from "USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.5".

For the generators proposed on site details procured from Emission Regulations – Part IV, CPCB'86 was utilized for emissions estimation. Widespread method based on the data available was to use emission factor in terms of pollutant mass per second generator operated. The emission factors have been taken from "AP42 Ref Stationary Internal Combustion Engines Diesel Fired Ref 3.1" prepared by US – EPA.

1.4.1. Data collection

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 2**.

Table 2: Traffic count survey

Location	2W	3W	Car	LCV	Bus	Truck
PRESENT SCENARIO						
Babudev Ranade Road	1730	2006	809	297	0	68
Laxman Mhatre Marg	7791	11981	2553	473	541	126
FUTURE ESTIMATES						
Babudev Ranade Road	4143	4804	1938	711	0	163
Laxman Mhatre Marg	18660	28695	6115	1133	1296	302

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. Construction phase detailing was collected from client. For the generators proposed on site details procured from Emission Regulations – Part IV, CPCB'86 was utilized for emissions estimation.

1.4.2. 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 3**.

Table 3: Vehicular Emission Estimates

Location	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Babudev Ranade Road	0.0027	0.0019	0.0120	0.0372
Laxman Mhatre Marg	0.0241	0.0164	0.0991	0.3213

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 $g/m^2/sec$ and were represented as g/s. Construction vehicle plying on unpaved site road was represented as g/s. Construction phase pollutant emissions are given in **Table 4**. Construction phase pollutant emissions are given in **Table 5**.

Table 4: Emissions for Each Pollutant during construction phase

Location	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Babudev Ranade Road	0.0033	0.0022	0.0144	0.0446
Laxman Mhatre Marg	0.0282	0.0192	0.1161	0.3761
Construction Activity	0.0251	0.0173	--	--
Material trucks	0.0034	0.0023	0.0005	0.0004
Stockpiling	0.0004	0.0003	--	--

Table 5: Emissions for Each Pollutant in Operation Phase (25yrs)

Location	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Babudev Ranade Road	0.0066	0.0045	0.0287	0.0892
Laxman Mhatre Marg	0.0578	0.0393	0.2372	0.7695

Proposed project will have one generator set of 100KVA for construction phase; one DG set each of 500 KVA to cater need of project along. These generators were set up for domestic purpose. If used, DGs will run mostly during power cuts and it is most unlikely phenomenon. These generators use diesel as fuel thereby having minimal potential to cause particulate and gaseous pollution. Emissions estimated for the same are given in **Table 6**.

Table6: Generator Set Emission Estimates

Parameter	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NOx (g/s)	CO (g/s)
Construction Phase				
100 KVA DG Set (1 No.)	$1.04x10^{-08}$	7.08×10^{-09}	$3.28x10^{-25}$	1.54×10^{-33}
Operations Phase				
500 KVADG Set (1 No.)	$5.21x10^{-08}$	$3.54x10^{-08}$	$4.10x10^{-23}$	$9.63x10^{-31}$

1.5. Model Inputs

AERMOD View™ has been used for evaluating the emission scenarios for proposed project. The inputs to the model are defined in 5 functional pathways as represented in the following sections. Each of these functional parameters include several options that may be user defined or set as default, the details of some of these essential elements of AERMOD View™ runs have been explained in the discussions.

A. Control pathway inputs

- ✓ Default option
- ✓ Calculate the concentration
- ✓ Averaging period of 24hr,1hr depending on the NAAQS and pollutant type

B. Source pathway inputs

- ✓ Includes definition of source, its locations
- ✓ Vehicle source parameter include emissions ($g/m^2/s$)
- ✓ Construction area source parameter include emissions ($g/m^2/s$)
- ✓ Soil stockpiling source parameter include emissions ($g/m^2/s$)
- ✓ Generator source parameter include emissions (g/s)

C. Receptors pathway inputs

- ✓ Cartesian grid starting at the SE corner of the ward with 400m increment over X & Y coordinates, thus forming a receptor output grid radius of 2km.
- ✓ Uniform grid is selected with 10x10 cell size.

D. Meteorology pathways inputs

- ✓ One hourly data from 1stMarch 2014 to 31stMay 2014 was used as an input in the meteorology processor to generate model ready one hourly input surface & profile meteorology files.

- ✓ Roughness length of 1m of measurement height, displacement height of 0.2m, Albedo of 0.2 &measurement height of 14m i.e. the height at which measurements of meteorology have been done.
- ✓ The minimum wind speed (0.5 m/s lower than 1m/s considered as calm by IMD), minimum mixed layer height (50m), and minimum heat flux 20 $W/M^2/s$).
- ✓ The Bowen ratio=Sensible Heat flux/Latent Heat Flux as a function of month to allow smaller Bowen Ratios during the Indian monsoon season when the ground is wet and latent heat fluxes become significant (from 2 in non-monsoon to 0.5 in monsoon).
- ✓ The potential temperature gradient above the mixed layer (0.008 degrees/m)
- ✓ The weather data for Mumbai base station provided by Indian Meteorological Department (IMD) have been used for the present project. The data was compiled in AERMET module of AERMODView™ and the results of this final analysis were used as input meteorological data.

E. Output Pathway

The model has been run for 24hr and1hr average as per the pollutant type and the NAAQS standards criteria. The contour for 1sthighest reading is shown for each pollutant based on present and future scenario.

Model outputs were obtained for emissions of each of the pollutants in each of the 400m x400m receptor grid spread across gridded impact zone. Contour map are plotted for each of the study pollutants and the impact by the line source i.e. future scenario including growth rate and additional vehicle assumed to be added due to project. This map is superimposed on the road tile map of the proposed location. The air quality results in the future are predicted including project traffic. The added percentage of vehicles by the project is negligible compared to the actual traffic in the future scenarios & the total traffic will be well within the capacity of the roads at present since the location of this site is primarily covering extensive network of roads distributing the traffic. To avoid redundancy, no separate analysis is included in the results differentiating present & future traffic as it shows no significant difference for future traffic with the project.

1.6. Results

The major road have been represented in the contour plots for concentration to understand the impact of individual roads on the overall area of influence, though combined influence have been already assessed and modeled for future scenario i.e. with generator sets and projected vehicular

traffic. Modeled pollutant concentrations for 24hr scenario were tabulated for present, construction and 25yrs down the line in operations phase scenario **Table 7**.

Table 7: Modeled 24 hour concentrations for all modeled scenarios

Parameters	Present	Construction	Operations
PM_{10} *(24hr average)*	1	50	5
$PM_{2.5}$ *(24hr average)*	1	40	3
NOx *(24hr average)*	6	10	20
CO *(1hr average)*	50	60	100

Comparative account of each pollutant concentration with respective National Ambient Air Quality Standards (NAAQS) is given. The emissions were compared as 24hr average. Both the results were presented in **Table 8(a, b)**. Particulate matter and gaseous pollutant levels account for no raise over future scenario break point.

Table 8(a): Comparative Account 24hr Emissions of Present and Construction Scenario *(µg/m³)*

Parameters	Concentrations			NAAQS*
	Baseline	Change	Resultant	
PM_{10} *(24hr average)*	68	49	117	**100**
$PM_{2.5}$ *(24hr average)*	30	39	69	**60**
NOx *(24hr average)*	20	4	24	**80**
CO *(1hr average)*	900	10	910	**4000**

***NAAQS** – National Ambient Air Quality Standards, 2009*

Table 8(b): Comparative Account 24hr Emissions of Present and Construction Scenario *(µg/m³)*

Parameters	Concentrations			NAAQS*
	Baseline	Change	Resultant	
PM_{10} *(24hr average)*	68	4	72	**100**
$PM_{2.5}$ *(24hr average)*	30	2	32	**60**
NOx *(24hr average)*	20	14	34	**80**
CO *(1hr average)*	900	50	950	**4000**

***NAAQS** – National Ambient Air Quality Standards, 2009*

The outputs for the modeled pollutant concentrations are done with regards to identified road as classified in earlier sections of the report for present year and future. Simulations for individual & combined activities on this road along with proposed generators were also done. Modeled predictions for pollutant concentrations due to combined activities on all the roads seems to be a much more valuable input to discussions and thereby have been used in further sections of this

report, though all the individual simulations for various permutation and combination of activities on roads are portrayed.

1.6.1. Scenario analysis for Particulate Matter (PM_{10})

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte-Patil Developers Ltd., Dahisar** are presented for 24hr in **Figure 1(a, b, c)**. Modeled 24hr average PM_{10} concentration was 1.0µg/m³ with present traffic scenario, 50µg/m³ with construction phase and 5.0µg/m³ for operation scenario.

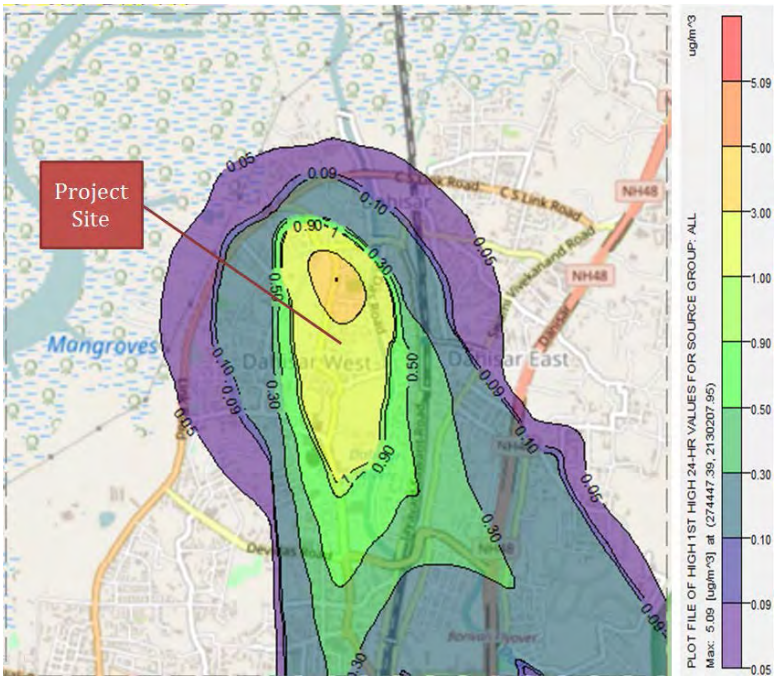

Figure 1(a): Present PM_{10} 24hr average emission dispersion contours

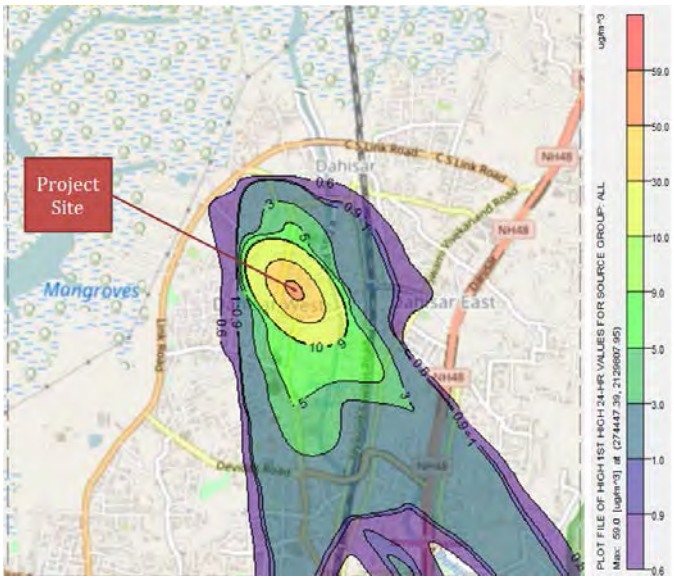

Figure 1(b): PM_{10} 24hr average emission dispersion contours – Construction Phase

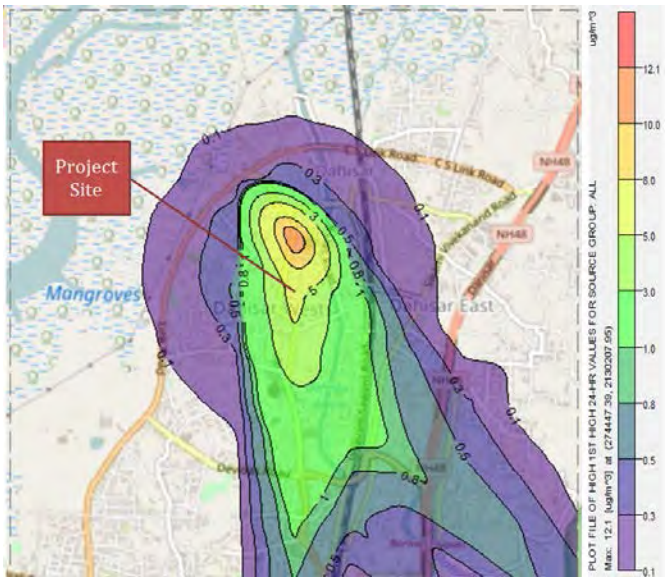

Figure 2(c): PM_{10} 24hr average emission dispersion contours – Operations Phase (25yrs)

1.6.2. Scenario analysis for Particulate Matter ($PM_{2.5}$)

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte Patil Developers Ltd., Dahisar** are presented for 24hr in **Figure 2(a, b, c)**. Modeled 24hr average $PM_{2.5}$ concentration was 1.0µg/m³ with present traffic scenario, 40µg/m³ with construction phase and 3.0µg/m³ for operation scenario.

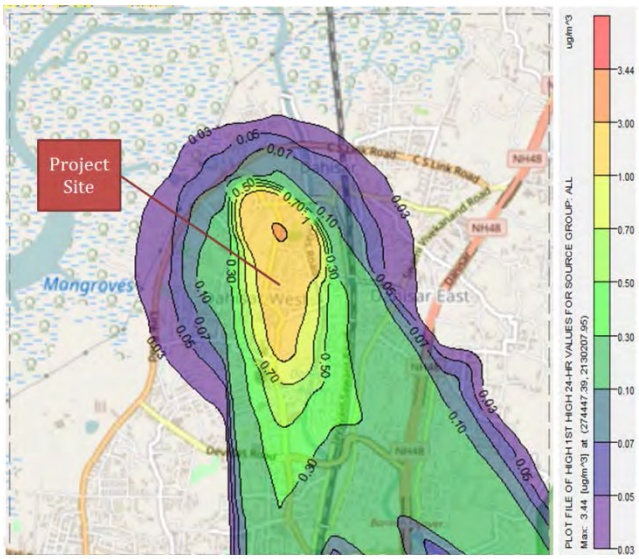

Figure 2(a): Present $PM_{2.5}$ 24hr average emission dispersion contours

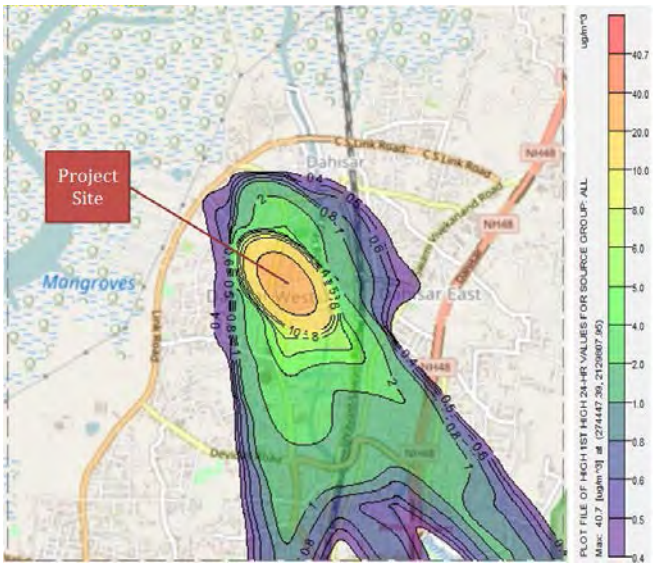

Figure 2(b): $PM_{2.5}$ 24hr average emission dispersion contours – Construction Phase

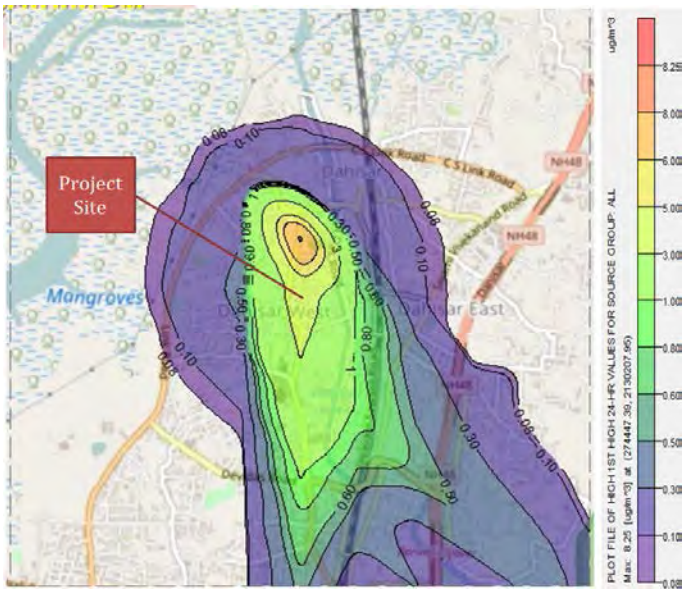

Figure 2(c): $PM_{2.5}$ 24hr average emission dispersion contours – Operations Phase (25yrs)

1.6.3. Scenario analysis for Oxides of Nitrogen (NOx)

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte Patil Developers Ltd., Dahisar** are presented for 24hr in **Figure 3(a, b, c)**. Modeled 24hr average NOx concentration was 6µg/m^3 with present traffic scenario, 10µg/m^3 with construction phase and 20µg/m^3 for operation scenario.

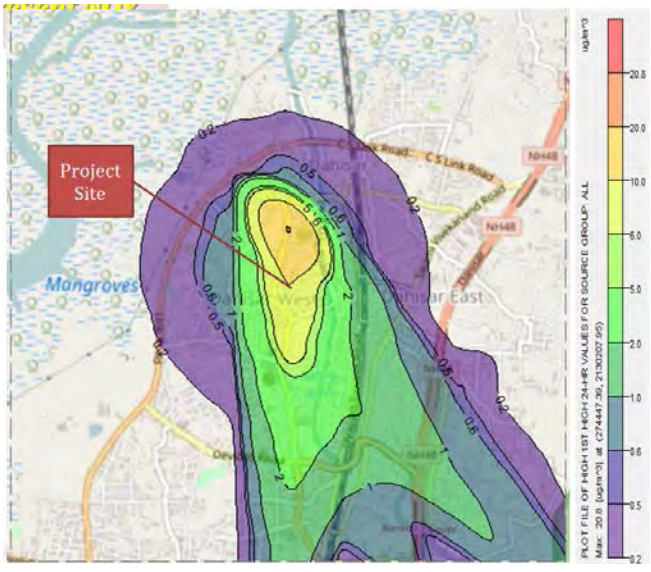

Figure 3(a): Present NOx24hr average emission dispersion contours

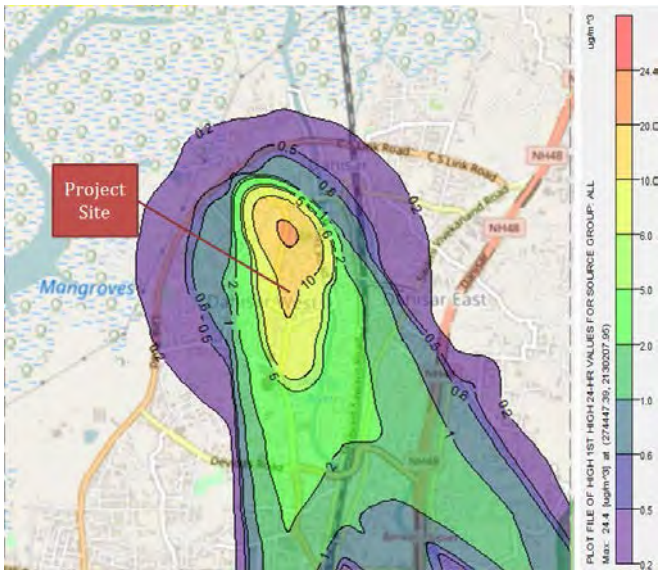

Figure 3(b): NOx24hr average emission dispersion contours– Construction Phase

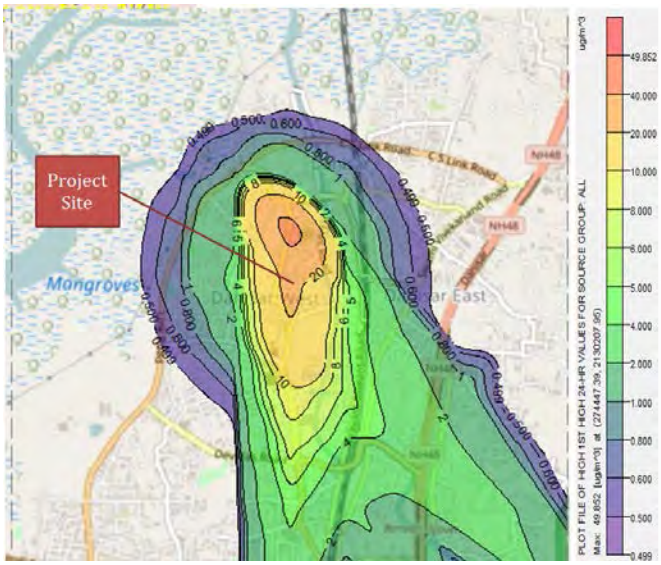

Figure 3(c): NOx24hr average emission dispersion contours – Operations Phase (25yrs)

1.6.4. Scenario analysis for Carbon Monoxide (CO)

Model simulations considering baseline activity for present, construction and operation considering BAU scenario with incremental vehicle average and fugitive emissions from the proposed project of **M/s. Kolte Patil Developers Ltd., Dahisar** are presented in **Figure 4(a, b, c).** Modeled 1hr average CO concentration was 50µg/m^3 with present traffic scenario, 60µg/m^3 with construction phase and 100µg/m^3 for operation scenario.

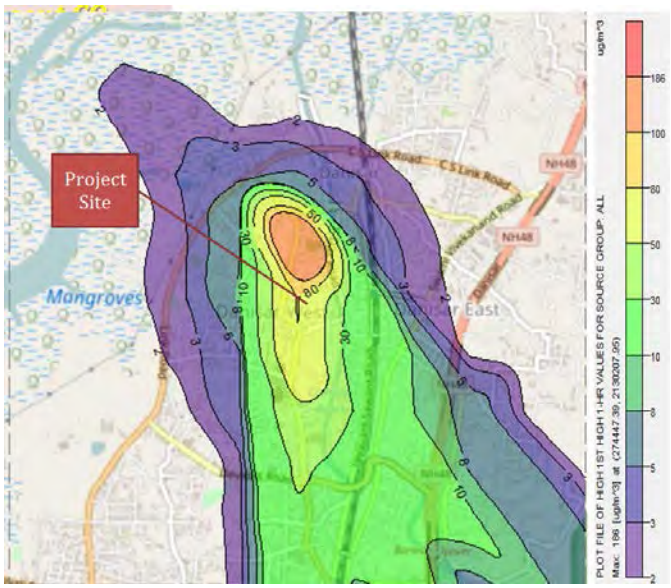

Figure 4(a): Present CO 1hr average emission dispersion contours

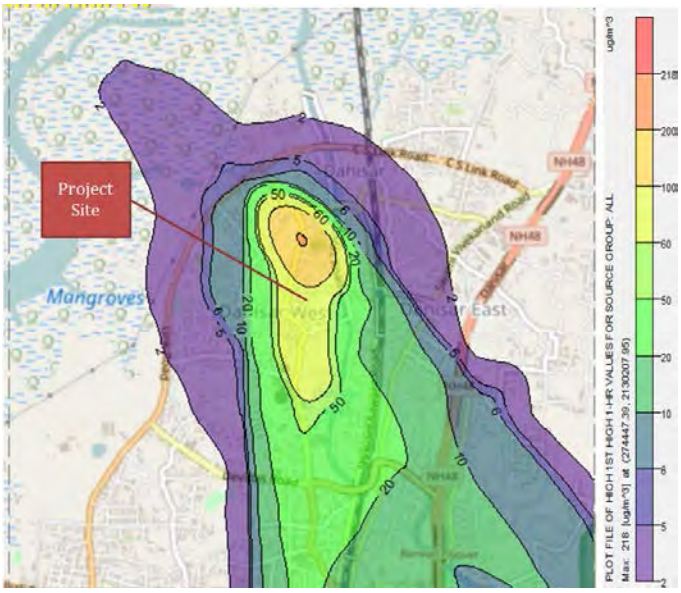

Figure 4(b): CO 1hr average emission dispersion contours– Construction Phase

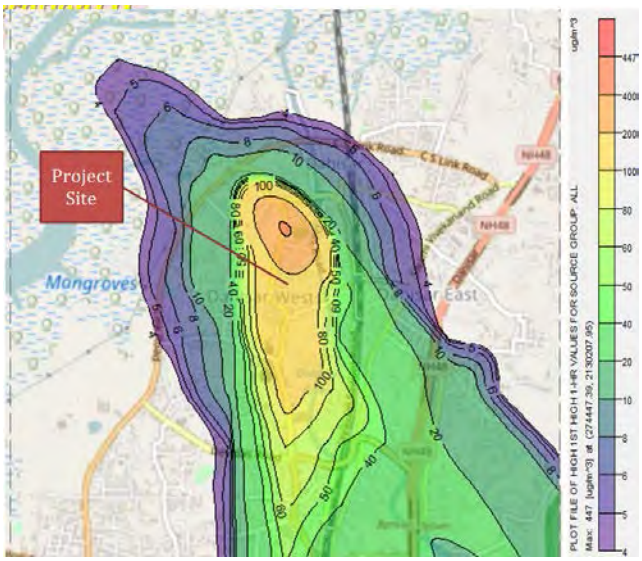

Figure 4(c): CO 1hr average emission dispersion contours – Operations Phase (25yrs)

1.7. Conclusion

Particulate matter levels were found to be above prescribed standards during construction phase. Future scenario analysis i.e. during operations phase illustrates that all pollutant concentrations to be within prescribed standards, thus project have no implication in overall air quality.

1.8. Environmental Management Plan

The predicted average concentrations with baseline BAU along with the negligible proposed contribution from the project will be below the standards. Hence considering the present and the future scenario, it can be concluded that there is minimal impact of the project. Whereas negligible impacts have to be mitigated as far as possible so as to keep the air quality pollutant free. Therefore following environment management measures need consideration the prevailing conditions;

- ✓ Site barricades will be provided along with the tree planting at the site boundary;
- ✓ Excavation and transport will be done during off peak hours along with material loading from site minimize to about 15-20mins;
- ✓ Excavation, handling and transport of materials will be avoided under high wind conditions or when a visible dust plume is present;
- ✓ During windy conditions, dust suppression measures will be adopted (dampening with water, tire washing facility at the entrance of the project site, etc.;

- ✓ The vehicles hired for transportation of material and labor shall have PUC certificate in order to reduce air emissions;
- ✓ Dust covers will be provided on trucks used for transportation of materials prone to fugitive dust emissions;
- ✓ The development will use Ready Mix Cement (RMC) to prevent any air emission occurring during mixing of the cement;
- ✓ If small volumes of concrete are to be mixed (manually), mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained;
- ✓ Traffic Management - vehicular movement to be regulated with proper parking facility and internal road system;
- ✓ The generators used on the site for energy backup will be CPCB norms complied for air emissions;
- ✓ Air & Dust monitoring will be conducted at the site boundary during drilling, excavation, stockpiling and building activities and at post occupancy stage with the help of MoEF approved laboratory.

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1 INTRODUCTION

1.1 BACKGROUND

Project proponent has proposed to construct residential building at CTS no 51, Mandapeshwar, Borivali. The project comprises of 211 apartments. On completion, the project will provide 209 car parking spaces within the premises. The project provides easy access to educational, medical and shopping facilities.

GMD Consultants has been commissioned by the project proponent to provide a Traffic Impact Study for this project.

1.2 SCOPE

The scope of this study is listed below:

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

1.3 ASSUMPTIONS

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

1.3.1 CODES AND MANUALS

Design standards are generally followed bottom-up or part to whole. Local bylaws are given highest priority to meet the requirements set by local development control agency. Other standards, although

explicitly not mentioned by local development control agency, are referred from national or international design manuals that are accepted and widely referred by other professionals in the industry.

Following Codes and Manuals have been referred in this study:

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

1.3.2 DESIGN PARAMETERS

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

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

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

Type of Roadway	Road Capacity*	Category
2 Lane 2 Way	1715	Sub-Arterial
4 Lane Divided	4143	Sub-Arterial

*Indian Road Congress 106: 1990 Urban Road Capacity

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

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

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

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

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

1.3.3 ENTRY / EXIT LANE CAPACITIES

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

Entry/Exit Lane Capacities for Car Parks

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

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

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

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

1.4 TRAFFIC STUDY METHODOLOGY

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

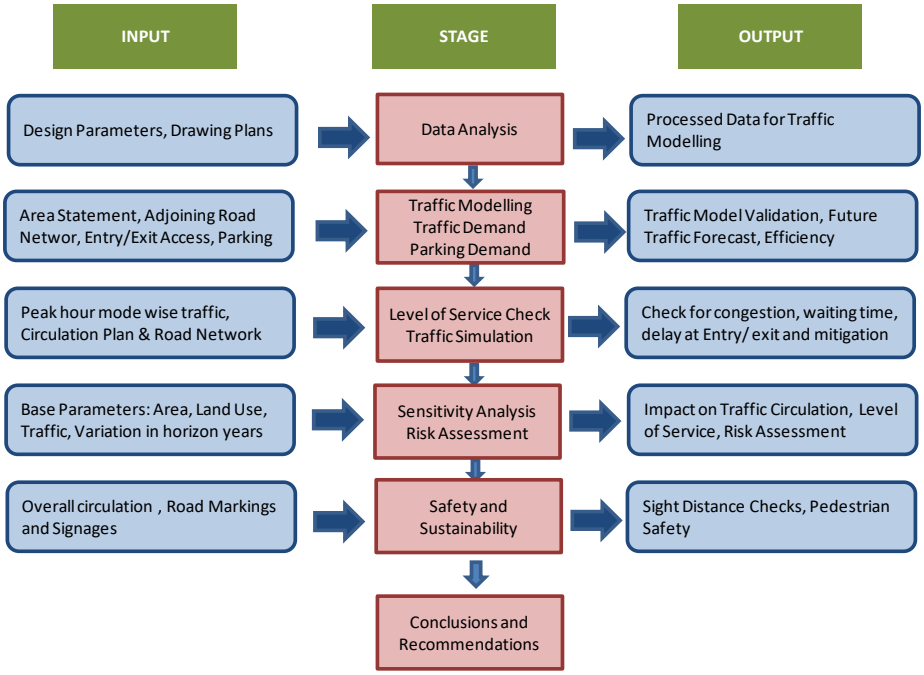

Figure 1-1 Traffic Study Methodology

1.5 TRAFFIC MODEL

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

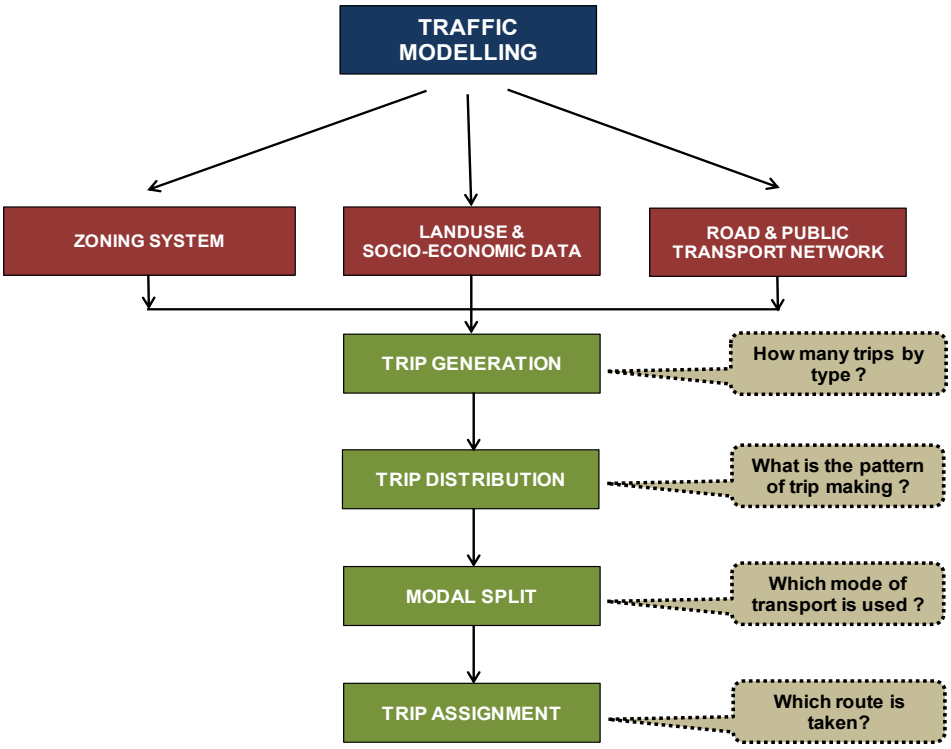

Figure 1-2 Traffic Model

1.6 OUTLINE OF THE REPORT

The report has been organized in the following order:

Chapter 1 Introduction, scope, assumptions and methodology

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

Chapter 3 Explains the salient features of the proposed development.

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

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

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

Chapter 7 Summarises the conclusions and recommendations of the study.

****

2 SITE APPRECIATION, EXISTING TRANSPORT NETWORK AND BASE TRAFFIC

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

2.1 PROJECT LOCATION

The project is located in Borivali. Dahisar Railway Station is the nearest railway station located at a distance of 1.1 km from site which provides local connectivity. Chhatrapati Shivaji International Airport is the nearest airport from site which is located at distance of 21 km from site. The site is well connected to major landmarks in and around Mumbai City by road as well as rail. The project has direct access to Laxman Mhatre Marg. The project provides easy access to other amenities such as educational, medical and shopping facilities. **Figure 2-1** shows an aerial view of the location.

Figure 2-1 Project Location

2.2 SURROUNDING ROAD NETWORK

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

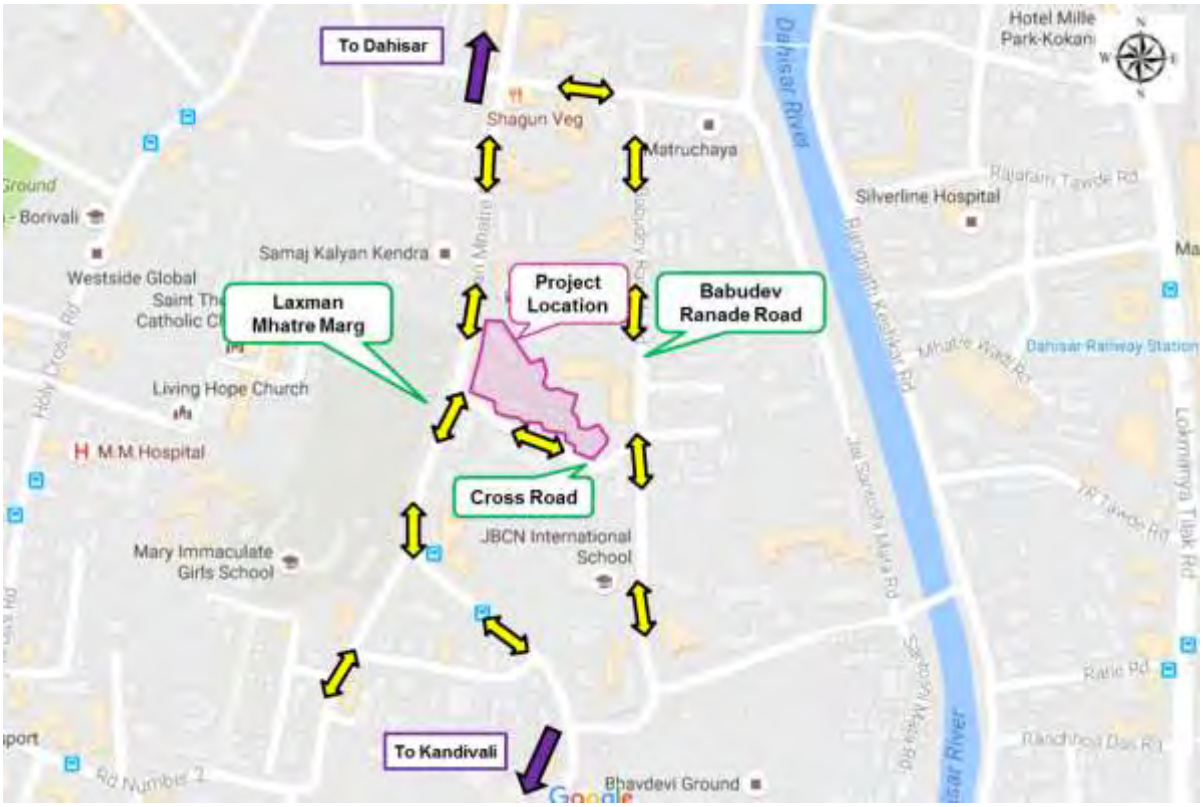

Figure 2-2 Surrounding Road Network and Traffic Survey Location

Following pictures depict the surrounding road network.

Figure 2-3 Laxman Mhatre Marg

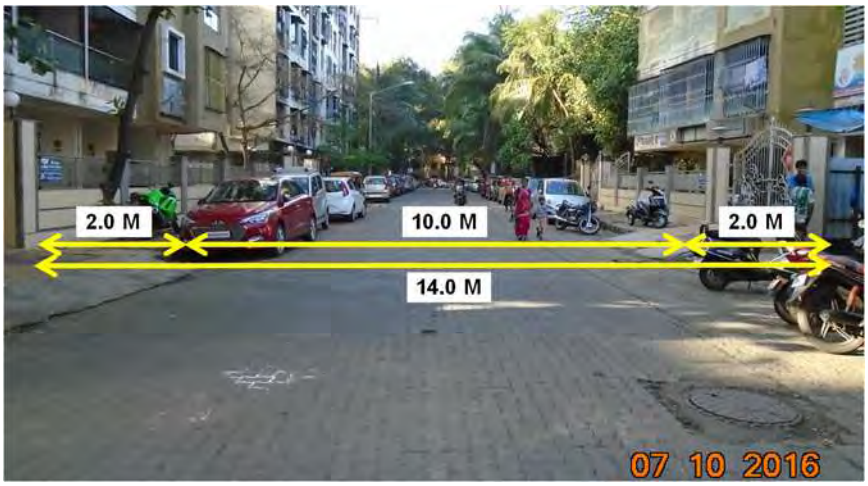

Figure 2-4 Babudev Ranade Road

Figure 2-5 Cross Road

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

2.3 TRAFFIC SURVEYS

Traffic surveys are necessary to gather base data information about existing traffic and travel pattern on surrounding roads. Traffic surveys were carried out on 7th October, 2016 (Friday) and 8th October, 2016 (Saturday). The traffic surveys included classified traffic volume counts. Traffic survey was conducted at Babudev Ranade Road and Laxman Mhatre Marg.

2.4 BASE TRAFFIC

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

Table 2-1 Hourly Traffic Volume on Laxman Mhatre Marg

Time Period	2W	3W	Cars	Buses	Lcv	2 Axle	3 Axle/ Multi Axle	Total Vehicles	Total PCU
8 to 9	200	120	37	4	17	4	0	382	468
9 to 10	222	133	41	4	19	4	0	423	518
10 to 11	204	122	38	4	17	4	0	389	476
11 to 12	196	118	36	4	17	4	0	375	460
12 to 13	185	111	34	4	16	4	0	354	435
13 to 14	178	107	33	3	15	3	0	339	415
14 to 15	159	96	30	3	14	3	0	305	374
15 to 16	167	100	31	3	14	3	0	318	389
16 to 17	218	131	40	4	19	4	0	416	510
17 to 18	240	144	44	4	20	4	0	456	558
18 to 19	259	156	48	5	22	5	0	495	607
19 to 20	229	138	42	4	20	4	0	437	535
20 to 21	204	122	38	4	17	4	0	389	476
21 to 22	185	111	34	4	16	4	0	354	435
22 to 23	156	94	29	3	13	3	0	298	365
23 to 24	148	89	28	3	13	3	0	284	348
24 to 1	130	78	24	3	11	3	0	249	306
1 to 2	93	56	17	2	8	2	0	178	219
2 to 3	56	34	11	1	5	1	0	108	132
3 to 4	34	20	7	1	3	1	0	66	81
4 to 5	30	18	6	1	3	1	0	59	73
5 to 6	82	49	15	2	7	2	0	157	193
6 to 7	111	67	21	2	10	2	0	213	261
7 to 8	148	89	28	3	13	3	0	284	348
Total	3834	2303	712	75	329	75	0	7328	8984

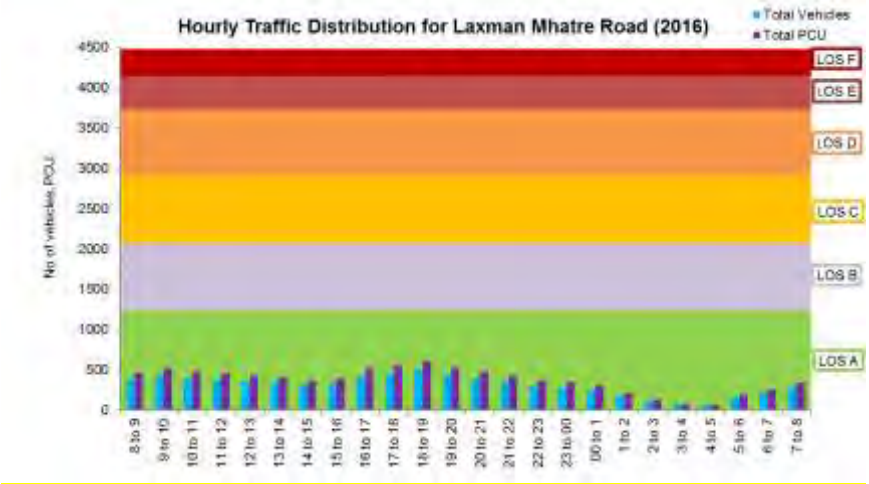

Figure 2-6 Hourly Traffic Distribution for Laxman Mhatre Marg

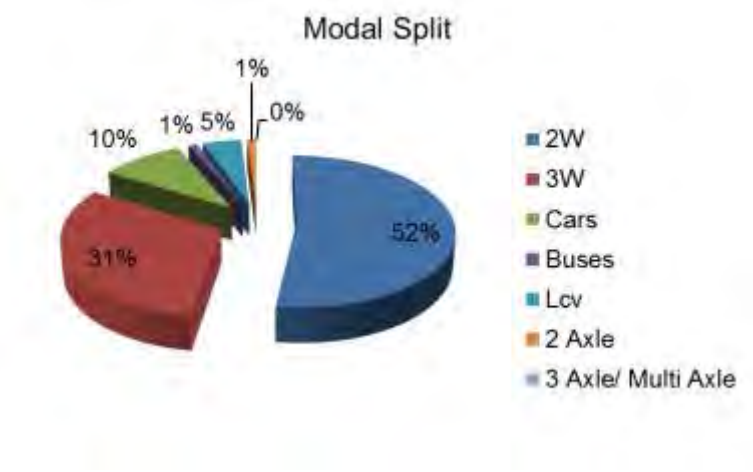

Figure 2-7 Modal Split (vehicles) for Laxman Mhatre Marg

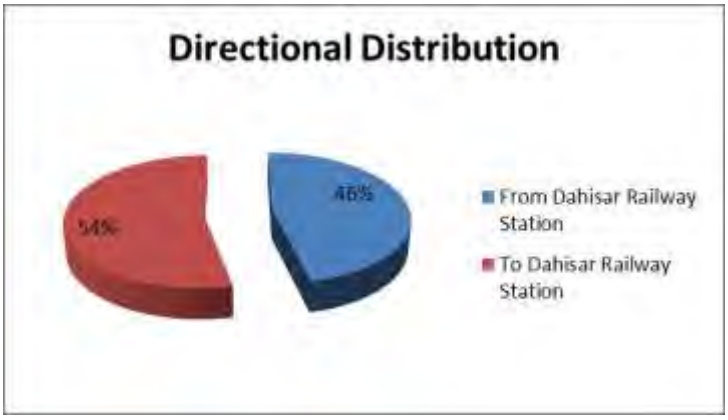

Figure 2-8 Directional Distribution for Laxman Mhatre Marg

Based on preliminary analysis it was observed that:

- Peak morning traffic was observed between 9 and 10 AM and peak evening traffic was observed between 6 to 7 PM.
- The vehicular traffic predominantly consists of 3W and two wheelers.
- Directional distribution analysis indicated that traffic is going more towards Dahisar railway station.

Table 2-2 Hourly Traffic Volume on Babudev Ranade Road

Time Period	2W	3W	Cars	Buses	Lcv	2 Axle	3 Axle/ Multi Axle	Total Vehicles	Total PCU
8 to 9	100	117	47	1	17	4	0	286	391
9 to 10	111	130	52	1	19	4	0	317	433
10 to 11	102	119	48	1	17	4	0	291	397
11 to 12	98	115	46	1	17	4	0	281	384
12 to 13	93	108	44	1	16	4	0	266	363
13 to 14	89	104	42	1	15	3	0	254	347
14 to 15	80	93	38	1	14	3	0	229	312
15 to 16	84	97	39	1	14	3	0	238	324
16 to 17	109	128	51	1	19	4	0	312	426
17 to 18	120	140	56	1	20	4	0	341	465
18 to 19	130	151	61	2	22	5	0	371	507
19 to 20	115	134	54	1	20	4	0	328	447
20 to 21	102	119	48	1	17	4	0	291	397
21 to 22	93	108	44	1	16	4	0	266	363
22 to 23	78	91	37	1	13	3	0	223	305
23 to 24	74	87	35	1	13	3	0	213	292
24 to 1	65	76	31	1	11	3	0	187	256
1 to 2	47	54	22	1	8	2	0	134	183
2 to 3	28	33	13	1	5	1	0	81	111
3 to 4	17	20	8	1	3	1	0	50	69
4 to 5	15	18	7	1	3	1	0	45	63
5 to 6	41	48	19	1	7	2	0	118	162
6 to 7	56	65	26	1	10	2	0	160	219
7 to 8	74	87	35	1	13	3	0	213	292
Total	1921	2242	903	25	329	75	0	5495	7508

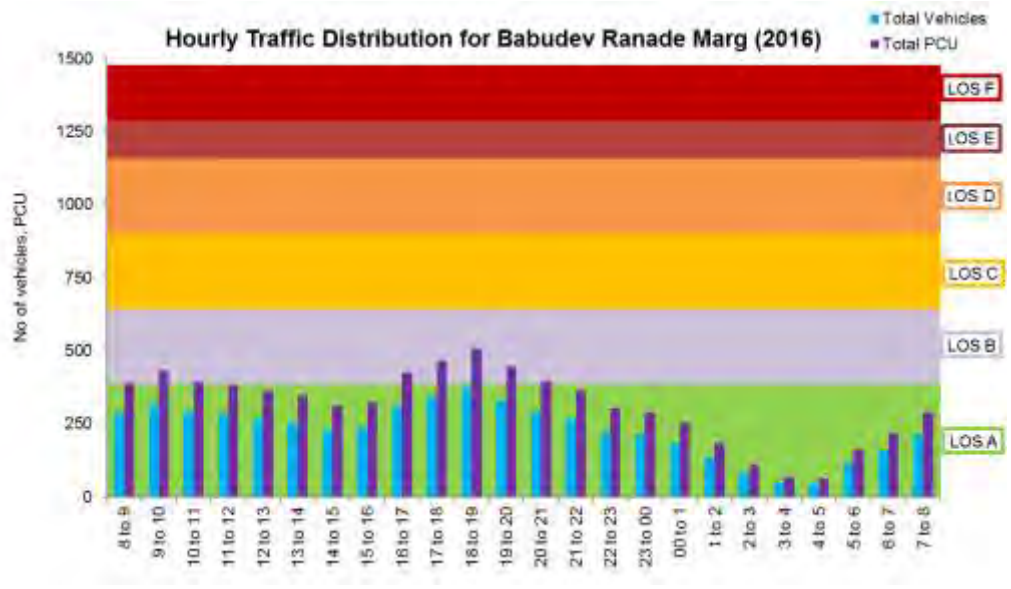

Figure 2-9 Hourly Traffic Distribution for Babudev Ranade Road

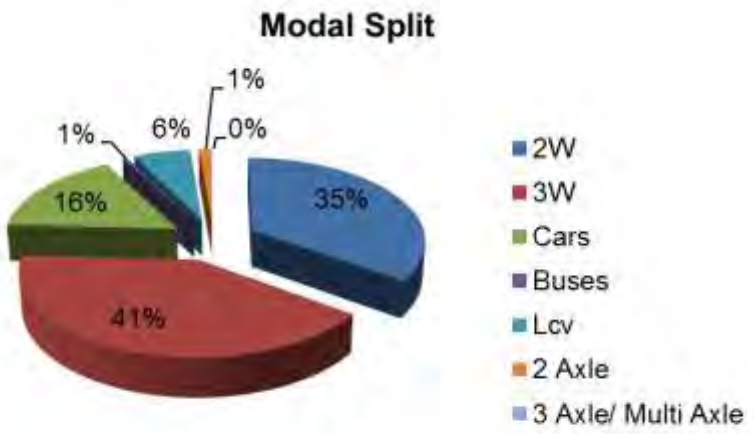

Figure 2-10 Modal Split (vehicles) for Babudev Ranade Road

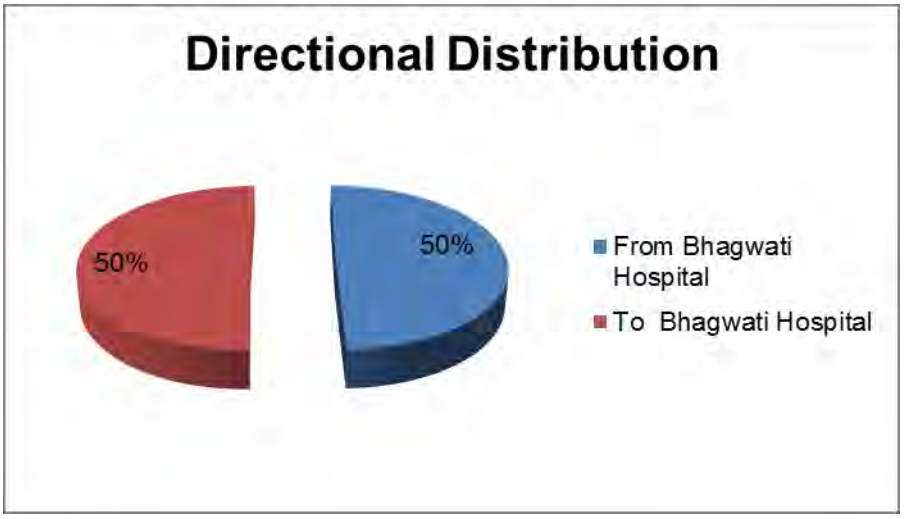

Figure 2-11 Directional Distribution for Babudev Ranade Road

Based on preliminary analysis it was observed that:

- Peak morning traffic was observed between 9 and 10 AM and peak evening traffic was observed between 6 to 7 PM.
- The vehicular traffic predominantly consists of 3W and two wheelers.
- Directional distribution analysis indicated that traffic is equally distributed in both directions.

3 PROPOSED DEVELOPMENT

The plot is being developed as a residential project having a total of 211 units comprising of 209 parking spaces.

3.1 PROJECT CONNECTIVITY AND ACCESS

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

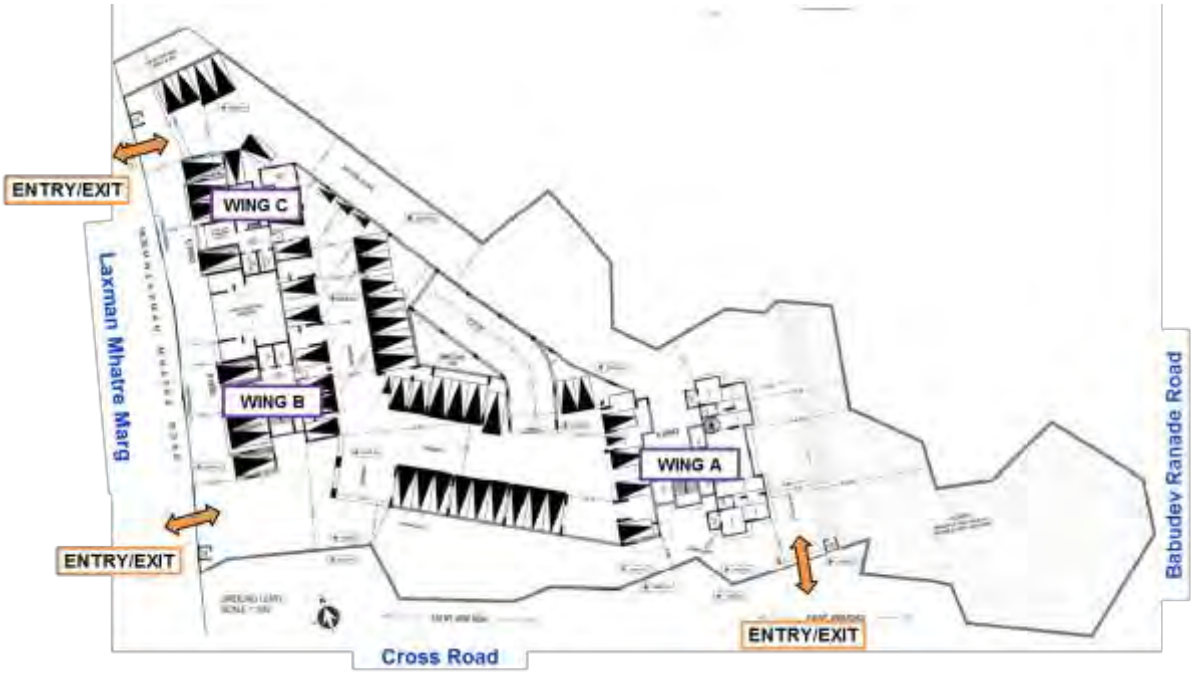

Figure 3-1 Access Points for Project Area

3.2 UNIT STATEMENT

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

Total No of Units	
Residential sale	211

3.3 PARKING STATEMENT

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

Table 3-1 Parking Statement

Floor	No of Car Parking Spaces	No of TW Parking Spaces
Podium Level	41	8
Ground Level	60	5
Lower Ground Level/Basement Level	108	7
Total	**209**	**20**

4 TRAFFIC ANALYSIS

The traffic analysis comprises of:

- Traffic Forecast
- Traffic Impact Analysis
- Traffic Circulation

4.1 TRAFFIC FORECAST

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

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

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

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

Table 4-1 Trip Generation

Description	AM Peak Hour		PM Peak Hour		Total Trip AM Peak Hour	Total Trip PM Peak Hour
	Trip in	Trip out	Trip in	Trip out		
Residential (Sale) (211 Units)	12	46	42	23	58	65

A traffic growth of 5% is considered per year for the surrounding network. Based on this, the traffic has been forecasted and has been summarized in Table 4-4 to Table 4-7.

Table 4-2 Base Traffic Forecast for Project Network Roads

Road Name	Description	Peak Traffic Volume in 2016 (PCU/hr) (A)	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio* (Peak volume /capacity)	LOS
Laxman Mhatre Road	4Lane 2 Way (Divided) (Sub Arterial)	607	4143	0.15	A
Babudev Ranade Marg	2 Lane 2 Way (Un Divided) (Collector)	507	1286	0.39	B

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

4.2 TRAFFIC ASSIGNMENT

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

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

Table 4-3 Trip Assignment on Existing Road Network

Road Name	Project Impact (%)
Babudev Ranade Road	50
Laxman Mhatre Marg	50

4.3 VEHICLE CIRCULATION

The project is a residential project which would accommodate 211 units. Multiple access points for vehicles have been provided in order to ensure smooth vehicle movement. This has been illustrated in Figure 3-1. Also, the floor wise circulation proposed for the project has been illustrated in Figure 4-1 to Figure 4-3.

Figure 4-1 Ground Floor Circulation Plan

Figure 4-2 Lower Ground Level/Basement Level - Circulation Plan

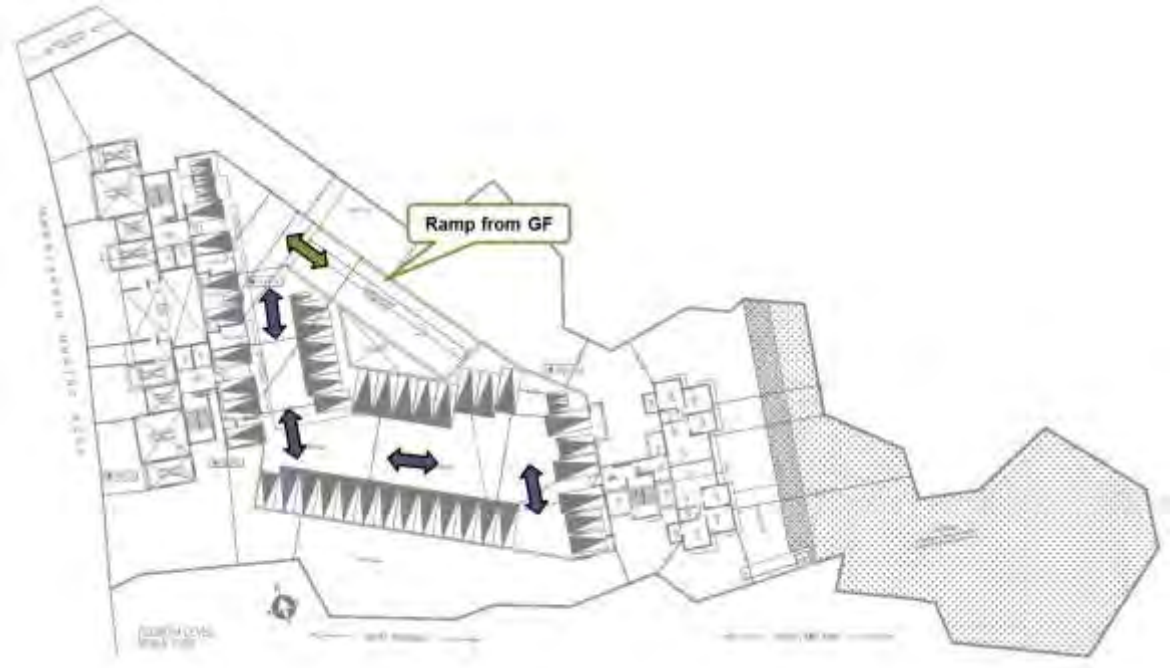

Figure 4-3 Podium - Circulation Plan

4.4 TRAFFIC IMPACT ANALYSIS

The traffic on Laxman Mhatre Marg and Babudev Ranade Road was analyzed to assess its traffic impact on the existing roads.

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

- Base Road Traffic (forecasted to year 2020, 2025, 2030 and 2040)
- Project Traffic (2020, 2025, 2030 and 2040)

The road traffic has been forecasted for year 2020, 2025, 2030 and 2040. This total traffic on the road is compared with its capacity. This V/C ratio of peak traffic volume and capacity is used as an index to determine level of congestion on link which is likely to occur when projected traffic is operative on link. Pedestrian traffic is assumed to use footpaths and not affect the road capacity. The summary of results for future traffic link flow conditions at different access roads is shown in Table 4-4 to Table 4-7.

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

Road Name	Peak Traffic Volume in 2020 (PCU/hr)(A)	Project Traffic (PCU/hr) (B)	Total Traffic in 2020 (A + B)	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio (Peak volume /capacity)	LOS
Laxman Mhatre Road	728	23	751	4143	0.18	A
Babudev Ranade Marg	608	23	631	1286	0.49	B

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

Road Name	Peak Traffic Volume in 2025 (PCU/hr)(A)	Project Traffic (PCU/hr) (B)	Total Traffic in 2025 (A + B)	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio (Peak volume /capacity)	LOS
Laxman Mhatre Road	880	32	913	4143	0.22	A
Babudev Ranade Marg	735	32	767	1286	0.60	C

Table 4-6 Traffic Capacity Analysis of Access Roads – 2030

Road Name	Peak Traffic Volume in 2030 (PCU/hr)(A)	Project Traffic (PCU/hr) (B)	Total Traffic in 2030 (A + B)	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio (Peak volume /capacity)	LOS
Laxman Mhatre Road	1032	32	1064	4143	0.26	A
Babudev Ranade Marg	861	32	894	1286	0.70	C

Table 4-7 Traffic Capacity Analysis of Access Roads – 2040

Road Name	Peak Traffic Volume in 2040 (PCU/hr)(A)	Project Traffic (PCU/hr) (B)	Total Traffic in 2040 (A + B)	Design Traffic Capacity as per IRC 106:1990 (PCU/hr)	V/C Ratio (Peak volume /capacity)	LOS
Laxman Mhatre Road	1336	32	1368	4143	0.33	B
Babudev Ranade Marg	1115	32	1147	1286	0.89	D

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

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

Under present configuration the roads will operate at V/C ratio of maximum 0.49, 0.60, 0.70 and 0.89 for the year 2020, 2025, 2030 and 2040 respectively during the peak hour after completion of the proposed development, which indicates the traffic will continue to run as usual with appropriate vigil during peak hours after commissioning of project by year 2020. Mitigation measures will have to be adopted by 2025 to cater to the increasing traffic. This has been discussed in the following sections.

4.5 MITIGATION MEASURES

By 2025, mitigation measures will have to be adopted to cater to the increasing traffic. The following mitigation measures have been proposed.

To the Project Proponent

Install traffic control measures to regulate the flow of traffic

- Provide adequate traffic signs and signages to notify residents
- Install safety mirrors to aid visibility in conflict points
- Prevent parking near the Entry and Exit Gate
- Provide speed humps to regulate speed of vehicles
- Provide pedestrian crossings and dedicated footpath to cater to the walking population
- Assign traffic wardens to regulate flow of project traffic during peak hours

5 OTHER IMPORTANT ASSESSMENTS

5.1 SWEPT PATH ANALYSIS

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

5.2 OBJECTIVES

The objectives of performing swept path analysis are as follows:

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

5.3 DESIGN VEHICLE

A design vehicle is a vehicle whose dimensions and operational characteristics are used to establish layout geometry. From an optimum design perspective it is beneficial to select the design vehicle which is near to 85% percentile, i.e. 85% of vehicles will have smaller dimensions. This helps in optimizing the space requirements. The design vehicles selected for this particular project are as follows:

- Toyota Innova (SUV)

Detailed design and dimensions of design vehicle has been illustrated in Figure 5-1.

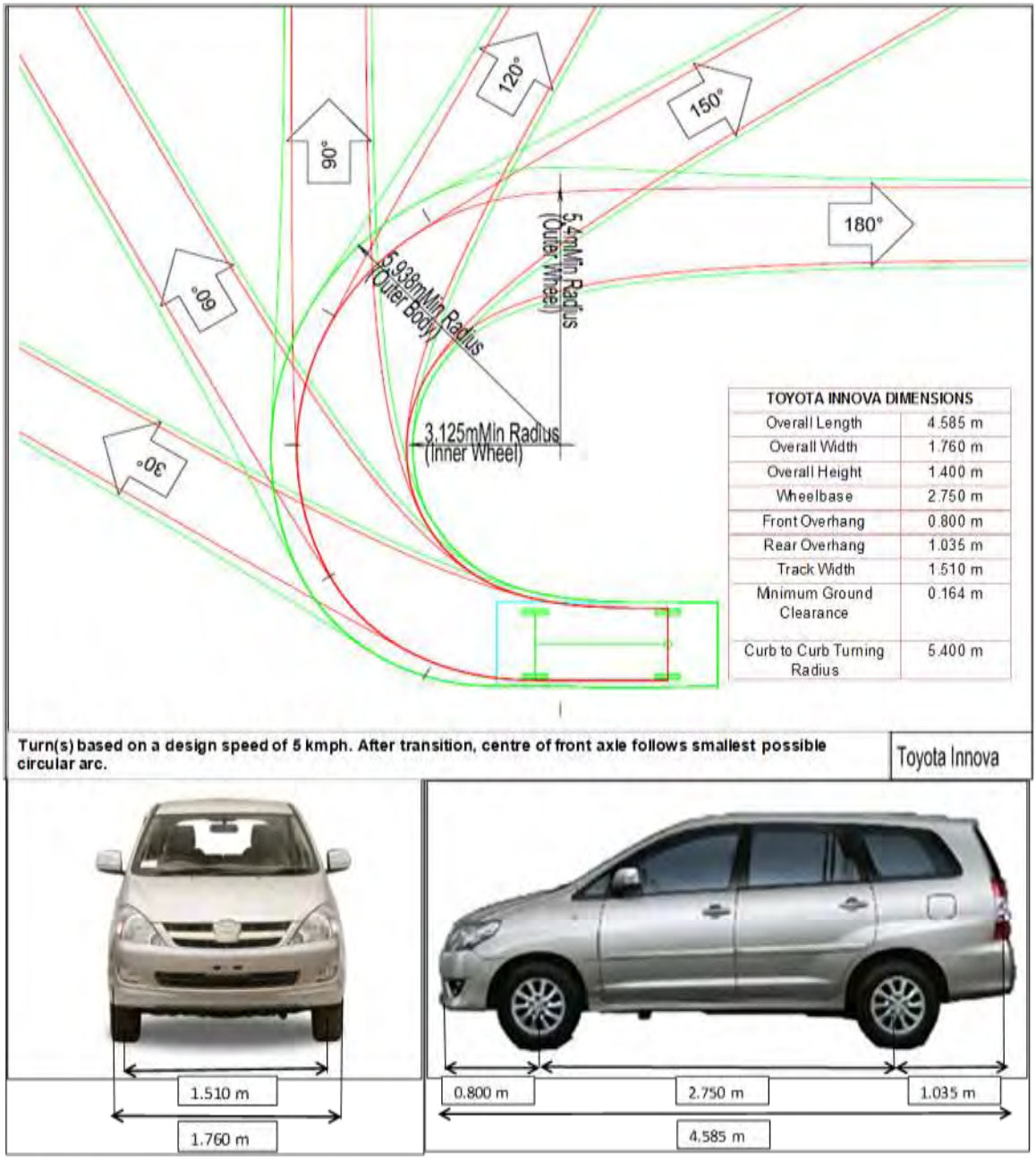

Figure 5-1 Dimensions of Toyota Innova

5.4 TYPICAL FLOOR PLAN

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

Figure 5-2 Swept Path Analysis at Ground Level

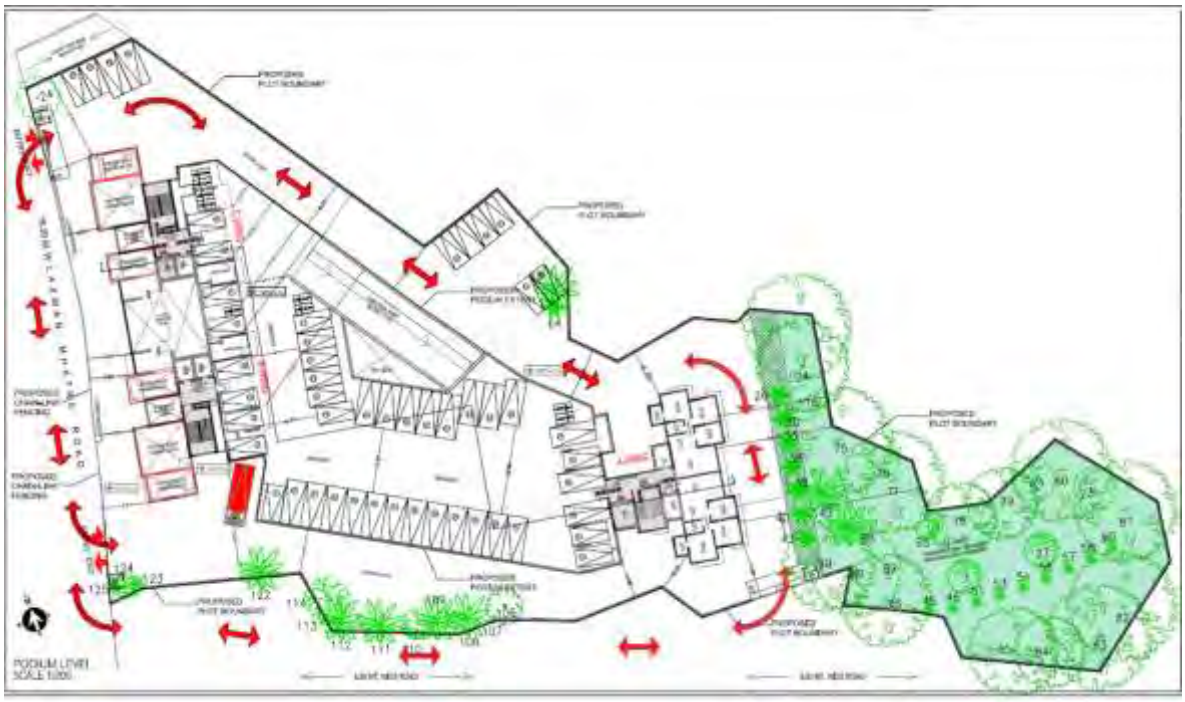

Figure 5-3 Fire Tender Movement

5.5 TWO WHEELER PARKING

Two Wheeler parking has been provided in Lower Ground Level/Basement, Ground Floor and Podium. Refer Figure 5-4 and Figure 5-6.

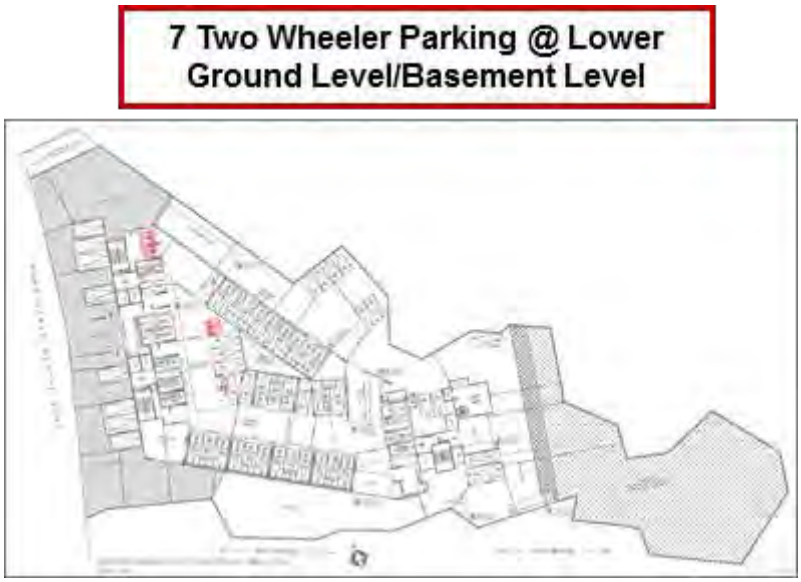

Figure 5-4 Two Wheeler Parking at Lower Ground Level/Basement

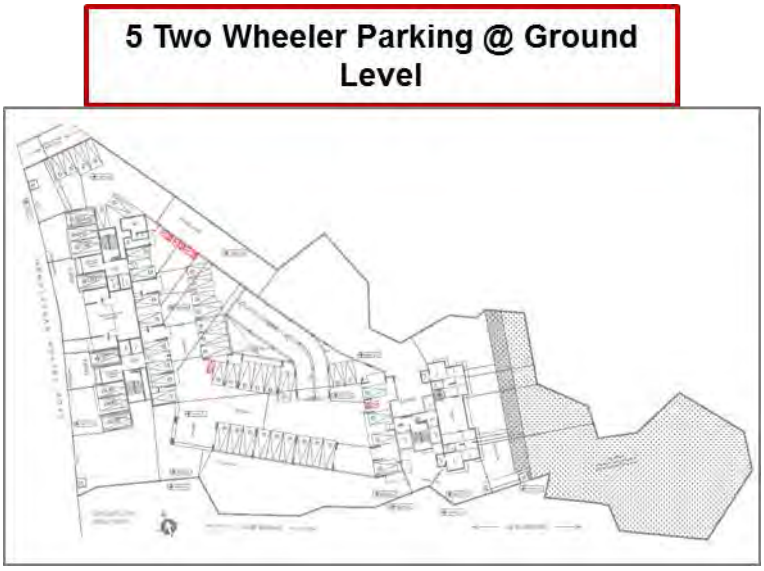

Figure 5-5 Two Wheeler Parking at Ground Level

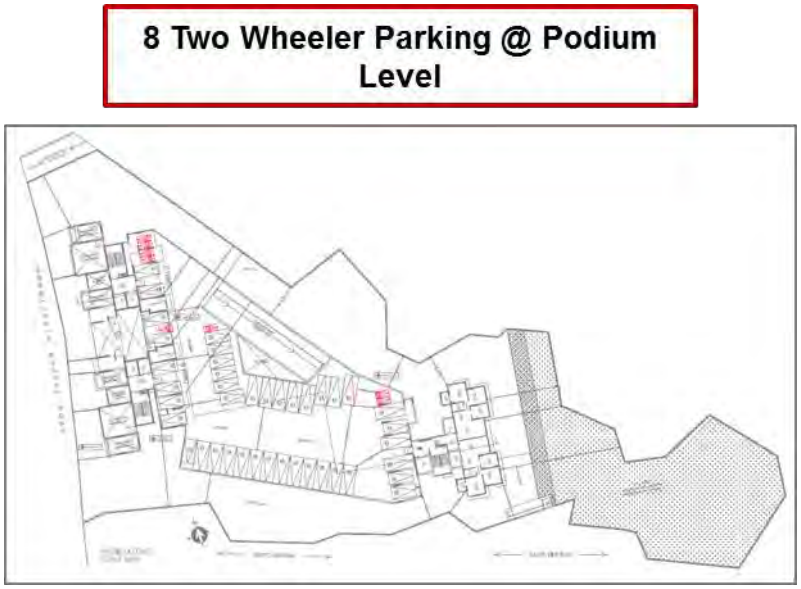

Figure 5-6 Two-Wheeler Parking at Podium

5.6 RETRIEVAL ANALYSIS

It is important to ensure the safety of each of the occupant of the project during an emergency via proper DMP. In addition to safety of residents, the vehicles from each parking floor should be also be retrieved in a systemic manner. The planning of this retrieval is necessary in case of multilevel parking's to ensure smooth retrieval in quickest possible time.

The main objective of this analysis is to determine the total time required to vacate the entire parking area. In this project 209 parking spaces are provided.

Table 5-1 Parking Statement

Floor	No of Car Parking Spaces	No of TW Parking Spaces	Remark
Podium Level	41	8	Access via Ramp
Ground Level	60	5	Direct Exit
Lower Ground Level/Basement Level	108	7	Direct Exit
Total	**209**	**20**	

Assumptions:

1) Speed for Cars = 20 kmph on straight 10 kmph at curves
2) Speed for 2W = 10 kmph on straight and 8 kmph at curves
3) Headway for Cars = 12 m (2 car lengths)
4) During an emergency, all ramps will be used for evacuation (exit)
5) During emergency, there will be simultaneous retrieval from multiple Exits
6) During emergency, the adjoining area will be cordoned off with help of police and retrieval will be marshaled with help of security wardens
7) Cars will be retrieved one level after other
8) Retrieval Time for each car includes the backup maneuver and slow down at turns
9) The principle of LIFO (Last In First Out) will be applied
10) Initial Delay and Circulation Delay time is considered

Sr No	Description	Value
1	Average Speed of Vehicles within parking lot	10 kmph (2.8m/sec)
2	Average Speed of Vehicles on Ramp / turns	10 kmph (2.8m/sec)
4	Space Headway considered	12m (2 car lengths)
5	Time Headway considered	6 seconds (@10kmph)
6	**Ramp throughput = No of cars / minute / per lane**	**10 cars /min/lane(60/6)**

5.6.1 RETRIEAL ANALYSIS

Retrieval plan for all floors has been illustrated below. Refer Figure 5-7 to Figure 5-9.

Figure 5-7 Retrieval Circulation – Ground floor

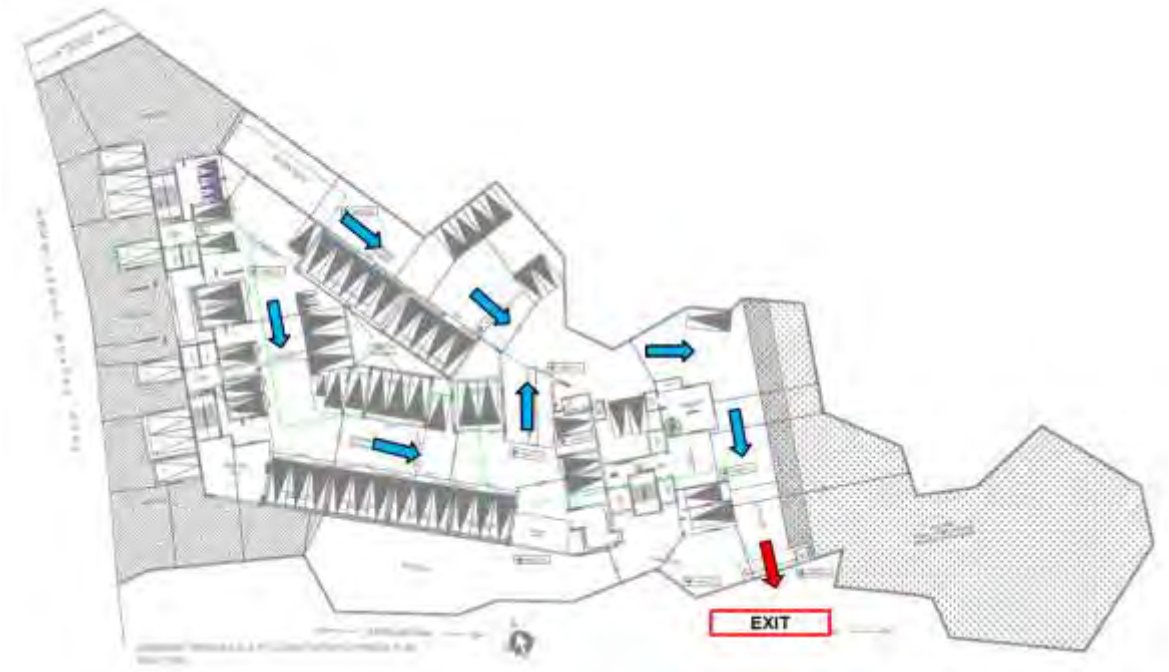

Figure 5-8 Retrieval Circulation – Lower Ground Level/Basement Level

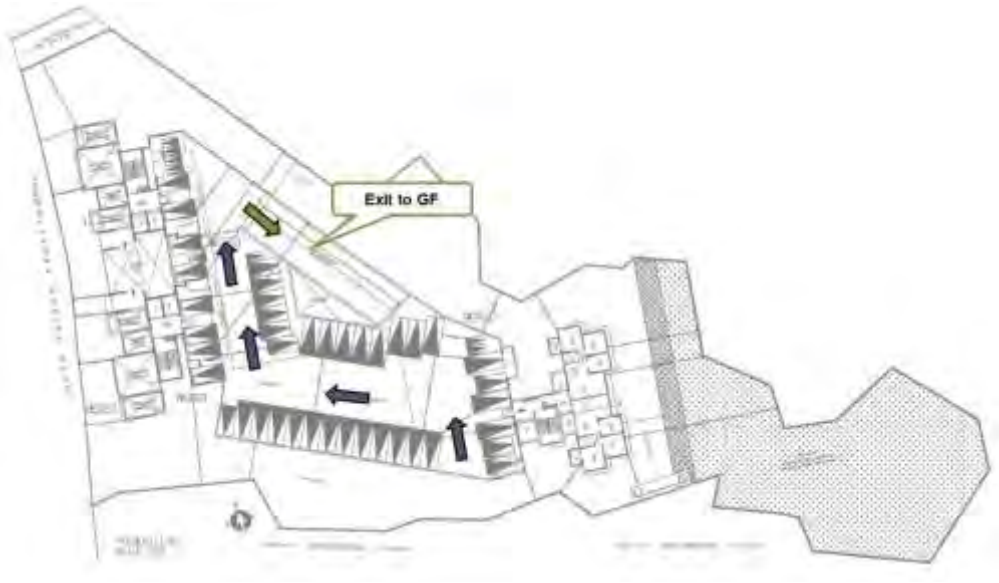

Figure 5-9 Retrieval Circulation – Podium

5.6.2 RETRIEVAL TIME CALCULATION

During peak morning hour, when office going traffic will be predominant, there will be a high demand of vehicles, i.e, it would be required to retrieve 30% of total vehicles. The total time taken for retrieval of cars from each floor was calculated. This has been illustrated in Table 5-2

Table 5-2 Retrieval Analysis – total

Floor	No of Exit Lanes	No of Cars	Retrieval Time of cars (mins)	No of Exit Lanes	No of Cars	Retrieval Time of cars (mins)
	EMERGENCY SCENARIO (100%)			PEAK SCENARIO (30%)		
Podium Level	2	41	3.4	1	12	2.2
Ground Level	4	60	2.1	2	18	1.4
Lower Ground Level/Basement Level	2	108	6.1	1	32	3.9
Total		**209**	**6.1**		**62**	**3.9**

The average time taken for a representative car to exit from Podium Level via Ground Level Exit is 1.0 minutes during AM Peak Hour

Considering sequential retrieval of Cars and additional 5 min each for circulation issues and unforeseen delays

Overall Retrieval time is 11 minutes during Emergency for all vehicles and 9 minutes during Peak Hour

5.7 RETRIEVAL TIME

Therefore, considering simultaneous movement of Cars from Ground and Podiums, overall retrieval time =11 min during emergency and 9 minutes during peak hour.

6 TRAFFIC MANAGEMENT PLAN

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

6.1 TRAFFIC CALMING

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

Following are the proposed specific improvements for each street.

6.2 TRAFFIC CONTROL MEASURES

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

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

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

Table 6-1 Traffic Control Measures

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

Figure 6-1 Illustration of a Speed Hump

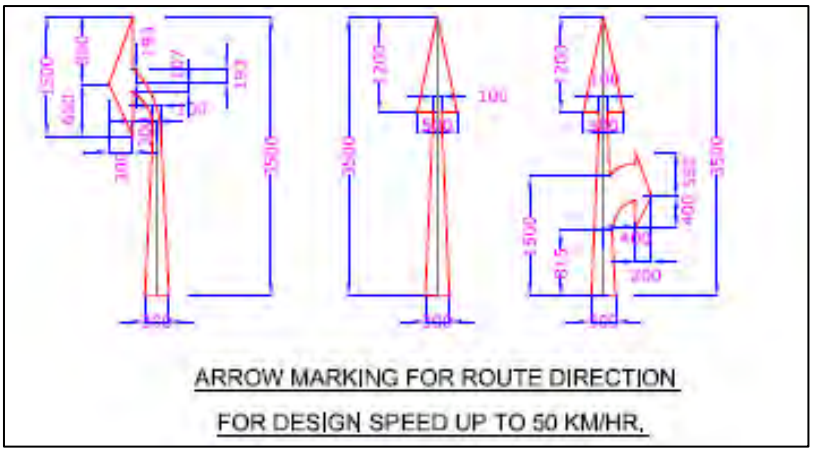

Figure 6-2 Pavement Markings

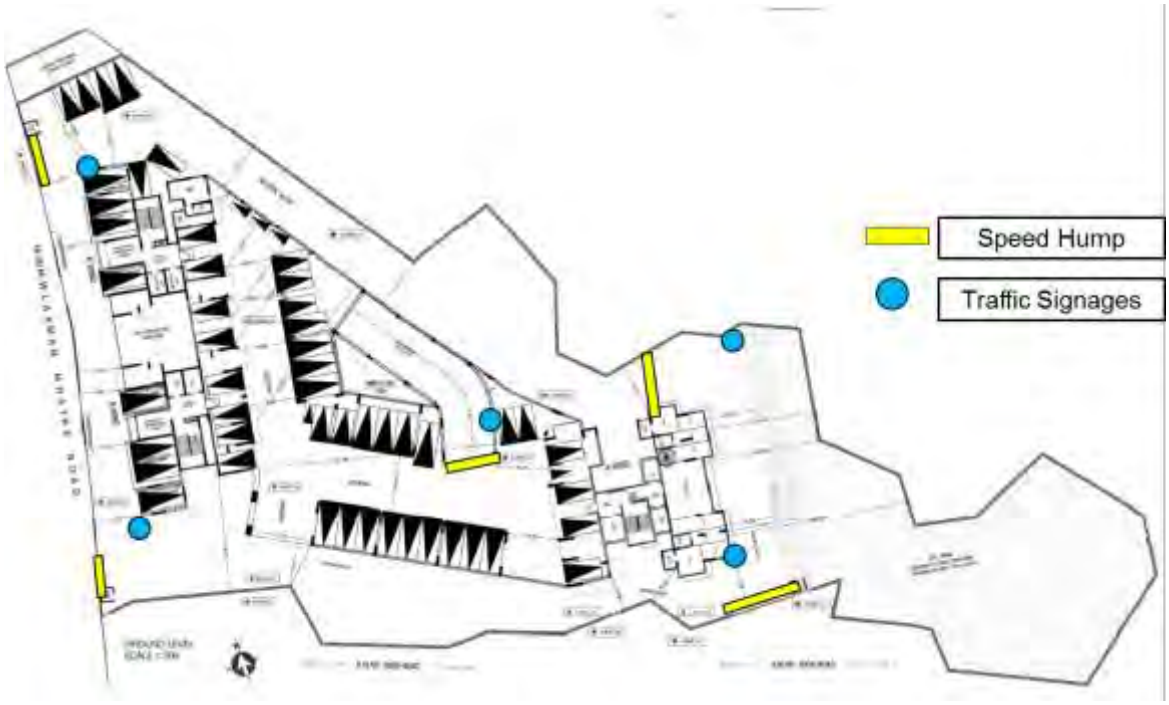

Figure 6-3 Traffic Management Plan

7 CONCLUSIONS & RECOMMENDATIONS

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

1) The project traffic has been forecasted for year 2020, 2025, 2030 and 2040 this has been superimposed along with existing projected traffic to arrive at future traffic for year 2020, 2025, 2030 and 2040.

2) The forecast traffic on the roads adjoining the project namely Laxman Mhatre Marg and Babudev Ranade Road will operate at acceptable level of service in future up to 2040.

3) Swept Path analysis yielded that road geometry was adequate for vehicle turning maneuvers.

4) The retrieval time is 11 minutes during an emergency and 9 minutes during peak hour which is within fire ratings and emergency evacuation limits.

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

****

ECBC Compliance

Section	Requirement	Compliance/Remarks
4.3.1	Roof assembly U factor to be max 0.409 W/m²°K	Complied with
6.2.2	Equipment efficiency standards	Equipment will be specified to meet the minimum standards.
7.2.1.2	Space control for lighting	Space controls will be provided for lighting in common areas
7.2.1.4	Exterior lighting to be controlled by sensor or time switch.	External lighting will be switched on / off by photo sensors.
7.3.1	Interior lighting power to be with in specified limits	For Common Area Lighting power Density) will be with in specified limits.
7.3.5	Exterior lighting power to be with in specified limits	LPD for exterior lighting will be as specified.
8.2.2	Energy efficient motors	All motors of PHE systems have nominal full load efficiency as per IS 12615.
8.2.3	Power factor to be maintained between 0.95 and unity	PF is maintained above 0.95
8.2.4	Check metering	Check meters are provided on all major consumption centers such as PHE, Lifts, Fire fighting etc.

ENCLOSURE - 12

DISCLOSURE OF CONSULTANTS ENGAGED

This Form 1 & 1A is prepared on behalf of the proponents, taking inputs from proponent's office staff, Architects, Project Management Professionals etc. by Environmental Consultants **M/s Ultra-Tech Environmental Consultancy & Laboratory,** Thane-Pune, who have been [provisionally] accredited by QCI-NABET vide official memorandum of MoEF dated 30th June 2011.

ENVIRONMENTAL CONSULTANTS ORGANIZATION

ULTRA-TECH ENVIRONMENTAL CONSULTANCY & LABORATORY [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 is in the process of getting QCI-NABET final accreditation for its EIA organization.

Ultra-Tech also provide 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 is in process.
- ISO 9001:2008, Quality Management System implemented

HONORS

We are honored by the following reputed firms for our unflagging 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 9001:2008 CERTIFICATION

ULTRA-TECH is one of the leading environmental consultancy and laboratory services providing companies and is ISO 9001:2008 certified with effect from 26th March, 2011.

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 greeniverse. 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.

SOURCES OF DATA

SR. NO.	DETAILS OF DATA / STUDY	DATA SOURCE / STUDY CONDUCTED AGENCY
1.	Design Architect	Aakar Architects
2.	MEP Plan and Study	MAK MEP Consultants
3.	Traffic Consultants	GMD Consultants

KOLTE • PATIL
Creation, not construction.

Date: 23.11.2016

To,
The Member Secretary
Expert Appraisal Committee (2) in the Infrastructure Sector
Ministry of Environment and Forests & Climate Change

Subject : Submission of compliance report to the observations raised during 51st (Part-A) SEAC-II meeting for REDEVELOPMENT OF "SAGAR VAIBHAV CO-OP HOUSING SOCIETY LTD." at Village Mandapeshwar, Opposite Mary Immaculate Girls School, Laxman Mhatre Road, Dahisar (West), Mumbai – 400068 for reference of the EAC, MoEF & CC

Reference : 1. Online submission of our project on MoEF website on dated 28.10.2016
Our Proposal No IA/MH/NCP/60056/2016 & File no. - F.No.21-31/2016-IA-III
2. Minutes of meeting (MoM) of 51st (Part- A) SEAC -II (Item No. 15)

Respected Sir,

This is with reference to the above mentioned subject. We would like to state here that the above mentioned project was appraised by SEAC 2, Maharashtra in its 51st meeting. Post that the Committee got dissolved hence we have withdrawn the proposal from State level and have submitted fresh application (Form 1, 1A and Conceptual plan) to EAC. For the reference of EAC, MoEF & CC we are submitting herewith the point wise compliance report to the observation raised by the SEAC-2, Maharashtra during the meeting as follows:

Observation:

PP informed that they have not received N.A. permission, water supply permission, CFO NOC & plans are yet to be approved etc. PP to submit any one of the permission received for the project.

Compliance:

Permission	Status
N.A. permission	This is a redevelopment project where there is an existing society hence NA permission is not applicable
Water supply permission	Applied. But as this project is in jurisdiction of Municipal Corporation of Greater Mumbai (M.C.G.M.) Water supply shall be supplied by MCGM. Please refer **Enclosure 1.**
CFO NOC	We have received CFO NOC from Chief Fire Brigade office, MCGM. Copy of the approval is attached as **Enclosure 2.**

We sincerely hope that our reply will satisfy the observation raised by the respected Committee.

Thanking you,
Yours faithfully,

For KOLTE-PATIL DEVELOPERS LTD.

Niren Chaudhary,
(AUTHORIZED SIGNATORY)

Encl: As above

KOLTE-PATIL DEVELOPERS LTD.
CIN : L45200PN1991PLC129428
Mumbai Office : 501, 5th Floor, The Capital, Plot No. C70, G - Block, Bandra-Kurla Complex, Bandra (East), Mumbai - 400051, India Tel.: +91 22 61770100, +91 8411905000, +91 8411906000
Pune Regd.Off.: 2nd Floor, City Point, Dhole Patil Road, Pune-411001, Maharashtra, India. Tel.: +91 20 66226500 Fax: +91 20 66226511 Web : www.koltepatil.com
Bangalore Off.: 22/11,1st Floor, Park West, Vittal Malya Road, Bangalore-560001, India. Tel.: + 91 80 2224 3135, 22242803, 49374444 Fax : + 91 80 2212 0654

Swati Consultancy

CIVIL ENGINEERS

Consultants for all MCGM, City Survey, Collector office & Revenue, Depts.

3, Roshan Apsara, Roshan Nagar, Off Chandavarkar Road, Borivali (W), Mumbai - 400092.
T : 28927599 | E : swaticonsultancy1999@yahoo.com

ENCLOSURE - 1

Date: 06/10/2016.

To,
The Executive Engineer,
Planning &Research,
Water works dept.
3rd Floor 'B' ward municipal office,
Babula Tank, Opp. J. J. Hospital,
Mumbai.

Sub: H.E. ~~NOC~~ remark for proposed building on plot bearing C.T.S. No. 51 of Village Mandpeswar at Laxman Mhatre Marg, Dahisar west, Mumbai.

Sir,

With reference to above, we are applying herewith for H.E. NOC for abov proposed bldg.

As per circular u/No.CHE/DP/37143/Gen. dt. 02/12/2015, CHE / DP / 49 / Gen 2015-16, you are requested issue us H.E. NOC as per Ease of doing Business & Submitting following documents.

1. License copy
2. Appointment letter.
3. D.P. remarks with plan
5. Proposed full potential plan = 1 No

Kindly do the needful & oblige.

Thanking you.

Yours Faithfully,
M/s. Swati Consultancy

R. B. Nevase
L. P. No. 2337/13/2016.

बृहन्मुंबई महानगरपालिका
कार्यकारी अभियंता जलकामे
[नियोजन व संशोधन]
13 OCT 2016
आ.क्र. HE/ /NOC
E.E.W.W.(P & R)/IR/FSTT/CIR

ENCLOSURE - 2

Office of the Chief Fire Officer
Mumbai Fire Brigade
Byculla Command Center Building,
1st Floor, Bapurao Jagtap Marg,
Byculla, Mumbai - 400 008.

MUNICIPAL CORPORATION OF GREATER MUMBAI
MUMBAI FIRE BRIGADE

No: FB/HR/R IV/389
Date: 17/10/2016

Sub: N.O.C. stipulating fire protection & firefighting requirements for the construction of High Rise Residential Building on plot bearing C.T.S. No.51 of Village Mandpeshwar at Laxman Mhatre Marg, Dahisar (West), Mumbai.

Ref: i) Letter dated 30/09/2016 from M/s. Aakar Architects.
ii) **M.F.B.No HR/R-IV/389 dated 05/10/2016**

E.E.B.P. (W.S.)

This is a proposal for the proposed construction of High Rise Residential building comprising of three wings i.e. Wing 'A' 'B' & 'C'. Wing 'A' having lower ground floor & ground floor for duplex fitness centre (accessible directly from 08.50 mtrs. wide Road) + common podium floor part for car parking by way 6.00 mtrs wide two way ramp & part for residential use + 1st to 19th upper residential floors (19th part floor) with a total height of 69.95 mtrs. measured from general ground level up to terrace slab and wing 'B' & 'C' having common basement part for car parking (having access through natural slop, due to level difference) and part for services + Common ground floor part on stilt + common podium floor for car parking by way 6.00 mtrs wide two way ramp + 1st to 19th upper residential floors (19th part floor in both wing 'A' &'B') with a total height of 69.95 mtrs. measured from general ground level up to terrace floor as per enclosed plans..

Architect has proposed Substation at common ground floor of the wing 'B' & 'C' as shown on the plan.

One podium is created /proposed between the open space of wing 'A' and wing 'B' & 'C' as shown on the plan.

The details of floor-wise use of wing 'A' will be as follows:

Floors	**Wing 'A'**
Lower Ground Floor	Lower duplex fitness center (with internal staircase of 1.00 mtrs wide) + Electric meter panel + L.T. room + surface car parking + 03 tier puzzle car parking(One level in pit).
Ground Floor (Common with wing 'B' & 'C'	Upper duplex fitness center (with internal staircase of 1.00 mtrs wide) + surface car parking + Space for Electric Substation + 03 tier puzzle car parking (One level in pit).
Common podium floor	Partly for surface car parking by way of 6.00 mtrs. wide 2 way ramp + partly for 02 nos. of residential flats.
1st to 5th floor	04 nos. of residential flats on each floor
6th& 13th floor	03 nos. of residential flats + refuge area on each floor
7th to 12th& 14th to 18th floor	04 nos. of residential flat on each floor on each floor
19th floor (Part)	03 nos. of residential flat + part terrace.
Terrace	Open to sky (treated as refuge area)

15/10/16

17/10/16

Floor	Wing 'B'	Wing 'C'
Common Basement floor	Electric meter panel + S.T.P.+ space for O.W.C.+ space for D.G. Set + surface car parking + 03 tier puzzle car parking (One level in pit) through natural slops.	
Ground Floor (Common with wing 'A'	surface car parking + 03 tier puzzle car parking(One level in pit) + space for electrical substation	
Common podium floor	Partly for surface car parking by way of 6.00 mtrs. wide 2 way ramp + partly for 02 nos. of residential flats.	
1st to 5thfloor	04 nos. of residential flat on each floor.	03 nos. of residential flat on each floor.
6th& 13th floor	03 nos. of residential flat+ common refuge area on each floor	03 nos. of residential flat + common refuge area on each floor
7th to 12th&14th to 17th floor	04 nos. of residential flat on each floor	04 nos. of residential flat on each floor
18th floor	04 nos. of residential flat	03 nos. of residential flat
19th floor (Part)	01 nos. of residential flat + part terrace	01 nos. of residential flat + part terrace
Terrace	Open to sky (treated as refuge area)	

THE DETAILS OF STAIRCASE & LIFT (each wing):

Staircase description	Width of staircase	Nos. of staircase	Type
1 no. of staircase Leading from lower ground floor to terrace floor in wing 'A' and basement to terrace level in wing 'B' & 'C' wing .	01.50 mtrs wide in each wing	01 No.	Enclosed type (Naturally ventilated)
The staircase of building is enclosed type, externally located & adequately ventilated to outside air basement staircase is terminated at ground floor with smoke check lobby at basement level, as shown on plans.			

Lifts Type	Profile	Nos. of lifts
2 nos. of lifts in each wing 'A' 'B' & 'C'	Leading from lower ground floor to top floor in wing 'A' and Leading from basement floor to top floor in wing 'B' & 'C'	02 Nos. (one passenger & one fire lift)
Out of two lifts, one lift in each wing 'A', 'B' & 'C' shall be converted into fire lift as per norms. The lift lobby & common corridor at each floor level is directly ventilated to outside air as shown on the plan.		

KOLTE PATIL DEVELOPERS LTD. MUMBAI

The site abuts on the of 18.30 mtrs wide Laxman Mhatre road on West side & 8.50 mtrs. wide D.P.Road on South side.

The side open spaces all around the Wing 'A' are as under:

Sides	Building line to plot boundary	Podium line to plot boundary	Building line to podium line
North	6.00 mtrs to 9.00 mtrs	No podium at this side	---------
South	4.50 mtrs to 7.10 mtrs +8.50 mtrs wide D.P. Road.	No podium at this side	---------
East	09.00 mtrs. including paved R.G + R.G.	No podium at this side	---------
West	35.90 mtrs (open space between wing 'A' & 'B' at ground floor)	35.90 mtrs (open space between wing 'A' & 'B' at podium floor)	--------

The side open spaces all around the Wing 'B' & 'C' are as under:

Sides	Building line to plot boundary	Podium line to plot boundary	Building line to podium line
North	11.07 mtrs to 12.00 mtrs(including surface car parking) + 0.45 mtrs. wide right of way	No podium at this side	--------
South	10.45 mtrs to 14.34 mtrs + 8.50 mtrs wide D.P. Road.	No podium at this side	--------
East	35.90 mtrs (open space between wing 'B' & 'A' at ground floor)	35.90 mtrs (open space between wing 'B' & 'A' at podium floor)	--------
West	4.50 mtrs to 5.81 mtrs + 18.30 mtrs wide LaxmanMhatre road	No podium at this side	--------

Refuge area for Wing 'A':

Refuge area floor	**Refuge area in sq. meters Wing 'A'**		**At height of refuge area from ground level In meters.**
	Required	**Proposed**	
6th floor	74.02	74.08	25.15 mtrs.
13th floor	73.96	74.14	47.55 mtrs.
In addition to that, terrace above 19th floor (Part) of Wing 'A' will be treated as refuge area.			
Refuge area beyond 4% shall be counted in F.S.I.			

15/10/16 15/10/16 17/10/16

SHREE PATIL DEVELOPERS MUMBAI

Common Refuge area for Wing 'B' & 'C':

Common Refuge area	Common refuge area in sq. meters Wing 'B' & 'C'		At height of refuge area from ground level In meters.
	Required	Proposed	
6th floor	111.07	111.09	25.15mtrs.
13th floor	101.13	101.19	47.55mtrs.
In addition to that, terrace above 19th floor (Part) of Wing 'B'& 'C' will be treated as refuge area.			
Refuge area beyond 4% shall be counted in F.S.I.			

The proposal has been considered favorably taking into consideration the following:

a) The site abuts on the of 18.30 mtrs wide Laxman Mhatre road on West side & 8.50 mtrs. wide D.P.Road on South side.
b) Refuge area are providing at 6th& 13th floor in each wing as mentioned above which are facing the road side & easily accessible for fire appliance in case of emergency.
c) Automatic sprinkler system will be provided at car parking area covering each car parking level at basement, lower ground floor, ground floor & common podium floor, Fitness center at both level, in each lift lobby/common corridor at each floor level of each wing &each flat on each floor of the each wing 'A', 'B' & 'C' ,
d) Architect has proposed mixed occupancy on common podium floor in wing 'A' i.e. residential use and car parking, same is considered subject to approval from Hon. M.C.
e) The Architect during course of discussion agreed to provide recommended active & passive fire protection requirements & also assured to provide any additional fire requirements in future from Mumbai Fire Brigade Officer.

In view of above, as far as this department is concerned, there would be no objection for the proposal for the proposed construction of High Rise Residential building comprising of three wings i.e. Wing 'A' 'B' & 'C'. Wing 'A' having lower ground floor & ground floor for duplex fitness centre (accessible directly from 08.50 mtrs. wide Road) + common podium floor part for car parking by way 6.00 mtrs wide two way ramp & part for residential use + 1st to 19th upper residential floors(19th part floor) with a total height of 69.95 mtrs. measured from general ground level up to terrace slab and wing 'B' & 'C' having common basement part for car parking(having access through natural slop, due to level difference) and part for services + Common ground floor part on stilt + common podium floor for car parking by way 6.00 mtrs wide two way ramp + 1st to 19th upper residential floors (19th part floor in both wing 'A' & 'B') with a total height of 69.95 mtrs. measured from general ground level up to terrace floor as per enclosed plans..as per enclosed plans.signed in token of approval, subject to satisfactory compliance of the following requirements.

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1. **ACCESS :(For each wing)**

i) All access & fire tender access should be free of encumbrances.

ii) Courtyard s shall be flushed with the road levels.

iii) Entrance gate if provided shall be of not less than 6.00 meters width each shall be provided, at locations marked on the plan. Archways, if any over the entrance gates, shall have height clearance of not less than 4.50 mtrs.

2. **PROTECTION TO STRUCTURAL STEEL: (For each wing)**

i) All the structural steel members i.e. columns, beams etc., shall be protected with the 02 hours fire resisting materials and methods as stipulated under IS 1942-1960 as application for residential building.

ii) A certificate to that effect that the fire resistance protection has been provided as above shall be furnished from the Structural Engineer as the time of application for occupying the building.

3. **COURTYARDS/OPEN SPACES: (For each wing)**

a. The entire open spaces shall be sufficiently hardened to bear the weight of fire engine weighing up to 48 M.T. each with a point load of 10 kgs/sq. cm.

b. All the courtyards shall be in one plane and it shall be clear of any obstructions including tree .

c. Courtyards around the building shall be maintained free from encumbrances / encroachments.

4. **STAIRCASE: (For each wing)**

i) The flight width of staircases shall be maintained as shown in the enclosed plans.

ii) The layout of main staircase shall be enclosed type as shown in the plan throughout its height and shall be approached (gained) at each floor level at least two hours fire resistant self closing door (45 mm. thickness) placed in the enclosed wall of the staircase.

iii) Externally located staircases adequately ventilated to outside air.

iv) Openable sashes or R.C.C. grills with clear opening of not less than 0.5 sq. mtrs. per landing on the external wall of the staircase shall be provided.

v) No combustible material shall be kept or stored in staircase / passage.

vi) Internal staircase shall be constructed with non-combustible material and non-flammable material.

5. **STAIRCASE TERRACE DOOR : (For each wing)**

The terrace door shall be provided in the following manner.

A. The top of portion of the doors shall be provided with louvers.

B. The single latch lock shall be installed from the terrace side at the height of not more than one mtr.

C. The glass front of 6 inch diameter with the breakable glass shall be provided just above the single latch lock, so as to open the latch in case of an emergency by breaking glass.

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6. **CORRIDOR / LIFT LOBBY : (For each wing)**

i) Corridor / lift lobby at each floor level shall be naturally ventilated as shown in plan.

ii) The common corridor / lift lobby at each floor level shall be kept free from obstructions at all times.

iii) Self glowing/fluorescent exit signs in green color shall be provided showing the means of escape for entire building.

iv) Portable lights / insta lights shall be provided at strategic locations in the staircase and lift lobby.

7. **STAIRCASE AND CORRIDOR LIGHTINGS: (For each wing)**

i) The staircase and corridor lighting shall be on separate circuits and shall be independently connected so that they could be operated by one switch installation on the ground floor easily accessible to fire fighting staff at any time irrespective of the position of the individual control of the light points, if any.

ii) Staircase and corridor lighting shall also be connected to alternate supply.

IV) Emergency lights shall be provided in the staircases/corridors.

8. **BASEMENT: for wing 'B' & 'C'**

i) The basement slab forming part of the courtyard shall be designed suitably to bear the load of the fire engine weighting up to the 48 m. tones with point load of 10 kg. / sq.cms.

ii) The staircase has been proposed for ingress & egress to the basement from ground floor. The staircase shall be totally enclosed type complying with the provisions of N.B.C. & as per D. C. Regulations.

iii) The basement shall be used for designated purposed only.

iv) The staircases shall be provided with self-closing fire resisting doors of at least 02 hours resistance.

v) Entry from the basement areas through the staircases shall be granted through 02 hours fire resistance doors of self-closing type placed in the enclosed walls of the staircases.

vi) Natural ventilation to the basement shall be provided through the duct or ventilation shafts etc., as shown on the plans.

vii) The basement shall be properly lighted. The escape route shall be lighted to have a minimum luminance of 2.5 lux.

viii) Suitable signage's shall be provided in the basement showing 'Exit Direction', 'Way To Exits' etc.

ix) Smoke check lobby, Staircase, common passage & escape route of the entire building shall be painted with fire retardant paint.

x) A.B.C. Type B.I.S. marked Portable Fire Extinguishers having capacity of 09 kgs. each, as per BIS:2190 of 1992 & sand buckets filled with cleaned sand shall be kept at prominent place in basement premises.

xi) Automatic sprinkler system shall be provided in car parking area covering each car parking level as per as per BIS:2190 of 1992of NBC.

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9. **PODIUM FLOORS:**

a. The Podium level is provided with 06.00 mtrs. wide two way ramp for entry and exists of cars. Which will have entry at the ground level.
b. Podium floors shall be used for horizontal car parking by way of 06.0 mtrs. wide two way ramp as per shown on the plans.
c. All the sides shall be provided with kept open except parapet walls of not more than 1.2 meters height.
d. The driveways shall be properly marked and maintained unobstructed, proper illuminated signage shall be provided for escape route car lifts etc. at prominent location.

10. **THREE TIER PIT / PUZZLE CAR PARKING: (For each wing)**

a. All the structural steel members of the parking block i.e. columns, beams, external cladding with coated steel sheets etc. shall be protected with the fire resisting / retardant materials and methods as stipulated under relevant I.S. specification. A certificate to that effect that the fire resistance protection has been provided as above shall be furnished from the Chartered Structural Engineer.
b. Drainage of the car parking area shall be laid independent from that of the buildings & it shall be provided with catch pit & fire trap before connecting the building drainage or Municipal drainage.
c. Dwelling, use of naked light / flame, repairing / maintenance of vehicles shall be strictly prohibited in the parking area.
d. Structural design shall be constructed of steel construction.
e. Vertical deck separation having multi car parking level, vertical separation between the upper & lower decks by using the non-perforated & non-combustible materials (structural steel plate) shall be provided. This is to minimize direct impingement of flame to the car in the upper deck & also to prevent dripping of any possible leaking fuel to the lower deck.
f. The cars shall be separated by perfect partition of 4.5 mm thick steel pallets between two cars, to prevent spread of fire from one level to next level.
g. The electrical cables used internally shall be fire retardant, & heat resistant of 105 degree centigrade.
h. Automatic sprinkler system conforming to the standards lay down by T.A.C. & relevant I.S. specification shall be provided with sprinkler head covering at each parking level.
i. The car's engine shall be shut off at ground level before parking at higher level.
j. Only trained operator certified by company installing car tower shall operate automatic car parking system.

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11. ELECTRIC SUBSTATION: Only Dry Type

a. Only dry type substation/transformers shall be installed as per plan on stilt area.
b. Entire installation of substation including switchgear room, capacitors, transformer etc. shall be confirmed to the Indian Electric Act/Rules in practice.
c. Cables in the cable trenches shall be coated with fire retardant material.
d. Automatic built-in circuit breakers shall be provided in the substation/transformer.
e. The door of the sub-station shall be of two hours fire resistance.
f. The capacity of the substation shall be as per service provider's requirements.
g. Adequate ventilation of switch room is essential to prevent condensation of moistures.
h. The substation/transformer area shall be kept prohibited and no unauthorized person shall be allowed to enter in the area.
i. The proposed substation shall be completely segregated either by brick masonry wall each of 9" thickness or R.C.C od 4" thickness from the rest of the premises as shown in the enclosed plans.
j. The danger signage on the substation fencing along with the electric voltage load.
k. Two dry chemical power type (ABC stored pressure type) fire extinguishers of 10 kgs. capacity each with BSI certification mark coupled with four buckets filled with dry clean sand shall be kept on the sub-station.

12. FLAT ENTRANCE, KITCHEN DOORS & EXIT / ENTRANCE STAIRCASE: (For each wing)

i) Flat entrance and kitchen doors (if provided) shall be of solid core having fire resistance of not less than one hour (solid wood of 45 mm thickness.)
ii) The fire resistance rating for staircase F.R.D., Lift lobby / protected lobby & the lift doors as per N.B.C. provisions.

13. ELECTRIC CABLE SHAFT, SERVICES & METER PANEL: (For each wing)

i) Electric cable shaft shall be exclusively used for electric cables and should not open in staircase enclosure.
ii) Inspection doors for shaft shall have two hours fire resistance.
iii) Electric shaft shall be sealed at each floor level with non combustible materials such as vermiculite concrete. No storage of any kind shall be done in electric shaft.
iv) Electric wiring/ cable shall be non-toxic, non-flammable, low smoke hazard having copper core / fire resistance for the entire building with provision of ELCB/MCB.
v) Electric panel room shall be provided at location marked on the plan. It shall be adequately ventilated & easily accessible.
vi) Low and medium voltage wiring running in conduit and in false ceiling should run in separate conduits;

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vii) Water mains, telephone lines, intercom lines, gas pipes or any other service line should not be laid in the shaft for electrical cables; use of bus bar/solid rising mains instead of cables is preferred.

viii) Master switches controlling essential service circuits shall be clearly labeled.

ix) Automatic Smoke detection system incorporate with response indicator shall be installed in electric duct on each floor.

14. FALSE CEILING (if provided): (For each wing)

False ceiling if provided in the building shall be of non combustible material. Similarly, the suspenders of the false ceiling shall be of no combustible materials.

15. MATERIALS FOR INTERIOR DECORATION/FURNISHING:(For each wing)

The use of materials which are combustible in nature and may spread toxic fume/gases should not be used for interior decoration/furnishing, etc.

16. LIFTS (For each wing)

A. PASSENGER LIFT :

i) Walls enclosing lift shaft shall have a fire resistance of not less than two hour.

ii) Shafts shall have permanent vent of not less than 0.2 sq. mtrs in clear area immediately under the machine room.

iii) Landing doors and lift car doors of the lifts shall be of steel shuttered with fire resistance of one hour. No collapsible shutter shall be permitted.

iv) One of the lift shall be converted into fire lift and shall be as per specifications laid down under the regulations, a toggle switch shall be provided to this lift for the use of Firemen.

B. FIRE LIFT:

i) Walls enclosing lift shafts shall have two hours fire resistance.

ii) The shafts shall have permanent vent equal 0.2 sq.mtr. clear area under the Lift Machine room.

iii) Landing doors and lift car doors shall be of steel shuttered type with one hour fire resistance. No collapsible shutters shall be provided.

iv) To enable fire services personnel to reach the upper floor with the minimum delay, one fire lift shall be provided and shall be available for the exclusive use of the firemen in an emergency and the directly accessible to every dwelling of each floor.

v) The lift shall have a floor area of not less than 1.4 sq. mtrs. with a minimum dimension of 1.12 mtrs. It shall have loading capacity of not less than 545 k.g. (8 persons lift) with automatic closing doors.

vi) There shall be an alternate electric supply of an adequate capacity apart from the normal electric supply the building and the cables run in a route safe from fire, i.e. within the lift shaft. In case of failure normal electric supply, it shall automatically trip over to alternate supply.

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vii) The operation of fire lift should be by a simple toggle or two button switch situated in glass-fronted box adjacent to the lift at the entrance level. When the switch is on, landing call points will become inoperative and the lift will be on car control only or on priority control device. When the switch is off, the lift will return to normal working. This lift can be used by the occupants in normal times.

viii) The words 'Fire lift' shall be conspicuously displayed in florescent paint on the lift landing door at each floor level & Threshold of non-combustible material shall be provided at the entrance of each landing door.

18. FIRE FIGHTING REQUIREMENTS

a) **Under Ground Water Storage Tank : (common for all wing)**

An underground water storage tank of 3,00,000 liters capacity shall be provided, as per the design specified in the rules with baffle wall and fire brigade collecting breaching. The layout of which shall be got approved from H.E.'s department prior to erection. The tank shall be connected to sprinkler system.

b) **Overhead Water Storage Tank (separate for each wing 'A' 'B' & 'C'):**

A tank of 30,000 liters capacity shall be provided on each staircase shaft at the terrace level, the layout of which shall be got approved from H. E.'s departments prior to erection. The tank shall be connected to wet risers through a booster pump through a non-return valve gate valve.

c) **WET- RISER CUM DOWN COMER :-(for each wing 'A' 'B' & 'C'):**

Wet riser cum down comer of internal dia. of 15 cms. of G.I. 'C' Class pipe shall be provided as shown on the plan with a twin hydrant outlet & hose reel at each floor in such a way as not to reduce the width of the common corridor. Pressure reducing discs or orifices shall be provided at lower level, so as not to exceed the pressure of 5.5 kgs. per sq. cms. A fire service inlet on the external face of the building near the tank directly fronting the courtyards shall be provided to connect the mobile pump of the fire service to the wet riser-cum-down comer and sprinkler system.

d) **Fire Service Inlet :**

i) A fire service inlet on the external face of the building near the tank directly fronting the courtyards shall be provide to connect the mobile pump of the fire service to (a) The wet riser (b) Sprinkler system .

ii) Breeching connection inlet shall be provided to refill U.G. tank.

iii) Operating switches of fire pumps shall be also provided in glass fronted boxes at ground floor.

e) **Automatic Sprinkler System:(for each wing 'A' 'B' & 'C'):**

The Automatic sprinkler system shall be provided in lift lobby/common corridor at each floor level in each wing and car parking area covering each car parking level at basement, Lower ground floor, stilt & fitness center at both

level as well as in each flat at each floor level in each wing i.e wing 'A', 'B' & 'C' as per the standards laid down by T.A.C. or relevant I.S. specifications.

f) **Automatic Smoke Detection System:(for each wing 'A' 'B' & 'C'):**
Automatic smoke detection system shall be provided in each electric meter room/panel, electric shaft, each lift machine room & fitness center as per IS specification.

g) **BOOSTER PUMP(Separate for each wing) FIRE PUMP,SPRINKLER PUMP AND JOCKEY PUMP (Common for all wing):**
Wet-riser shall be connected to a fire pump at ground level of capacity of not less than 2400 liters/min. capable of giving a pressure of not less than 3.2 kgs/ sq. cms. at the top most hydrant.

i) Booster pump of 900 liters/min. capacity giving a pressure of not less than 3.2 kgs./ sq. cms. at the top most hydrant out let of the wet-riser shall be provided at the terrace level.
ii) Sprinkler pump of suitable capacity along with jockey pump shall be provided for automatic sprinkler system.
iii) Electric supply (normal) to these pumps shall be independent circuit.
iv) Operating switches for booster pumps shall be also provided in glass fronted boxes in terrace floor as well as ground floor at prominent place.
v) Operating switches of fire pumps shall be also provided in glass fronted boxes at ground floor.
vi) All above pumps should be surface mounted or vertical turbine type (submersible pump not permitted) pump along with adequate size of pump room.

h) **External Hydrants:**
Courtyard hydrants shall be provided at distance of every 30.00 mtrs all around the building each within the confines of the site of the wet riser-cum-down comer. Hose box with two non-percolating BIS marked hoses (length not less than 15 mtrs) & branch shall be equally distributed on ground floor near the hydrant outlet.

i) **Alternate source of power supply:**
An alternate source of L. V./H. V. supply from a separate sub-station or D.G. Set with appropriate change over switch shall be provided for fire pump, fire lift, staircase, corridor lighting circuits, sprinkler pump, jockey pump and fire alarm system, detector systems, etc. It shall be housed in a separate cabin.

j) **Portable fire extinguishers : (for each wing 'A' 'B' & 'C'):**
a. One dry chemical powder type fire extinguisher of 09 kgs. capacity having I.S. certification mark and two bucket filled with dry clean sand shall be kept in each electric meter room and in each lift machine room and at car parking area at every 100.00 sq. mtrs. area.
b. One dry chemical powder type fire extinguisher of 09 kgs. capacity having B.I.S. certification mark shall be kept on each floor level at prominent place &

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refuge area .

c. All above fire extinguishers should be placed on each floor level as per IS:2190 of 1992.

19. FIRE ALARM SYSTEM : (for each wing):

The building shall be provided with manual fire alarm system with main control panel at main Security Cabin on ground floor level and pill-boxes and hooters at each upper floor level. The layout of fire alarm system shall be in accordance with I.S. specification.

20. PUBLIC ADDRESS SYSTEM (for each wing):

The building shall be provided with public address system as per the rules with main control operator at console panel at security cabin on ground floor area

21. SIGNAGES: (for each wing):

Self-glowing/fluorescent exit signs in green color shall be provided showing the means of escape for the entire building.

22. TRAINED FIRE STAFF/SECURITY GUARDS: (common for all wings)

The trained fire staff / security guards having basic knowledge of firefighting & fix firefighting installation shall be deputed in the building. They will be responsible for the following;

i. Maintenance of all the first aid firefighting equipment, fixed installations & other firefighting equipment / appliance in good working condition at all times.

ii. Imparting training to the occupants of the building in the use of firefighting equipment provided on the premises & kept them informed about the fire & other emergency evacuation procedures.

23. FIRE DRILLS / EVACUATION DRILLS:

Fire Drills and evacuation drills shall be conducted regularly in accordance with fire safety plan of building at least once in a six month in consultation with Mumbai Fire Brigade and log of the same shall be maintained.

24. REFUGE AREA: (for each wing):

Refuge area provided on 06th& 13thfloor level of 'A' wing & common refuge area for wing 'B' & 'C' on 06th& 13th floor level shall be conforming to the following requirements:

i) Manner of refuge area:

a) The refuge area shall be so located that it shall preferably face the access road /wider open space of the building.

b) The refuge area shall be provided with railing / parapet of 1.20 mt.

c) The refuge area shall have a door which 'shall be painted or fixed with a sign in luminous paint mentioning "REFUGE AREA"

d) The lift/s shall not be permitted to open into the refuge areas.

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e) The refuge area provided within building line shall be accessible from common passage/ staircase.

ii) **Use of refuge area:**

a. The refuge area shall be earmarked exclusively for the use of occupants as temporary shelter and for the use of Fire Brigade Department or any other organization dealing with fire or other emergencies when occur in the building and also for exercises/drills if conducted by the Fire Brigade Department.
b. The refuge areas shall not be allowed to be used for any other purpose and it shall be the responsibility of the owner/occupier to maintain the same clean and free of encumbrances and encroachments at all times.

iii) **Facilities to be provided at refuge area**

Adequate emergency lighting facility shall be provided.

iv) **Terrace floor as a refuge floor:**

a. The necessary facilities such as emergency lighting, drinking water etc. shall be provided.
b. The access door/s from the enclosed staircase/s to the terrace floor shall have louvers at top half portion of the door. The entrance doors to the terrace shall be painted or fixed with sign painted in luminous paint mentioning "REFUGE AREA".
c. Excess refuge area shall be counted in FSI.

The Party has paid Scrutiny fees of Rs. 8,71,650/-, vide Sap Receipt No. 0598479 Sap Doc. No. 1002710505 dated 13/10/2016, on the gross built up area of 22,350.00 sq.mtrs., as certified by the Architect vide his letter dated 30/09/2016.

However, E.E.B.P. (E.S.) is requested to verify the total built-up area and inform this department, if the same is found to be more for the purpose of levying additional Scrutiny fees, if required.

The width of the abutting road / Access road, Open spaces mentioned in this N.O.C. are as per plans submitted by the Architect, attached herewith. These parameters shall be verified by E.E.B.P. before granting any permission (I.O.D./C.C./further C.C.). If found any contradiction, the proposal shall be referred back to this Department.

This N.O.C. is issued for the proposed building from Fire Risk / Fire Safety point of view only. The plans approved along with this N.O.C. are approved from Fire Risk / Fire Safety point of view only. Approval of this plan does not mean in any way of allowing construction of the building. It is the Architect / Developer's responsibility to take necessary prior approval from all concerned competent authorities for the proposed construction of the building.

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Note:

i) The firefighting installation shall be carried out by licensed approved agency.

ii) The area calculation shown in the enclosed plan shall be checked by the E.E.B.P.(W.S.)

iii) E.E.B.P. (W.S.) shall verify the proposal in context with Hon. M.C.'s circulars issued u/n. Ch.E./32545/DP-Gen dated 24/02/2015 & u/no. Ch.E/34194/DP/Gen dated 10/03/2015 and verify the compliance as per the above said circulars. If the same is not complied with, this proposal shall be referred back to this department for issuing fresh NOC.

iv) E.E.B.P.(W.S.) requested to scrutinized the plans as per amended DCR & verify civil work and all other requirements pertaining to civil Engineering side about Road, open spaces, podiums, corridors, staircases, ventilation, height, refuge area & floor occupancy of the building. If any changes in the plans other than mentioned above then E.E.B.P.(W.S.) shall refer back the proposal to this department for revised NOC till then further process shall not be permitted.

v) Hon. M.C's approval is requested for open space deficiency, if any.

vi) There shall not be any trees, obstructing fire appliances reach in compulsory open spaces, required as per amended DCR.

vii) This N.O.C. is issued from fire risk point of view only without prejudice to legal matters pending in court of law if any.

Chief Fire Officer,
Mumbai Fire Brigade.

CONFORMITY OF PROPOSAL WITH LOCAL NORMS

No	Item	Required as per Development Control Regulations 1991	Proposed
1	**Recreation Ground**	20% of net plot area 4994.70 Sq. m. as per DCR Reg. No – 23-1(a)	1024.82 Sq.mt.
2	**Front Open Space**	DCR 29 (5) Table 10-A, (Serial No. 3) 4.50 m For Plot Abutting 18.30 m. Laxman Mhatre Road	4.50 mt.
3	**Side and Rear Open Spaces For Light and Ventilation**	DCR 29(1) (a) & Clause 43 (1)	North = 6.00 mt East = 13.30 mt.
4	**Side and Rear Open space for Dead Wall**	DCR 29 (1) (e) D/W subject to minimum 6.00 m. or as per Fire Brigade Authorities requirements.	North = 6.00 mt. East = 13.30 mt.
5	**Open Space at Ground Level for Fire Engine Movement**	The Approach To Building And Open Spaces On All Sides Up to 6.00M Width, As Per DCR 43(1) (A)	North = 6.00 mt. East = 13.30 mt.
		As Per DCR 43(1) (B) 9.00 mt.	North = 11.07 mt. East = 13.30 mt.
6	**Min. Width of street for High Rise Building**	9.00 mt. DCR 17(2)	18.30 mt. Laxman Mhatre Road
7	**Refuge Area**	6th floor 74.02 Sq. mt. **(For wing-A)** DCR 44(7)(a)	74.02 Sq.mt.
		13th floor 73.96 Sq. mt. **(For wing-A)** DCR 44(7)(a)	74.14 Sq.mt.
		6th floor 111.07 Sq. mt. **(For wing-B & C)** DCR 44(7)(a)	111.09 Sq.mt.
		13th floor 101.13 Sq. mt. **(For wing-B & C)** DCR 44(7)(a)	101.19 Sq.mt.