Shadow Analysis & Daylight Estimation Report

Of

Proposed Project – "Acme - Ozone"

At

Gut No. 61/1/1, 61/1/2, 3, 4 & 61/2/1, 2, 3
Village Chitalsar –Manpada,
Taluka & District - Thane

Proposed by

M/s. Acme Housing India Pvt Ltd

Prepared by

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Shadow Analysis

1.0 About the Project:

The proposed project is a development of residential project at Gut. No. 61/1/1, Gut. No. 61/1/2, 3, 4, 61/2/1, 2, 3 village Chitalsar -Manpada, Taluka& District Thane. The detail location is shown in **Figure 1.1.**

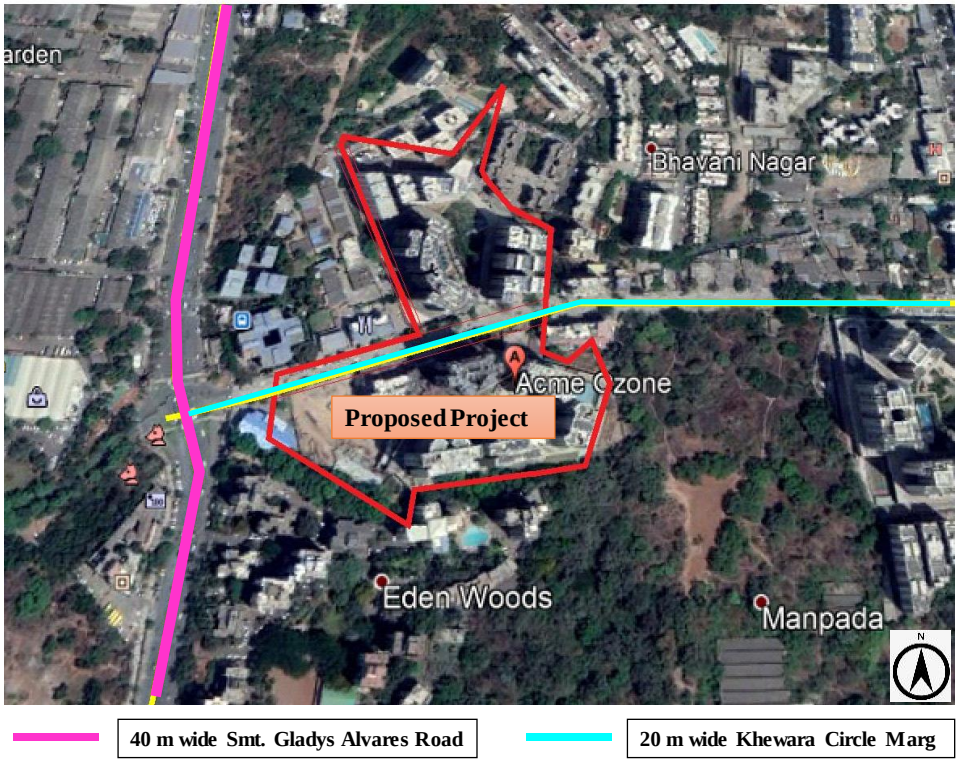


Figure 1.1: Location of the proposed project

Project layout shown in **Figure 1.2**

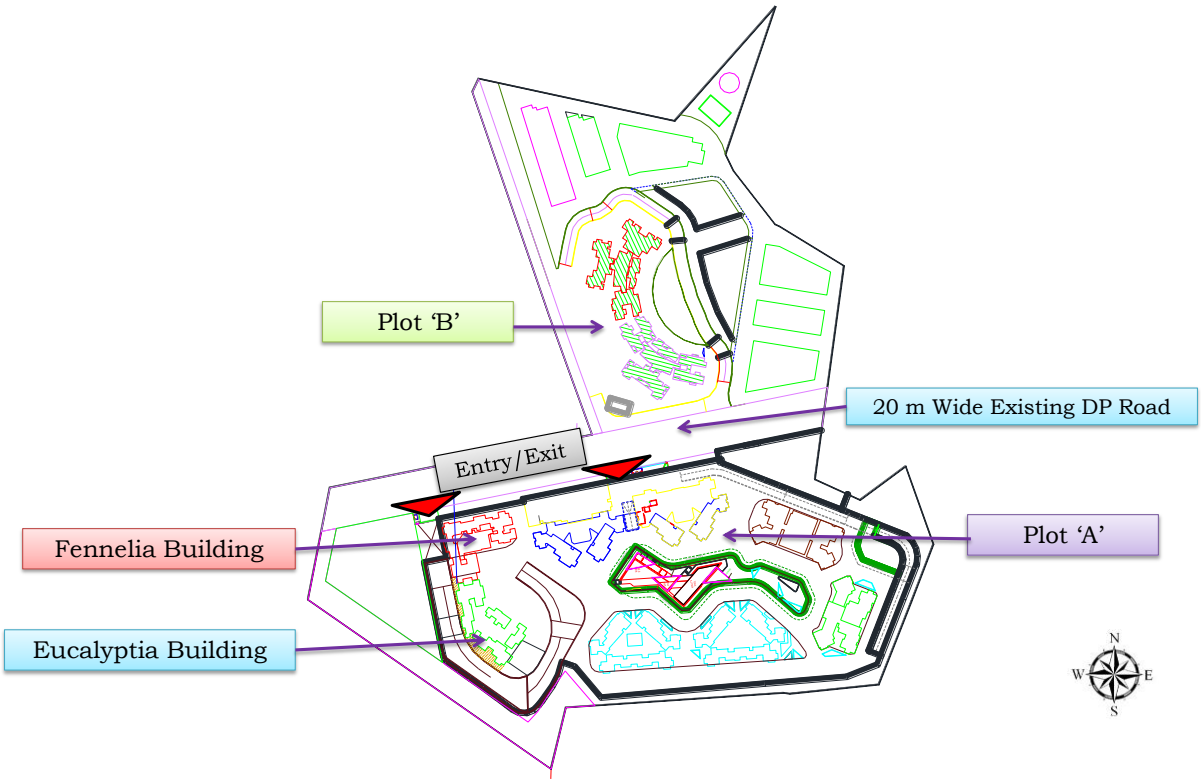


Figure 1.2: Layout plan of the proposed project

The project buildings details are given in **Table 1.1**.

Table 1.1 Project buildings

Building No.	Name of Building	Previous Status		Current Status		Remarks
		Configuration	Height in m	Configuration	Height in m	
1	Eucalyptia	Gr. + 2P + ST + 27 Floor	91.80	2 level Basement + 3 level Podium (Gr.+2P) +Stilt +1st to 19th floor + Fire Check floor + 20th to 35th (Pt) floors	118.87	Basement is added and also increases in floor from 27th to 35th floor. Height increased from 91. 8 m to 118.87 m
2	Fenelia	Gr. + 2P + ST + 27 Floor	91.80	2 level Basement+ Gr (Pt.)/ 1st level Podium + 1st floor (pt)/2nd level Podium +	118.87	Basement is added and also increases in floor from 27th to 35th

Building No.	Name of Building	Previous Status		Current Status		Remarks
		Configuration	Height in m	Configuration	Height in m	
				2nd Floor (pt)/3rd Podium +Stilt + 1st to 19th floor +fire Check floor +20th - 35th (Pt) floor		floor. Height increased from 91. 8 m to 118.87 m

1.1. Methodology:

Shadow analysis of the building was carried out by taking following aspects into consideration:

* Height of the building
* Roof top area
* Site Plan
* Floor Plan
* Roof Plan
* Elevations
* Weather data
* Building Model
* Building Material Properties

Out of these, roof top area, site plan, floor plan and area, building models and materials were obtained from the developer. Weather data was obtained from CPCB and shadow analysis was carried out using Amethyst Software. In order to predict the length and duration of the shadow, angle of incidence and building height are taken which are directly proportional to each other. Edge of the building is also important for shadow analysis.

The surrounding structures and their distance from proposed project are given in **Table 1.2**

Table1.2: Surrounding structures and their distance from proposed project

Name of structures	Distance from the proposed High Rise (m)	Direction
D Mart, Manpada	234.78	West
Hill Garden 1	261.16	West
Hill Garden 2	331.76	West
SRA Office, Thane	68.69	West
Infinity Management Centre	107.08	North-West
Agarwal Heritage	65.27	North
Valley Tower	166.22	North-West
Cluster of Building	170.42	North
Compusoft	242.82	North
Agarwal Estate	264.77	North
Shubharambh Complex	271.13	North-East
Shubharambh Society	235.13	North-East
Mamta Super Market	208.19	North-East
Dosti Imperia 1	427.21	East
Dosti Imperia 2	459.56	East
Regency Park 1	164.41	South
Regency Park 2	116.26	South
Gingelia	53.65	East
Herbalia	118.27	East
Alpinia	166.69	East
Basilia	194.10	East
Centilia	152.00	East
Dandilia	90.32	East
Oakwod	141.44	North-East
Ashwood	182.90	North-East
MMRDA 1	181.66	North-East
MMRDA 2	196.31	North-East
MMRDA 3	214.88	North-East
MMRDA 4	224.99	North-East

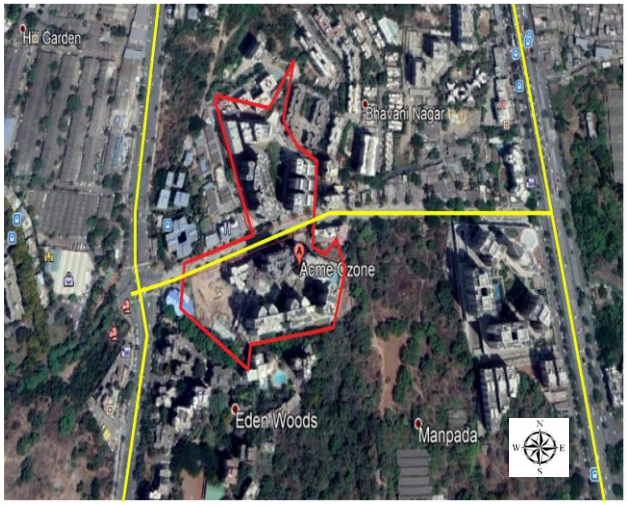
Name of structures	Distance from the proposed High Rise (m)	Direction
MMRDA 5	216.20	North
MMRDA 6	206.21	North

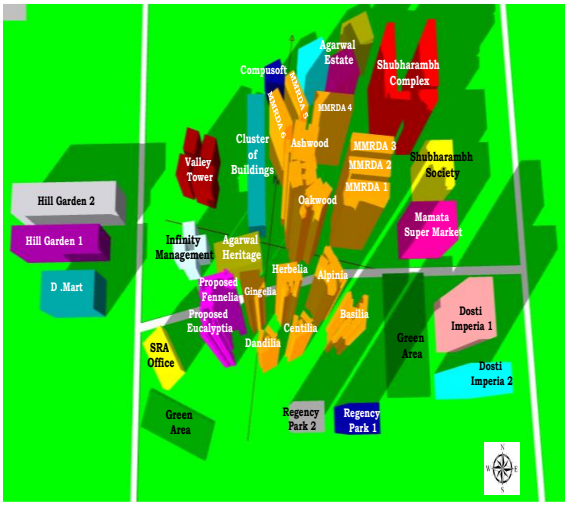
1.2. Findings:

The effect of the shadow is dependent on the position of the building with respect to sun as well as its height. Shadow length and its duration will depend on particular seasons. In winter, sun is at its lowest and shadows will be at their longest. During summer, sun is at its highest and shadows will be at their shortest. During rainy season, shadows would be in a period of shortening and during spring it would be in a period of lengthening.

1.2.1 Neighborhood structures of the proposed site:

The proposed project is located at Gut No. 61/1/1, 61/1/2, 3, 4 & 61/2/1, 2, 3 Village Chitalsar –Manpada, Taluka & District - Thane. There are various structures in and around the proposed site. A comparison of shadow is made with the proposed project and neighboring buildings for all the seasons and different timings of the day. During shadow prediction the internal structure were taken into consideration. The model diagram was drawn using goggle image and verified through site survey. It is highlighted in **Figure 1.3**



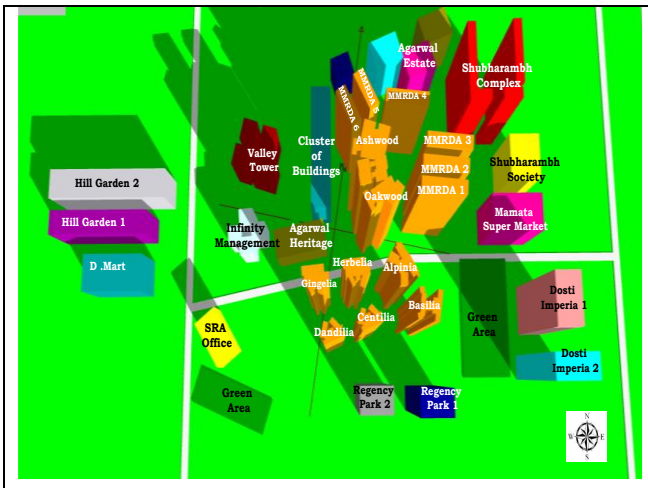


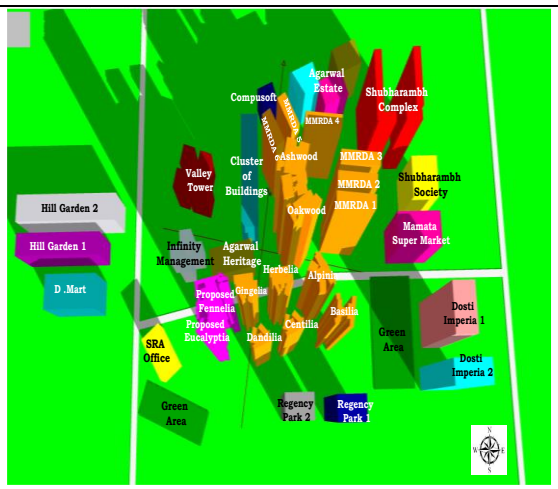
Google Image | **Model diagram**

Figure 1.3: Google image and model diagram

1.2.2 Morning Shadow:

During morning time shadow of proposed project would fall on west direction. The shadow from proposed project is partially falling on Infinity Management Centre and Valley Tower at West direction. Shadow affected areas with proposed project are given in **Figure 1.4**



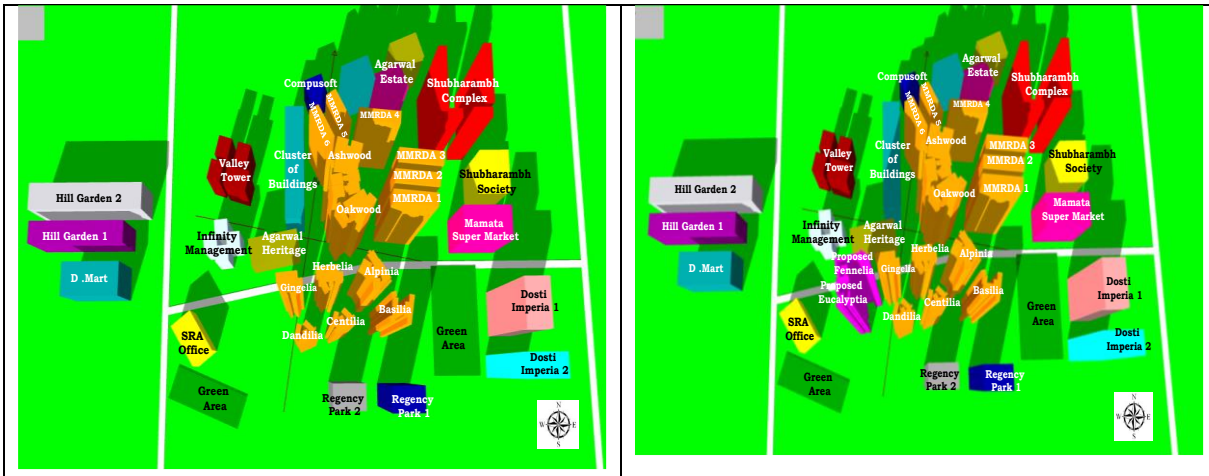


Without Project | **With Project**

Figure 1.4: Comparison of probable shadow without and with proposed project during Morning

1.2.3 Afternoon Shadow:

As the day progresses the path of the sun changes. Due to this, the direction of the shadow would change to north direction. Shadow from the proposed project would partly fall on Agarwal Heritage, Cluster of Buildings at North direction. This is shown in **Figure 1.5**



Without Project	With Project

Figure 1.5: Comparison of probable shadow without and with proposed project during Afternoon

1.2.4 Late Afternoon Shadow:

As the day progresses the path of the sun changes. Due to this, the direction of the shadow would change to north direction. Shadow from the proposed project partly falling on Gingelia, Herbalia, MMRDA Buildings are located at East direction. This is given in **Figure 1.6**



Without Project	With Project

Figure 1.6: Comparison of probable shadow without and with proposed project during Late Afternoon

1.2.5 Neighborhood Sunlight rating:

At current scenario (without the proposed project) duration of shadow cover on different structures along with their reason for shadow without the proposed project is given in **Table 1.3**

Table 1.3: Summary of Shadow covers on different structures without proposed project

Types of Properties	Shadow period (All seasons)		
Name of Structure	**Shadow Cover of structure**	**Time**	**Reason for Shadow**
D Mart, Manpada	Partial	7.00AM to 9.00AM	SRA office, Gingelia, Dandilia
	No Shadow	9.00AM to 6.00PM	-
Hill Garden 1	Full Shadow	7.00AM to 7.30AM	Oakwood
	Partial	7.30AM to 4.00PM	Oakwood, Gingelia, Dandilia, D-Mart, Infinity Management Centre
	No Shadow	4.00PM to 6.00PM	-
Hill Garden 2	Partial	7.00AM to 7.30PM	Ashwood, Oakwood
	Full Shadow	7.30AM to 8.00AM	Ashwood, Oakwood
	Partial	8.00AM to 4.30PM	Proposed Eucalypta and Fennelia Building, Ashwood, Oakwood, Cluster of Buildings
	No Shadow	4.30PM to 6.00PM	-
SRA office, Thane	Partial	7.00AM to 8.00AM	Gingelia, Dandilia, Regency Park 2
	No Shadow	8.00AM to 6.00PM	-
Infinity Management Centre	Full Shadow	7.00AM to 9.00AM	Oakwood, Agarwal Heritage, Gingelia, Herbalia, Alpinia
	Partial	9.00AM to 10.30AM	Gingelia, Herbelia
	No Shadow	10.30AM to 4.30PM	-
	Partial	4.30PM to 6.00PM	D-Mart, Hill Garden1 , Hill Garden 2
Agarwal Heritage	Full Shadow	7.00AM to 7.30AM	Oakwood, Herbalia, Alpinia
	Partial	7.30AM to 8.30AM	Alpinia, Herbalia, Oakwood
	Full Shadow	8.30AM to 10.00AM	Gingelia, Herbalia
	Partial	10.00AM to 1.30PM	Gingelia, Herbelia, Gingelia
	No Shadow	1.30PM to 3.00PM	-
	Partial	3.00PM to 6.00PM	Infinity Management Centre, Hill Garden 1
Valley Tower	Full Shadow	7.00AM to 10.00AM	Ashwood, Agarwal Heritage, Gingelia,

			Herbalia, Alpinia
	Partial	10.00AM to 2.00PM	Infinity Management Centre, Gingelia, Agarwal Heritage
	No Shadow	2.00PM to 4.00PM	-
	Partial	4.00PM to 6.00PM	Hill Garden 1, Hill Garden 2
Cluster of Building	Full Shadow	7.00AM to 9.30AM	MMRDA 6, Ashwood, Oakwood, Gingelia, Herbalia
	Partial	9.30AM to 6.00PM	Hill Garden 2, Infinity Management Centre, Valley Tower, Gingelia, Herbalia
Compusoft	Full Shadow	7.00AM to 7.30AM	Agarwal Estate
	Partial	7.30AM to 9.00AM	MMRDA 4, MMRDA 5, MMRDA 6, Cluster of Buildings
	Full Shadow	9.00AM to 10.30AM	MMRDA 6, MMRDA 5, Cluster of Buildings
	Partial	10.30AM to 4.00PM	MMRDA 6, MMRDA 5, Cluster of Buildings Valley Tower
	No Shadow	4.00PM to 6.00PM	-
Agarwal Estate	Partial	7.00AM to 5.00PM	Shubharambh Compex, MMRDA 4, MMRDA 5, MMRDA 6, Cluster of Buildings
	No Shadow	5.00PM to 6.00PM	-
Shubharambh Complex	Partial	7.00AM to 6.00PM	MMRDA 4, MMRDA 5, MMRDA 6, Shubharambh Society,
Shubharambh Society	No Shadow	7.00AM to 8.00AM	-
	Partial	8.00AM to 3.30PM	MMRDA 1, MMRDA 2, MMRDA 3, MMRDA 4, Shubharambh Complex
	Full Shadow	3.30PM to 4.30PM	MMRDA 1, MMRDA 2, MMRDA 3, Shubharambh Complex
	Partial	4.30PM to 6.00PM	Shubharambh Complex, MMRDA 4
Mamta Super Market	No Shadow	7.00AM to 8.30AM	-
	Partial	8.00AM to 12.30PM	Dosti Imperia 1
	No Shadow	12.30PM to 1.30PM	-
	Partial	1.30PM to 3.00 PM	MMRDA 2 , MMRDA 3, Alpinia, Basilia
	Full Shadow	3.00PM to 4.00PM	MMRDA 1, Alpinia, Basilia
	Partial	4.00PM to 6.00PM	MMRDA 1, MMRDA 2
Dosti Imperia 1	No Shadow	7.00AM to 8.30AM	-

	Partial	8.30PM to 5.00PM	Dosti Imperia 2, Regency 1, Regency 2
	Full Shadow	5.00PM to 5.30PM	Alpinia, Basilia
	Partial	5.30PM to 6.00PM	Alpinia, Basilia
Dosti Imperia 2	No Shadow	7.00AM to 3.30PM	-
	Partial	3.30PM to 6.00PM	Regency 1, Basilia
Regency Park 1	No Shadow	7.00AM to 3.00PM	-
	Partial	3.00PM to 6.00PM	Regency Park 1
Regency Park 2	No Shadow	7.00AM to 6.00PM	-
Gingelia	Partial	7.00AM to 12.30PM	Herbalia, Dandilia, Centilia, Basilia,
	No Shadow	12.30PM to 6.00PM	-
Herbalia	Partial	7.00AM to 6.00PM	Gingelia, Dandilia, Centilia, Basilia
Alpinia	Partial	7.00AM to 6.00PM	Gingelia, Dandilia, Centilia, Basilia
Basilia	Partial	7.00AM to 8.00PM	Dosti Imperia 1 & Dosti Imperia 2
	No Shadow	8.00AM to 3.00PM	-
	Partial	3.00PM to 6.00PM	Gingelia, Herbalia, Centilia
Centilia	No Shadow	7.00AM to 2.00PM	-
	Partial	2.00PM to 6.00PM	Dandilia
Dandilia	No Shadow	7.00AM to 6.00PM	-
Oakwood	Partial	7.00AM to 3.30PM	Gingelia, Herbalia, Alpinia, Cluster of Building
	No Shadow	3.30PM to 5.30PM	-
	Partial	5.30PM to 6.00PM	Agarwal Heritage
Ashwood	Partial	7.00AM to 2.30PM	MMRDA 1, MMRDA 2, MMRDA 3
	No Shadow	2.30PM to 4.30PM	-
	Partial	4.30PM to 6.00PM	Cluster of Buildings
MMRDA 1	Partial	7.00AM to 10.30AM	Mamta Super Market, Dosti Imperia 1
	No Shadow	10.30AM to 11.30AM	-
	Partial	11.30AM to 4.30PM	Ashwood, Oakwood, Alpinia, Herbalia
	Full Shadow	4.30PM to 6.00PM	Ashwood, Oakwood
MMRDA 2	Partial	7.00AM to 10.30AM	Shubharambh Complex, Dosti Imperia 1, Dosti Imperia 2
	No Shadow	10.30AM to 2.00PM	-
	Partial	2.00PM to 5.00PM	Alpinia, Oakwood
	Full Shadow	5.00PM to 6.00PM	Ashwood, Oakwood
MMRDA 3	Partial	7.00AM to 10.30PM	Mamta Super Market, Shubharambh Complex
	No Shadow	10.30AM to 1.00PM	-
	Partial	1.00PM to 5.00PM	Ashwood, Oakwood
	Full Shadow	5.00PM to 6.00PM	Ashwood, Oakwood

MMRDA 4	Partial	7.00AM to 5.30PM	Ashwood, MMRDA 5
	Full Shadow	5.30PM to 6.00PM	MMRDA 5, Ashwood
MMRDA 5	Partial	7.00AM to 6.00PM	Ashwood, MMRDA 6
MMRDA 6	Partial	7.00AM to 9.30AM	MMRDA 3, MMRDA 5, Ashwood
	Full Shadow	9.30AM to 11.30AM	Ashwood
	Partial	11.30AM to 6.00PM	Gingelia, Herbelia, Cluster of Buildings

.Note: All these predictions and findings were made with respect to proposed site for all seasons.

Similarly probable time period of partial and full sunlight of neighborhood structures without the proposed project is given in **Table 1.4**. This was considered in predicting the sunlight period.

Table 1.4: Probable sunlight period for different structures without proposed project

Properties	Partial	Full Shadow	Full Sunlight
D Mart, Manpada	2 Hrs.	-	9 Hrs.
Hill Garden 1	8 Hrs. 30 min	30 min	2 Hrs.
Hill Garden 2	9 Hrs	30 min	1 Hrs. 30 min
SRA Office, Thane	1 Hr	-	10 Hrs.
Infinity Management Centre	3 Hrs.	2 Hrs.	6 Hrs.
Agarwal Heritage	7 Hrs. 30 min	2 Hrs.	1 Hrs 30 min
Valley Tower	6 Hrs.	3 Hrs.	2 Hrs.
Cluster of Building	8 Hrs. 30 min	2 Hrs.30 min	-
Compusoft	7 Hrs.	2 Hrs.	2 Hrs.
Agarwal Estate	10 Hrs.	-	1 Hr
Shubharambh Complex	11 Hrs.	-	-
Shubharambh Society	9 Hrs.	1 Hrs.	1 Hrs.
Mamta Super Market	7 Hrs 30 min	1 Hr	2 Hours 30 min
Dosti Imperia 1	9 Hrs.	30 min	1 Hrs. 30 min
Dosti Imperia 2	2 Hrs. 30 min	-	8 Hrs. 30 min
Regency Park 1	3 Hrs.	-	8 Hrs.
Regency Park 2	-	-	11 Hrs.
Gingelia	5 Hrs. 30 min	-	5 Hrs. 30 min
Herbalia	11 Hrs.	-	-
Alpinia	11 Hrs.	-	-
Basilia	4 Hrs.	-	7 Hrs.
Centilia	4 Hrs.	-	7 Hrs.
Dandilia	-	-	11 Hrs.
Oakwod	9 Hrs.	-	2 Hrs.
Ashwood	9 Hrs.	-	2 Hrs.
MMRDA 1	8 Hrs. 30 min	1 Hr 30 min	1 Hrs.
MMRDA 2	6 Hrs. 30 min	1 Hr	3 Hrs. 30 min
MMRDA 3	7 Hrs. 30 min	1 Hr	2 Hrs. 30 min
MMRDA 4	10 Hrs. 30 min	30 min	-
MMRDA 5	11 Hrs.	-	-

Properties	Partial	Full Shadow	Full Sunlight
MMRDA 6	9 Hrs.	2 Hrs.	-

Note: All these predictions and findings were made with respect to proposed site for all seasons.

Without the construction of proposed high rise, duration of shadow cover on different structures along with their reason for shadow with the high rise is given in **Table 1.5**.

Table 1.5: Summary of shadow covers on different structures with proposed project

Types of Properties	Shadow period (All seasons)		
Name of Structure	**Shadow Cover of structure**	**Time**	**Reason for Shadow**
D Mart, Manpada	Full Shadow	7.00AM to 7.30AM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Partial	7.30AM to 9.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	No Shadow	9.00AM to 6.00PM	-
Hill Garden 1	Full Shadow	7.00AM to 7.30AM	Proposed Eucalyptia Building, Proposed Fenelia Building, Oakwood
	Partial	7.30AM to 4.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building Oakwood, Gingelia, Dandilia, D-Mart, Infinity Management Centre
	No Shadow	4.00PM to 6.00PM	-
Hill Garden 2	Partial	7.00AM to 7.30PM	Ashwood, Oakwood
	Full Shadow	7.30AM to 8.00AM	Ashwood, Oakwood
	Partial	8.00AM to 4.30PM	Proposed Eucalypta and Fennelia Building, Ashwood, Oakwood, Cluster of Buildings
	No Shadow	4.30PM to 6.00PM	-
SRA office, Thane	Partial	7.00AM to 8.00AM	Proposed Eucalyptia Building, Proposed Fenelia Building, Gingelia, Dandilia, Regency Park 2
	No Shadow	8.00AM to 6.00PM	-
Infinity Management Centre	Full Shadow	7.00AM to 10.00AM	Proposed Eucalyptia Building, Proposed Fenelia Building,

			Oakwood, Agarwal Heritage,
	Partial	10.00AM to 11.30AM	Proposed Eucalyptia Building, Proposed Fenelia Building, Gingelia, Herbelia
	No Shadow	11.30AM to 4.00PM	-
	Partial	4.00PM to 6.00PM	D-Mart, Hill Garden1 , Hill Garden 2
Agarwal Heritage	Full Shadow	7.00AM to 7.30AM	Oakwood, Ashwood, Gingelia, Herbalia, Alpinia
	Partial	7.30AM to 8.30AM	Oakwood, Gingelia, Alpinia, Herbalia
	Full Shadow	8.30AM to 10.30AM	Gingelia, Alpania, Herbalia
	Partial	10.30PM to 2.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Gingelia
	No Shadow	2.00PM to 3.00PM	-
	Partial	3.00PM to 6.00PM	Infinity Management Centre
Valley Tower	Full Shadow	7.00AM to 10.00AM	Ashwood, Oakwood, Agarwal Heritage, Gingelia, Herbalia, Alpinia
	Partial	10.00AM to 3.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Infinity Management Centre, Gingelia, Agarwal Heritage
	No Shadow	3.00PM to 4.00PM	-
	Partial	4.00PM to 5.30PM	Hill Garden 1, Hill Garden 2
	No Shadow	5.30PM to 6.00PM	-
Cluster of Building	Full Shadow	7.00AM to 9.30AM	MMRDA 6, Ashwood, Oakwood, Herbalia, Oakwood
	Partial	9.30AM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Agarwal Heritage, Herbalia, Alpinia, Gingelia, Valley Tower, Infinity Management Centre, Hill Garden 2
Compusoft	Full Shadow	7.00AM to 7.30AM	Agarwal Estate
	Partial	7.30AM to 9.00AM	MMRDA 4, MMRDA 5, MMRDA 6, Cluster of

			Buildings
	Full Shadow	9.00AM to 11.00AM	MMRDA 6, MMRDA 5, Cluster of Buildings
	Partial	11.00AM to 4.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, MMRDA 6, MMRDA 5, Cluster of Buildings Valley Tower
	No Shadow	4.00PM to 6.00PM	-
Agarwal Estate	Partial	7.00AM to 5.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Shubharambh Compex, MMRDA 4, MMRDA 5, MMRDA 6, Cluster of Buildings
	No Shadow	5.00PM to 6.00PM	-
Shubharambh Complex	Partial	7.00AM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, MMRDA 4, MMRDA 5, MMRDA 6, Shubharambh Society,
Shubharambh Society	No Shadow	7.00AM to 8.00AM	-
	Partial	8.00AM to 3.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building, MMRDA 1, MMRDA 2, MMRDA 3, MMRDA 4, Shubharambh Complex
	Full Shadow	3.30PM to 4.30PM	MMRDA 1, MMRDA 2, MMRDA 3, Shubharambh Complex
	Partial	4.30PM to 6.00PM	Shubharambh Complex, MMRDA 4
Mamta Super Market	No Shadow	7.00AM to 8.30AM	-
	Partial	8.00AM to 12.30PM	Dosti Imperia 1
	No Shadow	12.30PM to 1.30PM	-
	Partial	1.30PM to 3.00 PM	Proposed Eucalyptia Building, Proposed Fenelia Building, MMRDA 2 , MMRDA 3, Alpinia, Basilia
	Full Shadow	3.00PM to 4.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, MMRDA 1, Alpinia, Basilia
	Partial	4.00PM to 6.00PM	MMRDA 1, MMRDA 2

Dosti Imperia 1	No Shadow	7.00AM to 8.30AM	-
	Partial	8.30PM to 5.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Dosti Imperia 2, Regency 1, Regency 2
	Full Shadow	5.00PM to 5.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Alpinia, Basilia
	Partial	5.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Alpinia, Basilia
Dosti Imperia 2	No Shadow	7.00AM to 3.30PM	-
	Partial	3.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Regency 1, Basilia
Regency Park 1	No Shadow	7.00AM to 3.00PM	-
	Partial	3.00PM to 6.00PM	Regency Park 1
Regency Park 2	No Shadow	7.00AM to 6.00PM	-
Gingelia	Partial	7.00AM to 3.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building Dandilia, Centilia,
	Full Shadow	3.00PM to 3.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Partial	3.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
Herbalia	Partial	7.00AM to 3.30PM	Gingelia, Dandilia, Centilia, Basilia, Alpinia
	Full Shadow	3.30PM to 4.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Partial	4.00PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
Alpinia	Partial	7.00AM to 4.00PM	Dosti Imperia 1, Dosti Imperial 2, Basilia, Centilia, Dandilia
	Full Shadow	4.00PM to 4.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Partial	4.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Herbalia, Centilia,

			Dandilia
Basilia	Partial	7.00AM to 8.00PM	Dosti Imperia 1 & Dosti Imperia 2
	No Shadow	8.00AM to 3.00PM	-
	Partial	3.00PM to 5.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Gingelia, Herbalia, Centilia
	Full Shadow	5.00PM to 5.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Partial	5.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
Centilia	No Shadow	7.00AM to 2.00PM	-
	Partial	2.00PM to 5.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building, Dandilia
	Full Shadow	5.00PM to 5.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Partial	5.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
Dandilia	No Shadow	7.00AM to 4.00PM	-
	Partial	4.00PM to 5.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building
	Full Shadow	5.30PM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building
Oakwood	Partial	7.00AM to 3.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Gingelia, Herbalia, Alpinia, Cluster of Building
	No Shadow	3.30PM to 5.30PM	-
	Partial	5.30PM to 6.00PM	Agarwal Heritage
Ashwood	Partial	7.00AM to 2.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building , MMRDA 1, MMRDA 2, MMRDA 3
	No Shadow	2.30PM to 4.30PM	-
	Partial	4.30PM to 6.00PM	Cluster of Buildings
MMRDA 1	Partial	7.00AM to 10.30AM	Mamta Super Market, Dosti Imperia 1
	No Shadow	10.30AM to 11.30AM	-

	Partial	11.30AM to 4.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Ashwood, Oakwood, Alpinia, Herbalia
	Full Shadow	4.30PM to 6.00PM	Ashwood, Oakwood
MMRDA 2	Partial	7.00AM to 10.30AM	Shubharambh Complex, Dosti Imperia 1, Dosti Imperia 2
	No Shadow	10.30AM to 1.00PM	-
	Partial	1.00PM to 5.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Alpinia, Oakwood
	Full Shadow	5.00PM to 6.00PM	Ashwood, Oakwood
MMRDA 3	Partial	7.00AM to 10.30PM	Mamta Super Market, Shubharambh Complex
	No Shadow	10.30AM to 1.00PM	-
	Partial	1.00PM to 5.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Ashwood, Oakwood
	Full Shadow	5.00PM to 6.00PM	Ashwood, Oakwood
MMRDA 4	Partial	7.00AM to 5.30PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Ashwood, MMRDA 5, Shubharambh Complex
	Full Shadow	5.30PM to 6.00PM	MMRDA 5
MMRDA 5	Partial	7.00AM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Ashwood, MMRDA 6, MMRDA 4
MMRDA 6	Partial	7.00AM to 9.30AM	MMRDA 3, MMRDA 5, Ashwood, Cluster of buildings
	Full Shadow	9.30AM to 11.30AM	Ashwood
	Partial	11.30AM to 6.00PM	Proposed Eucalyptia Building, Proposed Fenelia Building , Gingelia, Herbelia, Cluster of Buildings

Note: All these predictions and findings were made with respect to proposed site for all seasons.

Similarly probable time period of partial and full sunlight of neighborhood structures with the proposed project is given in **Table 1.6**. This was considered in predicting the sunlight period.

Table 1.6: Probable Sunlight period for different structures with proposed project

Properties	Distance from Proposed Buildings (m)	Direction	Partial	Full Shadow	Full Sunlight
D Mart, Manpada	234.78	West	1 Hr 30 min	30 min	9 Hrs.
Hill Garden 1	261.16	West	8 Hrs. 30 min	30 min	2 Hrs.
Hill Garden 2	331.76	West	9 Hrs.	30 min	1 Hrs 30 min
SRA Office, Thane	68.69	West	1 Hr	-	10 Hrs.
Infinity Management Centre	107.08	North-West	3 Hrs. 30 min	3 Hrs.	4 Hrs.30 min
Agarwal Heritage	65.27	North	7 Hrs. 30 min	2 Hrs.	1 Hrs. 30 min
Valley Tower	166.22	North-West	6 Hrs. 30 min	3 Hrs.	1 Hrs. 30 min
Cluster of Building	170.42	North	8 Hrs. 30 min	2 Hrs. 30 min	-
Compusoft	242.82	North	6 Hrs. 30 min	2 Hrs. 30 min	2 Hrs.
Agarwal Estate	264.77	North	10 Hrs.	-	1 Hr
Shubharambh Complex	271.13	North-East	11 Hrs.	-	-
Shubharambh Society	235.13	North-East	9 Hrs.	1 Hrs.	1 Hrs.
Mamta Super Market	208.19	North-East	7 Hrs. 30 min	1 Hr	2 Hours 30 min
Dosti Imperia 1	427.21	East	9 Hrs.	30 min	1 Hrs. 30 min
Dosti Imperia 2	459.56	East	2 Hrs. 30 min	-	8 Hrs. 30 min
Regency Park 1	164.41	South	3 Hrs.	-	8 Hrs.
Regency Park 2	116.26	South	-	-	11 Hrs.
Gingelia	53.65	East	10 Hrs. 30 min	30 min	-
Herbalia	118.27	East	10 Hrs. 30 min	30 min	-
Alpinia	166.69	East	10 Hrs. 30 min	30 min	-
Basilia	194.10	East	3 Hrs. 30 min	30 min	7 Hrs.

Properties	Distance from Proposed Buildings (m)	Direction	Partial	Full Shadow	Full Sunlight
Centilia	152.00	East	3 Hrs. 30 min	30 min	7 Hrs.
Dandilia	90.32	East	1 Hr 30 min	30 min	9 Hrs.
Oakwod	141.44	North-East	9 Hrs.	-	2 Hrs.
Ashwood	182.90	North-East	9 Hrs.	-	2 Hrs.
MMRDA 1	181.66	North-East	8 Hrs. 30 min	1 Hr 30 min	1 Hrs.
MMRDA 2	196.31	North-East	7 Hrs. 30 min	1 Hr	2 Hrs. 30 min
MMRDA 3	214.88	North-East	7 Hrs. 30 min	1 Hr	2 Hrs. 30 min
MMRDA 4	224.99	North-East	10 Hrs. 30 min	30 min	-
MMRDA 5	216.20	North	11 Hrs.	-	-
MMRDA 6	206.21	North	9 Hrs.	2 Hrs.	-

*Note: *All these predictions and findings were made with respect to proposed site for all seasons.*

*** The distance given in table is measured from Google earth*

Studies have indicated that 3 - 4 hrs of sunlight is required for photosynthesis. Buildings require sunlight for its own maintenance (preventing algal growth on the walls), for improving indoor air quality, betterment of human health, optimal functioning of solar products and many more. Finding of the same is highlighted in **Table 1.7**

Table 1.7: Sunlight rating for structures in and around the proposed project

Structure	Without proposed project	With proposed project
D Mart, Manpada		
Hill Garden 1		
Hill Garden 2		
SRA Office, Thane		

Structure	Without proposed project	With proposed project
Infinity Management Centre		
Agarwal Heritage		
Valley Tower		
Cluster of Building		
Compusoft		
Agarwal Estate		
Shubharambh Complex		
Shubharambh Society		
Mamta Super Market		
Dosti Imperia 1		
Dosti Imperia 2		
Regency Park 1		
Regency Park 2		
Gingelia		
Herbalia		
Alpinia		
Basilia		
Centilia		
Dandilia		
Oakwod		
Ashwood		
MMRDA 1		
MMRDA 2		
MMRDA 3		
MMRDA 4		
MMRDA 5		
MMRDA 6		



1.2.6 Sunlight Percentage Assessment:

The probable time period of sunlight falling on neighborhood structures have been considered to calculate the sunlight percentage attribution for two scenarios; without proposed project and with proposed project. The results of this assessment is shown in the following tables; **Table 1.8**

Table 1.8: Percentage assessment of sunlight period

Structure	Sunlight Period (%)		Remark
	Without Proposed Project	With Proposed Project	
D Mart, Manpada	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Hill Garden 1	95.45 %	95.45 %	No Change
Hill Garden 2	95.45 %	95.45 %	No Change
SRA Office, Thane	100 %	100 %	No Change
Infinity Management Centre	81.82 %	72.73 %	Proposed Eucalyptia & Fenelia Building Oakwood, Agarwal Heritage
Agarwal Heritage	81.82 %	81.82 %	No Change
Valley Tower	72.73 %	70.00 %	Proposed Eucalyptia & Fenelia Building Ashwood, Oakwood, Agarwal Heritage, Gingelia, Herbalia, Alpinia
Cluster of Building	77.27 %	77.27 %	No Change
Compusoft	81.82 %	77.27 %	Proposed Eucalyptia & Fenelia Building, MMRDA 6, MMRDA 5, Cluster of Buildings Valley Tower
Agarwal Estate	100 %	100 %	No Change
Shubharambh Complex	100 %	100 %	No Change
Shubharambh Society	90.91 %	90.91 %	No Change
Mamta Super Market	90.91 %	90.91 %	No Change
Dosti Imperia 1	95.45 %	95.45 %	No Change
Dosti Imperia 2	100 %	100 %	No Change
Regency Park 1	100 %	100 %	No Change
Regency Park 2	100 %	100 %	No Change
Gingelia	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Herbalia	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Alpinia	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Basilia	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Centilia	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Dandilia	100 %	95.45 %	Proposed Eucalyptia & Fenelia Building
Oakwod	100 %	100 %	No Change
Ashwood	100 %	100 %	No Change

Structure	Sunlight Period (%)		Remark
	Without Proposed Project	With Proposed Project	
MMRDA 1	86.36 %	86.36 %	No Change
MMRDA 2	90.91 %	90.91 %	No Change
MMRDA 3	90.91 %	90.91 %	No Change
MMRDA 4	95.45 %	95.45 %	No Change
MMRDA 5	100 %	100 %	No Change
MMRDA 6	81.82 %	81.82 %	No Change

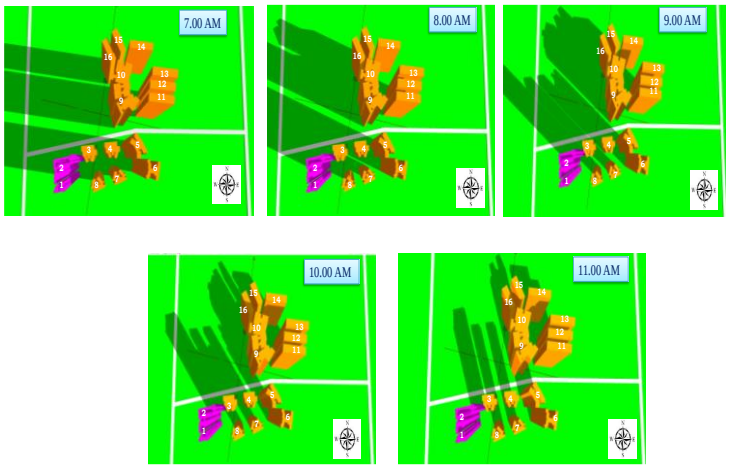
Note:

- 100% Sunlight period consist of total 11 hours sunlight period (which includes partial sunlight + full sunlight)
- Partial Sunlight: It means sunlight is falling partially on the structure
- Full Sunlight: It means all the structure are fully exposed to sunlight

1.2.7 Internal Shadow Analysis:

Internal shadow analysis is also carried out for the proposed project in order to examine the shadow effect on the high rise because of the high rise itself, if any. Hourly time period slabs were examined for the same and the results are estimated in the following figures.

Morning (Internal) Shadow Assessment:

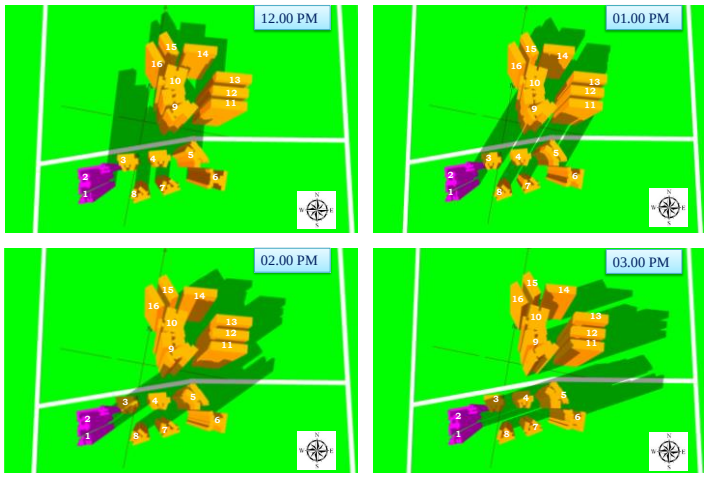


Legends:-			
1	Proposed Eucalyptia	9	Oakwood
2	Proposed Fenelia	10	Ashwood
3	Gingelia	11	MMRDA 1
4	Herbalia	12	MMRDA 2
5	Alpinia	13	MMRDA 3
6	Basilia	14	MMRDA 4
7	Centilia	15	MMRDA 5
8	Dandilia	16	MMRDA 6

Figure 1.7: Probable Internal Shadow due to proposed project during morning

The above **Figure 1.7** shows the glimpse of shadow analysis carried from 7.00 AM to 11.00 AM. In the morning, the shadow of the proposed wings falls on west direction.

Afternoon (Internal) Shadow Assessment:

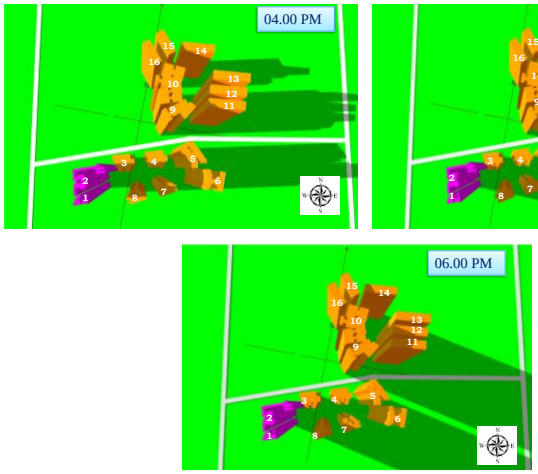


Legends:-			
1	Proposed Eucalyptia	9	Oakwood
2	Proposed Fenelia	10	Ashwood
3	Gingelia	11	MMRDA 1
4	Herbalia	12	MMRDA 2
5	Alpinia	13	MMRDA 3
6	Basilia	14	MMRDA 4
7	Centilia	15	MMRDA 5
8	Dandilia	16	MMRDA 6

Figure 1.8: Probable Internal Shadow due to proposed project during afternoon

During afternoon, the shadow tilts towards north side and hence the existing structure, is under partial shadow due internal shadow of proposed buildings. The above **Figure 1.8** represents analysis carried out from 12.00 PM to 3.00 PM.

Late Afternoon (Internal) Shadow Assessment:



Legends:-			
1	Proposed Eucalyptia	9	Oakwood
2	Proposed Fenelia	10	Ashwood
3	Gingelia	11	MMRDA 1
4	Herbalia	12	MMRDA 2
5	Alpinia	13	MMRDA 3
6	Basilia	14	MMRDA 4
7	Centilia	15	MMRDA 5
8	Dandilia	16	MMRDA 6

Figure 1.9: Probable Shadow due to proposed project during late afternoon

The above **Figure 1.9** depicts the shadow analysis from 4.00 PM to 6.00 PM, wherein the shadow travels from north to east direction. Therefore, the existing buildings, under partial sunlight and Herbalia Building is under full shadow

At current scenario (with the proposed project) duration of shadow cover on internal structures along with their reason for shadow is given in **Table 1.9**

Table 1.9: Summary of shadow covers on different structures of proposed project

Types of Properties	Shadow period (All seasons)		
Name of Structure	**Shadow Cover of structure**	**Time**	**Reason for Shadow**
Proposed Eucalyptia	Partial	7.00AM to 8.30AM	Dandilia
	No Shadow	8.30AM to 6.00PM	-
Proposed Fenelia	Partial	7.00AM to 10.30AM	Dandilia, Centilia, Gingelia
	No Shadow	10.30AM to 1.30PM	-
	Partial	1.30PM to 6.00PM	Proposed Eucalyptia Building
Gingelia (Existing)	Partial	7.00AM to 3.00PM	Dandilia, Centilia,
	Full Shadow	3.00PM to 3.30PM	Proposed Eucalyptia & Fenelia Building
	Partial	3.30PM to 6.00PM	Proposed Eucalyptia & Fenelia Building
Herbalia (Existing)	Partial	7.00AM to 3.30PM	Gingelia, Dandilia, Centilia, Basilia, Alpinia
	Full Shadow	3.30PM to 4.00PM	Proposed Eucalyptia & Fenelia Building
	Partial	4.00PM to 6.00PM	Proposed Eucalyptia & Fenelia Building
Alpinia (Existing)	Partial	7.00AM to 12.00PM	Basilia
	No Shadow	12.00PM to 12.30PM	-
	Partial	12.30PM to 4.00PM	Proposed Eucalyptia & Fenelia Building, Herbalia, Centilia, Gigelia, Dandilia
	Full Shadow	4.00PM to 4.30PM	Proposed Eucalyptia & Fenelia Building
	Partial	4.30PM to 6.00PM	Proposed Eucalyptia & Fenelia Building, Herbalia, Centilia, Dandilia
Basilia (Existing)	No Shadow	7.00AM to 3.00PM	-
	Partial	3.00PM to 5.00PM	Proposed Eucalyptia &

			Fenelia Building , Gingelia, Herbalia, Centilia
	Full Shadow	5.00PM to 5.30PM	Proposed Eucalyptia & Fenelia Building
	Partial	5.30PM to 6.00PM	Proposed Eucalyptia & Fenelia Building
Centilia (Existing)	No Shadow	7.00AM to 2.00PM	-
	Partial	2.00PM to 5.00PM	Proposed Eucalyptia & Fenelia Building , Dandilia
	Full Shadow	5.00PM to 5.30PM	Proposed Eucalyptia & Fenelia Building
	Partial	5.30PM to 6.00PM	Proposed Eucalyptia & Fenelia Building
Dandilia (Existing)	No Shadow	7.00AM to 4.00PM	-
	Partial	4.00PM to 5.30PM	Proposed Eucalyptia & Fenelia Building
	Full Shadow	5.30PM to 6.00PM	Proposed Eucalyptia & Fenelia Building
Oakwood (Existing)	No Shadow	7.00AM to 9.30AM	-
	Partial	9.30AM to 3.00PM	Proposed Eucalyptia & Fenelia Building, Alpinia, Herbalia, Gingelia
	No Shadow	3.00PM to 6.00PM	-
Ashwood (Existing)	Partial	7.00AM to 2.30PM	Proposed Eucalyptia & Fenelia Building , MMRDA 1, MMRDA 2, MMRDA 3
	No Shadow	2.30PM to 6.00PM	-
MMRDA 1 (Existing)	No Shadow	7.00AM to 11.30AM	-
	Partial	11.30AM to 4.30PM	Proposed Eucalyptia & Fenelia Building , Ashwood, Oakwood, Alpinia, Herbalia
	Full Shadow	4.30PM to 6.00PM	Ashwood, Oakwood
MMRDA 2 (Existing)	No Shadow	7.00AM to 1.00PM	-
	Partial	1.00PM to 5.00PM	Proposed Eucalyptia & Fenelia Building , Alpinia, Oakwood
	Full Shadow	5.00PM to 6.00PM	Ashwood, Oakwood
MMRDA 3 (Existing)	No Shadow	7.00AM to 1.00PM	-
	Partial	1.00PM to 5.00PM	Proposed Eucalyptia & Fenelia Building , Ashwood, Oakwood
	Full Shadow	5.00PM to 6.00PM	Ashwood, Oakwood
	No Shadow	7.00AM to 8.30AM	-
MMRDA 4 (Existing)	Partial	8.30AM to 5.00PM	Proposed Eucalyptia & Fenelia Building , Ashwood, MMRDA 5,

	Full Shadow	5.30PM to 6.00PM	MMRDA 5
MMRDA 5 (Existing)	Partial	7.00AM to 6.00PM	Proposed Eucalyptia & Fenelia Building , Ashwood, MMRDA 6, MMRDA 4
MMRDA 6 (Existing)	Partial	7.00AM to 9.30AM	MMRDA 3, MMRDA 5, Ashwood,
	Full Shadow	9.30AM to 11.30AM	Ashwood
	Partial	11.30AM to 6.00PM	Proposed Eucalyptia & Fenelia Building , Gingelia, Herbelia, Cluster of Buildings

Note: All these predictions and findings were made with respect to proposed site for all seasons.

Similarly probable time period of partial and full sunlight of internal structures with the proposed project is given in **Table 1.10**. This was considered in predicting the sunlight period.

Table 1.10: Probable Sunlight Period for different structures of proposed project

Properties	Partial	Full Shadow	Full Sunlight
Proposed Eucalyptia	1 Hr 30 min	-	9 Hrs. 30 min
Proposed Fenelia	8 Hrs.	-	3 Hrs
Gingelia (Existing)	10 Hrs. 30 min	30 min	-
Herbalia (Existing)	10 Hrs. 30 min	30 min	-
Alpinia (Existing)	10 Hrs.	30 min	30 min
Basilia (Existing)	2 Hrs. 30 min	30 min	8 Hrs.
Centilia (Existing)	3 Hrs. 30 min	30 min	7 Hrs.
Dandilia (Existing)	1 Hr 30 min	30 min	9 Hrs.
Oakwod (Existing)	5 Hrs. 30 min	-	5 Hrs. 30 min
Ashwood (Existing)	7 Hrs. 30 min	-	3 Hrs. 30 min
MMRDA 1 (Existing)	5 Hrs.	1 Hr 30 min	4 Hrs. 30 min
MMRDA 2 (Existing)	4 Hrs.	1 Hr	6 Hrs.
MMRDA 3 (Existing)	4 Hrs.	1 Hr	6 Hrs.
MMRDA 4 (Existing)	10 Hrs. 30 min	30 min	-
MMRDA 5 (Existing)	11 Hrs.	-	-
MMRDA 6 (Existing)	9 Hrs.	2 Hrs.	-

Note: All these predictions and findings were made with respect to proposed site for all seasons.

Studies have indicated that 3– 4 hrs of sunlight is required for photosynthesis. Buildings require sunlight for its own maintenance (preventing algal growth on the walls), for improving indoor air quality, betterment of human health, optimal functioning of solar products and many more. Finding of the same is highlighted in **Table 1.11**

Table 1.11: Sunlight rating for structures in the proposed project

Structure	With proposed site
Proposed Eucalyptia	
Proposed Fenelia	
Gingelia (Existing)	
Herbalia (Existing)	
Alpinia (Existing)	
Basilia (Existing)	
Centilia (Existing)	
Dandilia (Existing)	
Oakwod (Existing)	
Ashwood (Existing)	
MMRDA 1 (Existing)	
MMRDA 2 (Existing)	
MMRDA 3 (Existing)	
MMRDA 4 (Existing)	
MMRDA 5 (Existing)	
MMRDA 6 (Existing)	



Daylight Analysis

1.3 Daylight Estimation:

Day lighting in the building is the direct result of the amount of light coming from the sun and sky. The luminance distribution of the sky makes a tremendous impact on the amount of light entering the interiors of the building. Windows that admit daylight in buildings are important for the view and connection they provide with outdoors, daylight is also important for its quality, spectral composition, and variability. Working long term in electric lighting is believed to be deleterious to health; working by daylight is believed to result in less stress and discomfort. Good lighting is necessary for all buildings and has three primary aims. The first aim is to promote work and other activities carried out within the building;

- To promote safety of the people using the building.
- To create, in conjunction with the structure and decoration, a pleasing environment.
- Conducive to interest of the occupants and sense of their wellbeing.

Daylight Simulation is carried out by using Ecotect software.

1.4 Floor Plans:

Eucalyptia Building

The First floor plan of the Eucalyptia building is shown in **Figure 1.10.** The Typical floor plan of the Eucalyptia building is shown in **Figure 1.11** & the Refuge floor plan of the Eucalyptia building is shown in **Figure 1.12.**

Eucalyptia Building

Figure 1.10: First floor plan of Eucalyptia building

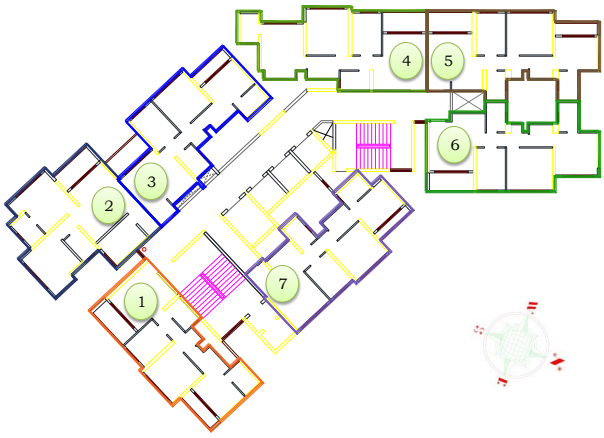


Figure 1.11: Typical floor plan of Eucalyptia building

(2nd to 4th floor; 6th to 9th and 11th to 14th and 16th to 19th and 21st to 24th and 26th to 29th and 31st to 34th floor)



Figure 1.12: Refuge floor plan of Eucalyptia building

(5th; 10th; 15th; 25th; 30th & 35th floor)

Fenelia Building

The First floor plan of the Fenelia Building is shown in **Figure 1.13.** The Typical floor plan of the Fenelia building is shown in **Figure 1.14** & the Refuge floor plan of the Fenelia building is shown in **Figure 1.1**

Fenelia Building

Figure 1.13: First floor plan of Fenelia building

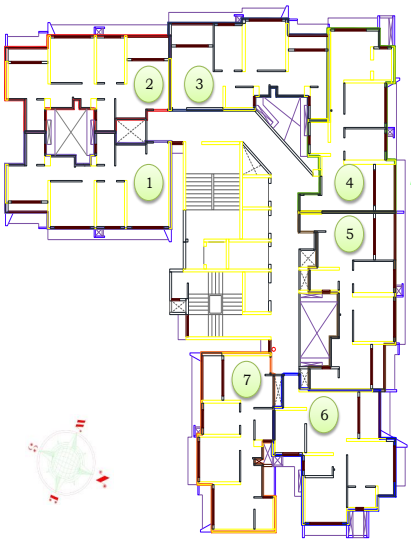


Figure 1.14: Typical floor plan of Fenelia building
(2nd to 4th floor; 6th to 9th and 11th to 14th and 16th to 19th and 21st to 24th and 26th to 29th and 31st to 34th floor)

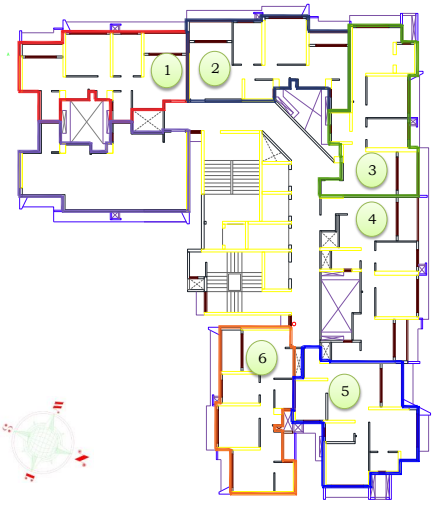


Figure 1.15: Refuge floor plan of Fenelia building

(5th; 10th; 15th; 25th; 30th & 35th floor

1.5 Daylight Assessment – Simulation Method:

Proposed project comply with 70^0 angle of obstruction compliance. The section plan of buildings shown in **Figure 1.16**

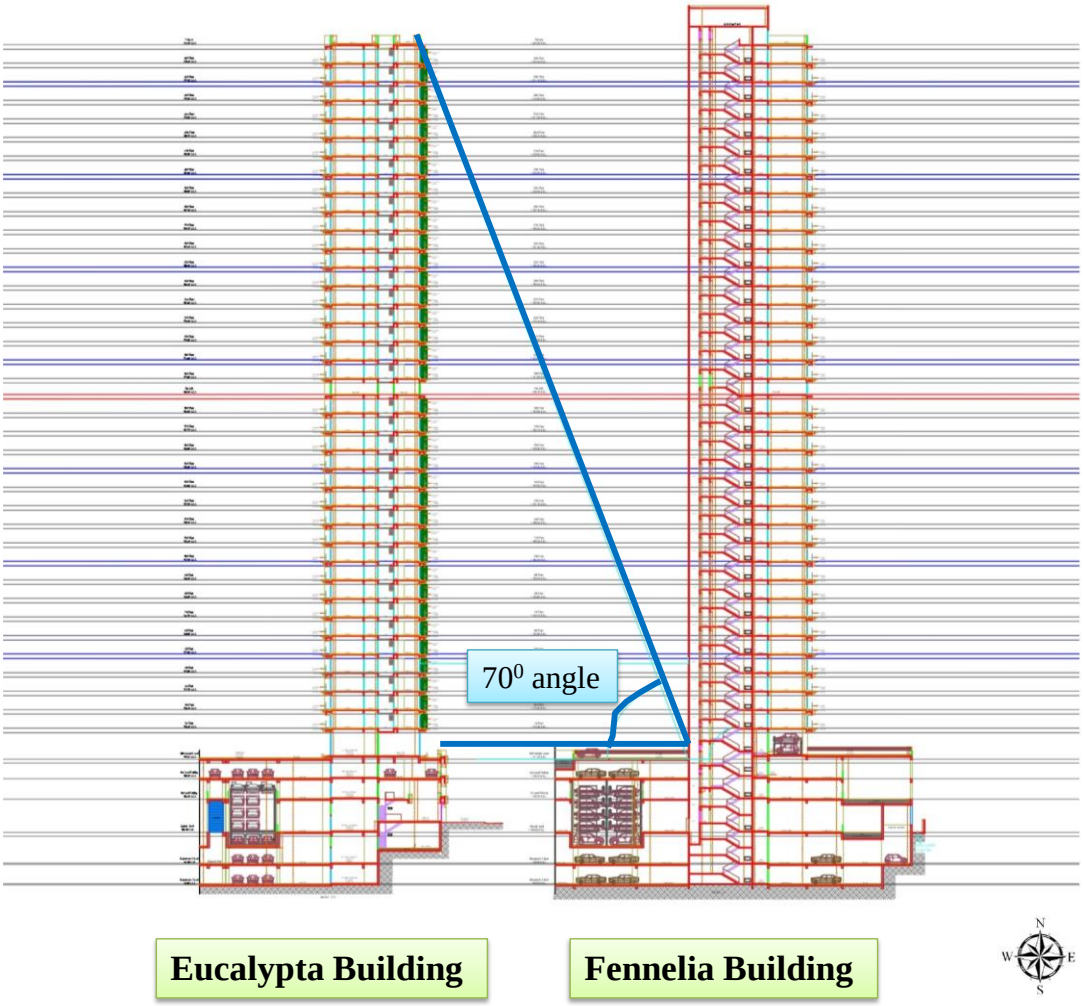


Figure 1.16: Sections of buildings showing 70^0 angle

An angle of 70^0 between proposed project and nearby structure was calculated in AutoCAD software. Based on the angle the minimum distance required between two buildings was estimated.

Indoor Daylight Assessment –Eucalyptia Building (Simulation Method)

The Indoor daylight assessment for typical floor plan of the proposed Eucalyptia building is given below in **Figure 1.17**

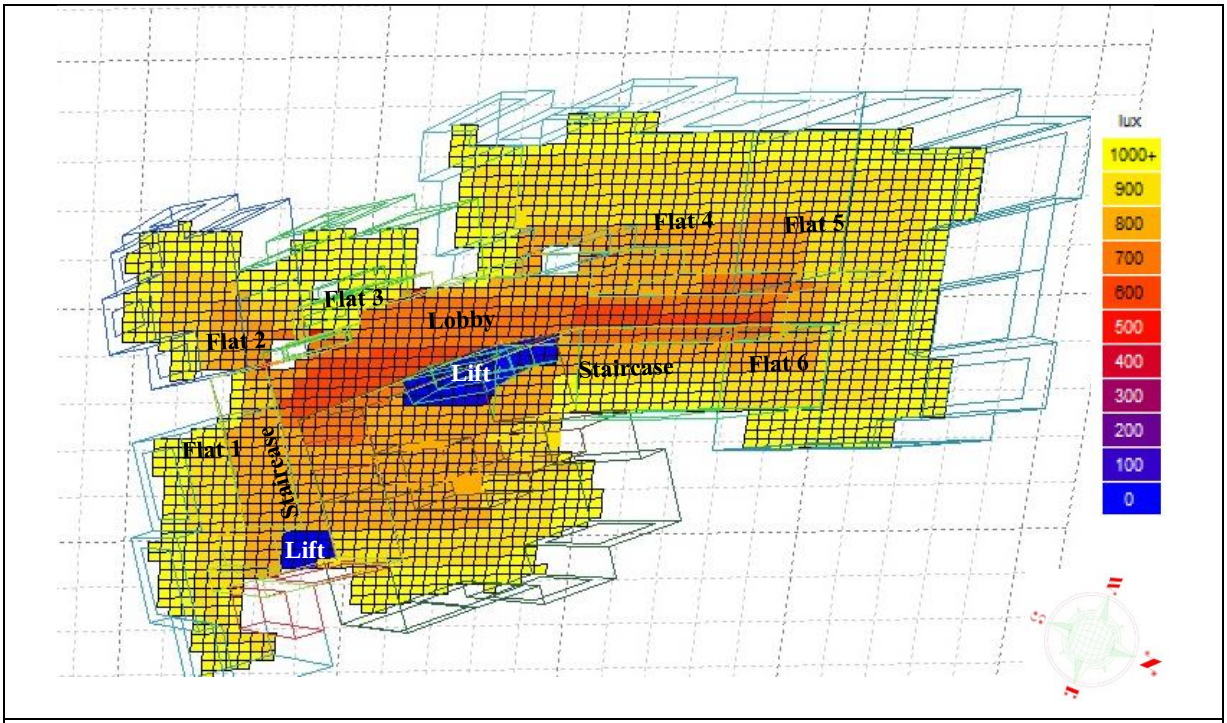


Figure 1.17: Indoor daylight assessment for typical floor plan of proposed Eucalyptia building

Indoor Daylight Assessment – Fenelia Building (Simulation Method)

The Indoor daylight assessment for typical floor plan of the proposed Fennelia building is given below in **Figure 1.18**

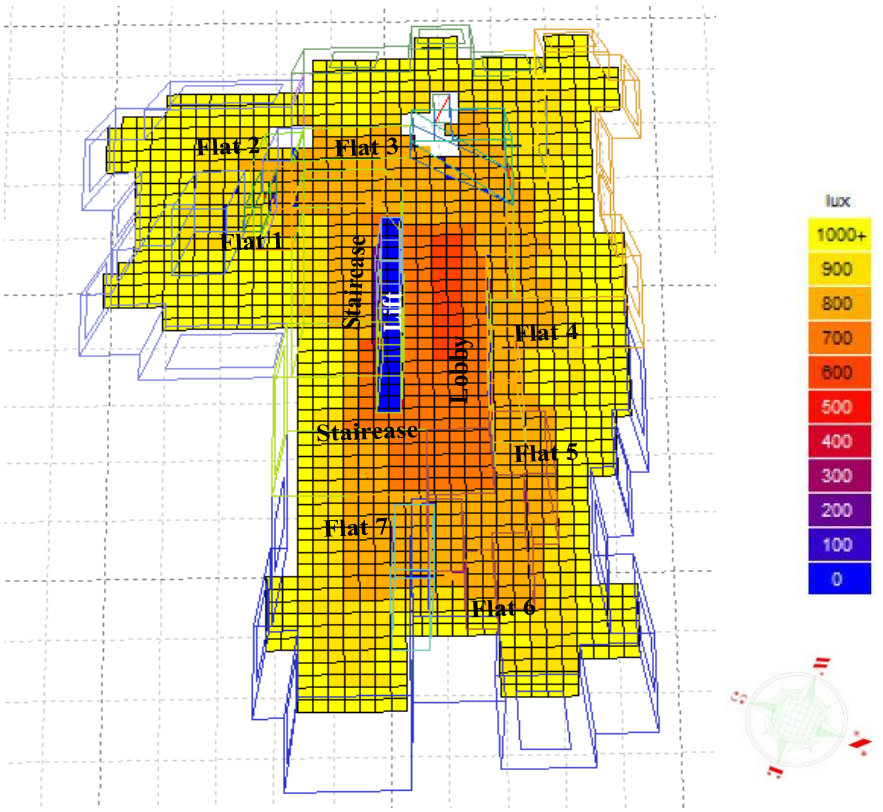


Figure 1.18: Indoor daylight assessment for typical floor plan of Fenelia building

1.6 Daylight Assessment – Perspective Method:

The Manual Assessment for daylight estimation is done by using Glazing Factor. The Glazing factor for different rooms shown in **Table 1.12**

Table 1.12: Glazing factor to be achieved

Type of Regularly Occupied Spaces	Glazing Factors (GF)
Living/Bedroom	1
Study room	1
Kitchen	2
Other spaces	1

Glazing factor is calculated as:

$$\textbf{Glazing Factor} = \frac{\textbf{Window Area } (sq.m)}{\textbf{Floor Area } (sq.m)} \textbf{ x Actual Visual Transmittance of Glazing } (VLT) \textbf{ x Constant x } 100$$

The constant values are:

- Windows to wall: 0.2
- Windows to roof (skylight): 1.0

VLT obtained from glass: 0.27, 0.41, and 0.53.

The glass used Ecosense Exceed (Clear Platina) for Bedroom; the glass used Ecosense Excel (Clear Pearl) for Living room & the glass used Ecosense Enhance (Aura Clear Glass) for Kitchen.

The Glazing achieved for different rooms of proposed project shown in **Table 1.13**

Table 1.13: Glazing achieved for different rooms

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
Eucalyptia Building									
First Floor (Refer **Figure 1.10**)	2 BHK	1	Living Room	17.31	4.62	0.41	2.19	1	54.31
			Kitchen	5.84	2.2	0.53	3.99	2	49.91
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.11
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.15
			Average of Flat 1						**55.62**
	2 BHK	2	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.33	4.4	0.27	2.55	1	60.72
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 2						**53.90**
	2 BHK	3	Living Room	15.73	4.62	0.41	2.41	1	58.48
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 3						**55.30**
	2 BHK	4	Living Room	18.18	4.62	0.41	2.08	1	52.00
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 4						**52.69**
	2 BHK	5	Living Room	14.76	4.62	0.41	2.57	1	61.04
			Kitchen	5.84	2.2	0.53	4.00	2	49.95
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	9.24	4.4	0.27	2.57	1	61.10
			Average of Flat 5						**58.30**
	Average of First Floor								**55.16**
Typical Floor 2nd to 4th and 6th to 9th and 11th to 14th, and 16th to 19th, 21th to 24th and 26th to 29th and 31th to 34th Floor	2 BHK	1	Living Room	17.31	4.62	0.41	2.19	1	54.30
			Kitchen	5.84	2.2	0.53	4.00	2	49.95
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 1						**55.62**
	2 BHK	2	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.33	4.4	0.27	2.55	1	60.72
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 2						**53.90**
	2 BHK	3	Living Room	15.73	4.62	0.41	2.41	1	58.48
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
(Refer **Figure 1.11**)			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 3						**55.30**
	2 BHK	4	Living Room	18.18	4.62	0.41	2.08	1	52.00
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 4						**52.69**
	2 BHK	5	Living Room	16.31	4.62	0.41	2.32	1	56.94
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 5						**53.92**
	2 BHK	6	Living Room	16.02	4.62	0.41	2.36	1	57.71
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	9.24	4.4	0.27	2.57	1	61.10
			Average of Flat 6						**55.10**
	Average of Typical Floor								**54.42**
Refuge Floor 5th ,10th ,15th	2 BHK	1	Living Room	17.31	4.62	0.41	2.19	1	54.30
			Kitchen	5.84	2.2	0.53	4.00	2	49.95
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
,20th ,25th ,30th, 35th Floor (Refer **Figure 1.12**)			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 1						**55.62**
	2 BHK	2	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.33	4.4	0.27	2.55	1	60.72
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 2						**53.90**
	2 BHK	3	Living Room	15.73	4.62	0.41	2.41	1	58.48
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 3						**55.30**
	2 BHK	4	Living Room	18.18	4.62	0.41	2.08	1	52.00
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 4						**52.69**
	2 BHK	5	Living Room	16.34	4.62	0.41	2.32	1	56.86
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
			Average of Flat 5						**53.90**
	Average of Refuge Floor								**54.28**
Fenelia Building									
First Floor (Refer **Figure 1.13**)	2 BHK	1	Living Room	15.76	4.62	0.41	2.40	1	58.39
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.39	4.4	0.27	2.29	1	56.29
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 1						**54.07**
	2 BHK	2	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 2						**54.00**
	2 BHK	3	Living Room	16.73	4.62	0.41	2.26	1	55.84
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.61	4.4	0.27	2.47	1	59.57
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 3						**54.25**
	2 BHK	4	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.75	2.2	0.53	3.46	2	42.15
			Bedroom -1	10.73	4.4	0.27	2.21	1	54.84

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
			Bedroom -2	9.73	4.4	0.27	2.44	1	59.06
			Average of Flat 4						**52.33**
	2 BHK	5	Living Room	14.44	4.62	0.41	2.62	1	61.88
			Kitchen	5.84	2.2	0.53	4.00	2	49.95
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	9.24	4.4	0.27	2.57	1	61.10
			Average of Flat 5						**58.51**
	Average of First Floor								**54.63**
Typical Floor 2nd , to 4th and 6th to 9th and 11th to 14th and 16th to 19th and 21th to 24th and 26th to 29th and 31th to 34th Floor	2 BHK	1	Living Room	16.02	4.62	0.41	2.36	1	57.71
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	9.24	4.4	0.27	2.57	1	61.10
			Average of Flat 1						**55.10**
	2 BHK	2	Living Room	15.73	4.62	0.41	2.41	1	58.48
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 2						**54.31**
	2 BHK	3	Living Room	18.18	4.62	0.41	2.08	1	52.00
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.39	4.4	0.27	2.29	1	56.29

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
(Refer **Figure 1.14**)			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 3						**52.47**
	2 BHK	4	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 4						**54.00**
	2 BHK	5	Living Room	16.73	4.62	0.41	2.26	1	55.84
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.61	4.4	0.27	2.47	1	59.57
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 5						**54.25**
	2 BHK	6	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.75	2.2	0.53	3.46	2	42.15
			Bedroom -1	10.73	4.4	0.27	2.21	1	54.84
			Bedroom -2	9.73	4.4	0.27	2.44	1	59.06
			Average of Flat 6						**52.33**
	2 BHK	7	Living Room	14.44	4.62	0.41	2.62	1	61.88
			Kitchen	5.84	2.2	0.53	4.00	2	49.95
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	9.24	4.4	0.27	2.57	1	61.10

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
			Average of Flat 7						**58.51**
	Average of Typical Floor								**54.42**
Refuge Floor 5th ,10th,15th ,20th,25th ,30th, 35th Floor (Refer **Figure 1.15**)	2 BHK	1	Living Room	15.73	4.62	0.41	2.41	1	58.48
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.18	4.4	0.27	2.33	1	57.14
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 1						**54.31**
	2 BHK	2	Living Room	18.18	4.62	0.41	2.08	1	52.00
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	10.39	4.4	0.27	2.29	1	56.29
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 2						**52.47**
	2 BHK	3	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14
			Average of Flat 3						**54.00**
	2 BHK	4	Living Room	16.73	4.62	0.41	2.26	1	55.84
			Kitchen	6.48	2.2	0.53	3.60	2	44.47
			Bedroom -1	9.61	4.4	0.27	2.47	1	59.57
			Bedroom -2	10.18	4.4	0.27	2.33	1	57.14

Floor	Flat Type	Flat No	Spaces	Floor Area (Sq. m)	Window Area (Sq. m)	Window Glazing (VLT)	Glazing Factor achieved (as per formula)	Glazing Factor to be achieved	Area of regularly occupied spaces meeting criteria (%)
			Average of Flat 4						**54.25**
	2 BHK	5	Living Room	17.70	4.62	0.41	2.14	1	53.28
			Kitchen	6.75	2.2	0.53	3.46	2	42.15
			Bedroom -1	10.73	4.4	0.27	2.21	1	54.84
			Bedroom -2	9.73	4.4	0.27	2.44	1	59.06
			Average of Flat 5						**52.33**
	2 BHK	6	Living Room	14.44	4.62	0.41	2.62	1	61.88
			Kitchen	5.84	2.2	0.53	4.00	2	49.95
			Bedroom -1	9.24	4.4	0.27	2.57	1	61.10
			Bedroom -2	9.24	4.4	0.27	2.57	1	61.10
			Average of Flat 6						**58.51**
	Average of Refuge Floor								**54.31**

1.7 Conclusion and Recommendations:

- The proposed project consists of 16 buildings out of which 2 buildings are for amendment. The proposed Eucalyptia building contains 2 level Basement + 3 level Podium (Gr.+2P) +Stilt+1st- 19th floor + Fire Check floor+ 20th - 35th (Pt) floors with a height of 118.87 m. The proposed Fenelia building contains 2 level Basement+ Gr (Pt.)/ 1st level Podium + 1st floor (pt) / 2nd level Podium + 2nd floor (pt)/3rd Podium +Stilt + 1st to 19th floor +fire Check Floor + 20th -35th (Pt) floor with a height of 118.87 m. Basement is added and also increases in floor from 27th to 35th floor. Height increased from 91.8 m to 118.87 m for both buildings. All these structures have been designed in such a way that it would not affect the sunlight rating of internal structure (Refer **Table 1.7**).
- Comparing with the current scenario (without proposed project) not much significance difference was observed in terms of shadow creation from proposed project. This is mainly due to the sustainable design feature of the high rise. This is highlighted in **Table 1.7**
- Most of the structures would receive more than 4 Hrs. of direct sunlight with the proposed project.
- As per common and recommended minimum light level accepted for indoors is 150 lux. For many spaces of proposed development would have light intensity more than 500 lux is observed.
- The type of Glasses for windows that can be proposed for this project is given below. These glasses improve energy efficiency and daylight parameters. It allows the optimum amount of light to pass. These glasses are ecofriendly and ideal for Green Building concept. The technical specification of these glasses are as follows;

Type of Glass	Particulars	Product Name	Shade	VLT	Reflection	
					External (%)	Internal (%)
AIS Ecosense Exceed	6 mm Solar Control Low E-Glass	Clear Platina	Clear	0.27	40	16
AIS Ecosense	6 mm Double	Clear Pearl	Clear	0.41	19	13

Type of Glass	Particulars	Product Name	Shade	VLT	Reflection	
					External (%)	Internal (%)
Excel	Low E-Glass					
AIS Ecosense Enhance	Solar Control Glass – 6 mm	Aura	Clear	0.53	25	21

Image of glasses that can be proposed for this project shown in **Figure No. 1.19**



Figure No. 1.19: Image of AIS Ecosense Enhance -Aura Clear Glass