

# PROFESSIONAL TRAINING REPORT

Submitted in partial fulfillment of the requirements for the award of  
Master of Architecture degree in Sustainable Architecture

by

**S. MANASWINI DEVI / 40890009**



**SCHOOL OF BUILDING AND ENVIRONMENT  
DEPARTMENT OF ARCHITECTURE**

**SATHYABAMA**  
**INSTITUTE OF SCIENCE AND TECHNOLOGY**  
**(DEEMED TO BE UNIVERSITY)**  
**Accredited with Grade "A" by NAAC**  
**JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

**JAN 2022**



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(Est U/s(3) of UGC Act,1956) Accredited with Grade "A" by NAAC (A Christian Minority Institution)

**JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHEMMENCHERY, CHENNAI – 600119. TAMILNADU.**

**PHONE: 2450 1443/9941912481 INTERNET: [www.sathyabama.ac.in](http://www.sathyabama.ac.in)**

**E-mail: [archhod@sathyabama.ac.in](mailto:archhod@sathyabama.ac.in)**



**SCHOOL OF BUILDING AND ENVIRONMENT  
DEPARTMENT OF ARCHITECTURE  
M. Arch (Sustainable Architecture)**

**PROFESSIONAL TRAINING PORTFOLIO (S89A PT)  
JAN 2022**

Name of the Student : S. Manaswini Devi

Semester : III

Reg No. : 40890009

Batch : 2020-2022





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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

**M. Arch (Sustainable Architecture)**

## **BONAFIDE CERTIFICATE**

This is to certify that the professional training (S89A PT) is the work of S.MANASWINI DEVI / 40890009 who had undergone training in Auger Engineers Pvt. Ltd and has been monitored by the continuous assessment during **Dec 2021 to Jan 2022.**

**DR. DEVYANI GANGOPADHYAY**

**DEAN,**

School of Building and

Environment

Department of Architecture

Submitted for Viva voce Examination held on 07/02/2022

**Internal Examiner**

**External Examiner**



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## **DECLARATION**

I S.MANASWINI DEVI hereby declare that the Professional Training Report 1<sup>st</sup> Dec 2021 – 21<sup>st</sup> Jan 2022 done by me under the guidance of Mr. Magesh.S is submitted in partial fulfillment of the requirements for the completion of practical training session.

DATE : 21<sup>st</sup> January, 2022

PLACE : Chennai

A handwritten signature in blue ink, appearing to read "S. Manaswini Devi".

SIGNATURE OF CANDIDATE

## ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Devyani Gangopadhyay**, Dean and Head of Department , School of building and Environment, Dept. of architecture for providing me necessary support and details at the right time during the progressive training session.

I would like to express my sincere and deep sense of gratitude to **Mr. Magesh.S / Principal Consultant / Auger Engineers Pvt. Ltd** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work. My sincere thanks to **Ar.Sheetal Amraotkar** Professional Training Coordinator for her motivation and guidance.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Architecture who were helpful in many ways for the completion of the project.

(Also thank Architect of the firm) **Mr. Mahesh / Principal Consultant / Auger Engineers Pvt. Ltd**



+91- 87541 53526  
www.augerengineers.com  
info@augerengineers.com  
W-126, 3rd Floor, 3rd Avenue,  
Anna Nagar, Chennai - 600 040



Date: 21.01.2022

To

The Head of the Department,  
Sathyabama Institute of Science & Technology,  
Chennai – 600 119,  
Tamil Nadu

Sub: Internship completion letter – Reg.

Respected Sir/Madam,

This is to inform that **Ms. S. Manaswini Devi** (Reg no. 40890009), pursuing M.Arch – Sustainable Architecture at Sathyabama Institute of Science & Technology, has completed her internship successfully at our firm from **01-12-2021** to **21-01-2022**.

During this period, we found her work good & satisfactory.

We wish her all the best for her future endeavors.

Yours sincerely,

For AUGER ENGINEERS Green Building Consultants

  
MAGESH S  
Principal Consultant & Co-Founder



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info@augerengineers.com  
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## DEPARTMENT OF ARCHITECTURE

### M. Arch (Sustainable Architecture)

#### Continuous Assessment Report for Professional training

(Continuous progress report of the trainee architect/Project Manager for the period of 30 working days in the office to be submitted to HOD by the Trainee attending the training session)

1. Name of the office / organization : Auger Engineers.
2. Address & Contact Number : W-126, 3rd floor, 3rd Avenue, Anna Nagar, Ch- 600 040
3. Name of the student : S. Manaswini Devi
4. Duration : From 1st Dec To 10th Dec
5. Total No. of days : 8 days. - Excluding Sat & Sun
6. Evaluation of Performance criteria shall be on

\* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 200 marks by the department.

| Description of works                               | Excellent | Good | Fair | Poor | NA |
|----------------------------------------------------|-----------|------|------|------|----|
| Understanding of office culture and methodology    |           | ✓    |      |      |    |
| Active Participation in the Project activities     |           | ✓    |      |      |    |
| Documentation and tracking of project              |           | ✓    |      |      |    |
| Presentation Skills developed                      |           | ✓    |      |      |    |
| Understanding of construction details & techniques | ✓         |      |      |      |    |
| Participation and contribution in project meetings |           | ✓    |      |      |    |
| Understanding of codes and standards               |           | ✓    |      |      |    |
| Schedule preparation & tracking activities         | ✓         |      |      |      |    |
| Preparation / Management of drawings               |           | ✓    |      |      |    |
| Learning / Application of software in Projects     |           | ✓    |      |      |    |
| Preparation of concept for projects                |           | ✓    |      |      |    |
| Site Management / Discussion with clients          | ✓         |      |      |      |    |
| Overall Grading*                                   |           |      |      |      |    |

(A - 8.0, B - 7.0, C - 6.0, D - 5.5, E - 5.0, F - <5)

7. Any other Remarks : \_\_\_\_\_

8. Signature of the  
Head of the Office /  
Organization (With Seal)



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2. Address & Contact Number : W-126, 3rd floor, 3rd Avenue, Anna Nagar, Ch- 600 040
3. Name of the student : S. Manaswini Devi
4. Duration : From 11th Dec To 19th Dec
5. Total No. of days : 5 days - [13-17]
6. Evaluation of Performance criteria shall be on

\* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 200 marks by the department.

| Description of works                               | Excellent | Good | Fair | Poor | NA |
|----------------------------------------------------|-----------|------|------|------|----|
| Understanding of office culture and methodology    | ✓         |      |      |      |    |
| Active Participation in the Project activities     | ✓         |      |      |      |    |
| Documentation and tracking of project              | ✓         |      |      |      |    |
| Presentation Skills developed                      |           | ✓    |      |      |    |
| Understanding of construction details & techniques |           | ✓    |      |      |    |
| Participation and contribution in project meetings |           | ✓    |      |      |    |
| Understanding of codes and standards               |           | ✓    |      |      |    |
| Schedule preparation & tracking activities         |           | ✓    |      |      |    |
| Preparation / Management of drawings               |           | ✓    |      |      |    |
| Learning / Application of software in Projects     |           | ✓    |      |      |    |
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| Overall Grading*                                   |           |      |      |      |    |

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1. Name of the office / organization : Angus Engineers
2. Address & Contact Number : W-126, 3rd floor, 3rd Avenue, Anna Nagar, Ch-600 040
3. Name of the student : S. Manaswini Devi
4. Duration : From 20th Dec To 26th Dec
5. Total No. of days : 5 days - [20-24]
6. Evaluation of Performance criteria shall be on

\* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 200 marks by the department.

| Description of works                               | Excellent | Good | Fair | Poor | NA |
|----------------------------------------------------|-----------|------|------|------|----|
| Understanding of office culture and methodology    |           | ✓    |      |      |    |
| Active Participation in the Project activities     | ✓         |      |      |      |    |
| Documentation and tracking of project              |           | ✓    |      |      |    |
| Presentation Skills developed                      |           |      |      |      |    |
| Understanding of construction details & techniques |           | ✓    |      |      |    |
| Participation and contribution in project meetings |           | ✓    |      |      |    |
| Understanding of codes and standards               | ✓         |      |      |      |    |
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| Preparation / Management of drawings               | ✓         |      |      |      |    |
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| Preparation of concept for projects                |           | ✓    |      |      |    |
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Overall Grading\*

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1. Name of the office / organization : Angus Engineers
2. Address & Contact Number : W-126, 3rd floor, 3rd Avenue, Anna Nagar, Ch-600 040
3. Name of the student : S. Manaswini Devi
4. Duration : From 27th Dec To 30th 2nd Jan
5. Total No. of days : 4 days - [27-30]
6. Evaluation of Performance criteria shall be on

\* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 200 marks by the department.

| Description of works                               | Excellent | Good | Fair | Poor | NA |
|----------------------------------------------------|-----------|------|------|------|----|
| Understanding of office culture and methodology    |           | ✓    |      |      |    |
| Active Participation in the Project activities     |           | ✓    |      |      |    |
| Documentation and tracking of project              | ✓         |      |      |      |    |
| Presentation Skills developed                      | ✓         |      |      |      |    |
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| Preparation of concept for projects                |           | ✓    |      |      |    |
| Site Management / Discussion with clients          |           | ✓    |      |      |    |

Overall Grading\*

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2. Address & Contact Number : W-126, 3rd floor, 3rd Avenue, Anna Nagar, Ch-600 040
3. Name of the student : S. Manaswini Devi
4. Duration : From 3rd Jan To 17th Jan.
5. Total No. of days : 5 days [3-7 - working]
6. Evaluation of Performance criteria shall be on

\* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 200 marks by the department.

| Description of works                               | Excellent | Good | Fair | Poor | NA |
|----------------------------------------------------|-----------|------|------|------|----|
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2. Address & Contact Number : W-126, 3rd floor, 3rd Avenue, Anna Nagar, Ch-600 040.
3. Name of the student : S. Manaswini Devi
4. Duration : From 18th Jan To 24th Jan
5. Total No. of days : 4 days.
6. Evaluation of Performance criteria shall be on

\* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 200 marks by the department.

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| Understanding of office culture and methodology    |           | ✓    |      |      |    |
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# WORK DIARY

| Duration Of Work              | Description of Work                                                                                           |
|-------------------------------|---------------------------------------------------------------------------------------------------------------|
| 1st December - 10th December  | Introduction to IGBC Green Homes, Scheduling of Door & Windows ( Incl Orientation ), Glazing detail Narrative |
| 13th December - 17th December | Roof Section & Detail, Roof Area Statement and Narrative and Alternate Water heating System.                  |
| 20th December - 24th December | RETV Calculation for TOWER A,B & C ( By excel , Eco- Nivas Tool and Manual Calculation )                      |
| 27th December - 30th December | WWR and WFR op Calculation, Eco - Nivas Samhita Tool                                                          |
| 3rd January - 7th January     | Landscape Site Visit - Chennai plant Water Audit Introduction, Landscape area calculation Chennai & Jaipur    |
| 18th Januray - 20th January   | Lighting Calculation - Jaipur and Chennai (In progress)                                                       |

Signature Of Consultant -  
Office seal -







*Our firm's mission is, "To make a sustainable built environment for all through our best in class affordable consultation services" and the vision of the firm is, "To provide a complete in-house holistic solution for Green & Sustainable buildings".*

### About The Firm

Auger Engineers is a startup firm, co-founded by Mr.Magesh & Mr.Prakash which offers consultancy services for Green & Sustainable design of buildings. **The firm is primarily involved in green building consultation services for acquiring LEED/IGBC/GRIHA/GEM certification for the buildings, both for new & existing buildings.** This involves Sustainable site selection & planning, passive architecture design, energy efficiency, water conservation, selection of sustainable building materials and ensuring good indoor environmental quality for the occupants.

The firm is having a dedicated team of professionals for its operational activities which includes architect, structural engineer, interiors designer and energy analyst

**Mr. Magesh, Principal Consultant & Co-Founder of AUGER ENGINEERS** is a Civil Engineer by profession having more than 5 years of experience in building design & construction. He is a Certified Green Building Professional and hold the credentials of **LEED Green Associate, IGBC AP & GEM CP**. Earlier, he was working as Project Civil Engineer at **National Institute of Wind Energy under Ministry of New & Renewable Energy**

**Mr. Prakash, Executive consultant & Co-Founder** is a Civil Engineer having 5 years of experience in project management, building supervision, QA/QC, quantity survey, men power handling. He has a strong expertise in working with more than 15 civil construction projects executions in & around Chennai such as **MGM Health care building, AVM Foundations, DEEJOS Engineers & Contractors, Atha Decors**, etc.

**Popular Green building rating systems in India are**

★ LEED   ★ IGBC   ★ GRIHA   ★ GEM ASSOCHAM

Ratings are available for wide range of building typologies for both new & existing buildings which are as follows

|                        |                                |
|------------------------|--------------------------------|
| ➔ Residential Homes    | ➔ Factories                    |
| ➔ Offices              | ➔ Warehouses & Logistics parks |
| ➔ Schools              | ➔ SEZs                         |
| ➔ Hospitals            | ➔ Health & fitness centers     |
| ➔ Banks                | ➔ Heritage structures          |
| ➔ Restaurants          | ➔ Museums                      |
| ➔ Shopping complex     | ➔ Airports                     |
| ➔ Retail Stores        | ➔ Data Centers                 |
| ➔ Government buildings | ➔ Service buildings            |
| ➔ Hotels & Resorts     | ➔ Large campuses & townships   |
| ➔ Apartments           | ➔ Transit terminals            |
| ➔ Institutions         | ➔ Green Commercial Interiors   |

Based on the above, specific rating system is applicable to project depending upon the type of building, budget, size & the project requirements.

Auger Engineers assist in choosing the right rating system that fits best for the project.





Indian Green Building Council  
*Greening India since 2001*



Enable Sustainable Built Environment for all by 2025 - VISION IGBC



| Sheet No.   | Table of Contents                                        |
|-------------|----------------------------------------------------------|
| 1           | Residential Project Description                          |
| 2           | IGBC Green Homes - Scope Description                     |
| 3rd - 4th   | Schedule of Joinery                                      |
| 5           | Glass Narrative and Roof Calculation                     |
| 6th - 7th   | Roof Area statement and Alternate Water Heating          |
| 8th - 11th  | RETV Calculation                                         |
| 12          | WWR and WFRop                                            |
| 13          | Eco- Nivas Samhita Tool                                  |
| 14th - 15th | Landscape plan and calculation - Jaipur Factory          |
| 16th        | Lighting calculation - Jaipur Factory                    |
| 17th        | Landscape plan and calculation - Chennai Factory         |
| 18th        | Site Visit Chennai Factory & Water Audit<br>Fundamentals |

RESIDENTIAL PROJECT

FACTORY  
PROJECT



## PROJECT DESCRIPTION

Deccan Prakruti at Egattur by Deccan Estates is a prime project located just 4 mins drive from the OMR main Road to Navalur within the premises of SIPCOT.

Comprises of 3 Blocks of 102 premium Apartments crafted for the discerning, Deccan Prakruti located in close proximity of Sipcot IT Park, Very close to companies like TCS, WIPRO and Infosys.plus major educational Institutions.

TOWER A - 60 Units

TOWER B - 24 Units

TOWER C - 18 Units

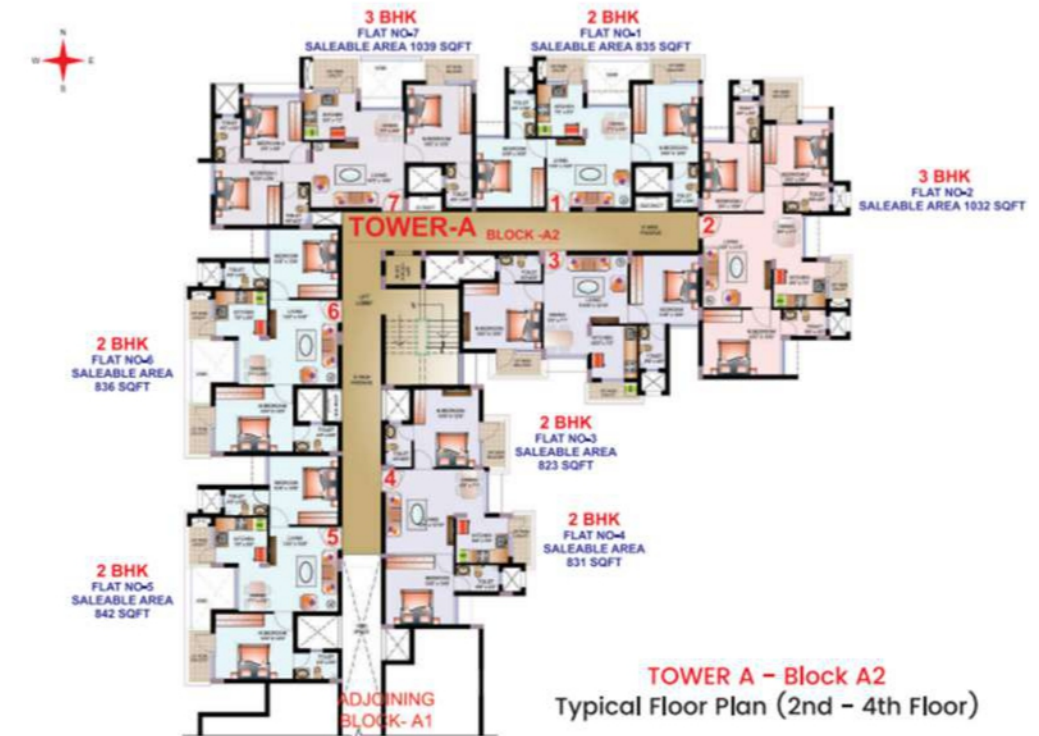
No .of Floors - Ground + 4 ( Stilt Parking )

## SCOPE OF WORK

**Pre- requisite** - Window schedule , Roof area calculations and landscape area statemnt

Energy Efficiency (RETV) calculation - Comparison Table  
- Alternative water heating system - Glazing selection and Narrative - Roof area calcuations - Roof section - U- value caluculation.

## TOWER A



TOWER A - Block A2  
Typical Floor Plan (2nd - 4th Floor)



## TOWER B



TOWER - B  
2nd-4th Floor Plans

## TOWER C



TOWER - C  
1st Floor Plan



TOWER A - Block A1  
1st Floor Plan

SOURCE - IGBC Green Homes Rating System - Version 3.0



## Check List Green Homes Ver3.0

The Project was registered for IGBC Green Homes Rating - There are two main Credit Requirements according to IGBC Rating wherein the **Mandatory Requirements** are compulsory for every project. Then the **other credit** can be applied based on the **eligibility** of each project

| Sustainable Design         |                                             | Possible Points: | 20 |
|----------------------------|---------------------------------------------|------------------|----|
| SD Mandatory Requirement 1 | Local Building Regulations                  | Required         |    |
| SD Mandatory Requirement 2 | Soil Erosion Control                        | Required         |    |
| SD Credit 1                | Natural Topography & Vegetation             | 4                |    |
| SD Credit 2                | Heat Island Effect, Roof & Non-roof         | 4                |    |
| SD Credit 3                | Passive Architecture                        | 2                |    |
| SD Credit 4                | Universal Design                            | 2                |    |
| SD Credit 5                | Green Parking Facility                      | 4                |    |
| SD Credit 6                | Access to Amenities                         | 2                |    |
| SD Credit 7                | Basic Facilities for Construction Workforce | 1                |    |
| SD Credit 8                | Green Education & Awareness                 | 1                |    |
| Water Conservation         |                                             | Possible Points: | 23 |
| WC Mandatory Requirement 1 | Water Efficient Plumbing Fixtures           | Required         |    |
| WC Mandatory Requirement 2 | Rainwater Harvesting                        | Required         |    |
| WC Credit 1                | Water Efficient Plumbing Fixtures           | 6                |    |
| WC Credit 2                | Landscape Design                            | 3                |    |
| WC Credit 3                | Management of Irrigation System             | 2                |    |
| WC Credit 4                | Recycle & Reuse of Waste water              | 4                |    |
| WC Credit 5                | Water Quality                               | 1                |    |
| WC Credit 6                | Enhanced Rainwater Harvesting               | 4                |    |
| WC Credit 7                | Water Metering                              | 3                |    |

| Materials and Resources     |                                             | Possible Points: | 18 |
|-----------------------------|---------------------------------------------|------------------|----|
| MR Mandatory Requirement 1  | Separation of House-hold Waste              | Required         |    |
| MR Credit 1                 | Green Procurement Policy                    | 1                |    |
| MR Credit 2                 | Optimisation on Structural Design           | 1                |    |
| MR Credit 3                 | Certified Green Products                    | 5                |    |
| MR Credit 4                 | Local Materials                             | 2                |    |
| MR Credit 5                 | Eco friendly wood based materials           | 2                |    |
| MR Credit 6                 | Alternative Construction Material           | 2                |    |
| MR Credit 7                 | Handling of Construction & Demolition Waste | 2                |    |
| MR Credit 8                 | Organic Waste treatment Post Occupancy      | 3                |    |
| Resident Health & Wellbeing |                                             | Possible Points: | 14 |
| RHW Mandatory Requirement 1 | Minimum Daylighting, 50%                    | Required         |    |
| RHW Mandatory Requirement 2 | Ventilation Design                          | Required         |    |
| RHW Mandatory Requirement 3 | No Smoking Policy                           | Required         |    |
| RHW Credit 1                | Enhanced Daylighting                        | 2                |    |
| RHW Credit 2                | Enhanced Ventilation Design                 | 2                |    |
| RHW Credit 3                | Cross Ventilation                           | 4                |    |
| RHW Credit 4                | Connectivity to Exteriors                   | 2                |    |
| RHW Credit 5                | Low VOC Materials, Paints & Adhesives       | 2                |    |
| RHW Credit 6                | Facility for Physical Wellbeing             | 2                |    |

## Energy Efficiency

| Energy Efficiency          |                                                 | Possible Points: | 20 |
|----------------------------|-------------------------------------------------|------------------|----|
| EE Mandatory Requirement 1 | HCFC Free Equipment                             | Required         |    |
| EE Mandatory Requirement 2 | Minimum Energy Performance                      | Required         |    |
| EE Credit 1                | Enhanced Energy Performance                     | 10               |    |
| EE Credit 2                | Alternate Water Heating system                  | 3                |    |
| EE Credit 3                | On-site Renewable Energy - Common area Lighting | 4                |    |
| EE Credit 4                | Energy efficiency in common area equipment      | 1                |    |
| EE Credit 5                | Integrated Energy Monitoring System             | 2                |    |

The project was on the progress of construction where the structure was completed 90% and the block work was on progress. **MY CONTRIBUTION was in the part of the Energy Efficiency which constitutes 20 Points** and has most important calculations involved  
SOURCE - IGBC Green Homes Rating System - Version 3.0

## Prescriptive approach Calculations

- RETV Calculations
- WWR Documentation
- WFR Documentation
- Roof U-Value calculation
- Roof section detail
- Glazing detail documentation
- Roof area calculation
- Alternative fuel for water heating

## Minimum Energy Performance - EE Mandatory Requirement 2 Prescriptive Approach

The prescriptive approach allows the project to comply with applicable criteria for all the parameters as outlined below:

1. Building Envelope:

The project must ensure that the following building envelope measures meet the baseline criteria as outlined below:

☒ Glazing

i. Equivalent Solar Heat Gain Coefficient (SHGC<sub>eq</sub>): 0.5

ii. U value : 5.7 W/m<sup>2</sup>K

☒ Roof Assembly: U value : 1.5 W/m<sup>2</sup>K

☒ Wall Assembly: U value : 2.5 W/m<sup>2</sup>K

## Efficient Lighting systems:

## Air-conditioning Systems:

## Enhanced Energy Performance

1. Building Envelope: (7 points)

• The project should design the building envelope measures as per Eco-Niwas Samhita 2018 (ECBC-R). The criteria for attaining the points shall be as follows:  
Residential envelope transmittance value (RETV\*) for building envelope (except roof) shall comply with the following:

i. RETV value of 15.0 W/m<sup>2</sup>

(1 point)

ii. RETV value of 14.5 W/m<sup>2</sup>

(2 points)

iii. RETV value of 14.0 W/m<sup>2</sup>

(3 points)

iv. RETV value of 13.5 W/m<sup>2</sup>

(4 points)

v. RETV value of 13.0 W/m<sup>2</sup>

(5 points)

• Roof Assembly:

i. U value of Roof assembly of 1.2 W/m<sup>2</sup>K

(1 point)

ii. U value of Roof assembly of 1.0 W/m<sup>2</sup>K;

(2 points)



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

Preparation of the joinery schedule from the base drawing given from the Architect.

The Schedule is Prepared for all Towers A,B and C

The First floor has a different schedule and the 2nd to 4th floor are typical.

## SCHEDULE OF JOINERIES

|      |             |                |
|------|-------------|----------------|
| MD   | 1.07 X 2.13 | Main Door      |
| D3   | 0.91 X 2.13 | Door           |
| D26  | 0.76 X 2.13 | Door           |
| O3   | 0.91 X 2.13 | Opening        |
| FW66 | 1.95 x 1.95 | French Window  |
| W4   | 1.22 x 1.67 | Window         |
| W5   | 1.52 x 1.67 | Window         |
| W6   | 1.95 x 1.67 | Window         |
| W8   | 2.44 x 1.67 | Window         |
| KW3  | 1.00 x 1.37 | Kitchen Window |
| V2   | 0.61 x 0.91 | Ventilator     |

In some spaces due to lack of natural lighting the height of windows were varied during the course of dicussion

Hence the shedule eas revised and detail schedule was prepared based on the current conditions.

The same was upated in As built drawings and the joinery schedule for all the Towers.

The orienatation of the windows and external doors was marked in detail for furthur use in calculations related to the Building Envelope.

| BLOCK -A2 First Floor (Doors & Windows Details) |             |     |     |     |     |     |     |     |  |       |            |
|-------------------------------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|--|-------|------------|
| Flat No                                         | Sizes       | 101 | 102 | 103 | 104 | 105 | 106 | 107 |  | TOTAL | Gran Total |
| D1                                              | 1.07 x 2.20 | 1   | 1   | 1   | 1   | 1   | 1   | 1   |  | 7     | 7          |
| D2                                              | 0.91 x 2.20 | 2   | 3   | 2   | 2   | 2   | 2   | 3   |  | 16    | 16         |
| D3                                              | 0.75 x 2.20 | 2   | 3   | 2   | 2   | 2   | 2   | 3   |  | 16    | 16         |
| D4                                              | 0.75 x 2.20 |     |     |     |     |     |     |     |  | 0     | 0          |
| DW1                                             | 1.83 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   |  | 7     | 7          |
| DW2                                             | 2.13 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   |  | 7     | 7          |
| DW3                                             | 1.22 x 2.10 | 1   | 2   | 1   | 1   | 1   | 1   | 1   |  | 7     | 7          |
| DW4                                             | 1.73 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   |  | 7     | 7          |
| DW5                                             | 1.52 x 2.10 |     |     |     |     |     |     |     |  | 0     | 0          |
| DW7                                             | 1.63 x 2.10 |     |     |     |     |     |     |     |  | 0     | 0          |
| DW8                                             | 0.6 x 2.10  |     |     |     |     |     |     |     |  | 0     | 0          |
| W1                                              | 1.83 x 1.83 |     |     |     |     |     |     |     |  | 0     | 0          |
| W3                                              | 1.22 x 1.35 |     | 1   |     |     |     |     |     |  | 1     | 1          |
| W3a                                             | 1.17 x 1.35 |     |     |     |     |     |     |     |  | 0     | 0          |
| W5                                              | 1.52 x 1.35 |     |     |     |     |     |     | 2   |  | 2     | 2          |
| W7                                              | 1.63 x 1.83 |     |     |     |     |     |     |     |  | 0     | 0          |
| W6                                              | 1.22 x 1.22 |     |     |     |     |     |     |     |  | 0     | 0          |
| W8                                              | 1.50 x 1.22 |     |     |     |     |     |     | 1   |  | 1     | 1          |
| V                                               | 0.61 x 0.91 | 2   | 3   | 2   | 2   | 2   | 2   | 2   |  | 15    | 15         |

| BLOCK -A1 Second,Third & Fourth Floor (Doors & Windows Details) |             |     |     |     |     |     |     |     |     |       |            |
|-----------------------------------------------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-------|------------|
| Flat No                                                         | Sizes       | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | TOTAL | Gran Total |
| D1                                                              | 1.07 x 2.20 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8     | 24         |
| D2                                                              | 0.91 x 2.20 | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 18    | 54         |
| D3                                                              | 0.75 x 2.20 | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 18    | 54         |
| D4                                                              | 0.75 x 2.20 |     |     |     |     |     |     |     |     | 0     | 0          |
| DW1                                                             | 1.83 x 2.10 |     |     |     |     |     |     |     |     | 0     | 0          |
| DW2                                                             | 2.13 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8     | 24         |
| DW3                                                             | 1.22 x 2.10 |     |     |     |     |     |     |     |     | 0     | 0          |
| DW4                                                             | 1.73 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8     | 24         |
| DW5                                                             | 1.52 x 2.10 |     |     |     |     |     |     |     |     | 0     | 0          |
| DW7                                                             | 1.63 x 2.10 |     |     |     |     |     |     |     |     | 0     | 0          |
| DW8                                                             | 0.6 x 2.10  |     |     |     |     |     |     |     |     | 0     | 0          |
| W1                                                              | 1.83 x 1.83 | 1   | 1   | 1   | 1   | 1   | 1   | 1   |     | 7     | 21         |
| W3                                                              | 1.22 x 1.35 |     | 1   | 1   | 1   | 2   | 1   | 1   | 2   | 9     | 27         |
| W3a                                                             | 1.17 x 1.35 | 1   |     |     |     |     |     |     |     | 1     | 3          |
| W5                                                              | 1.52 x 1.35 | 1   |     |     |     |     |     |     |     | 1     | 3          |
| W7                                                              | 1.63 x 1.83 |     |     |     |     |     |     |     | 1   | 1     | 3          |
| W6                                                              | 1.22 x 1.22 |     |     |     |     |     |     |     |     | 0     | 0          |
| W8                                                              | 1.50 x 1.22 |     |     |     |     |     |     |     |     | 0     | 0          |
| V                                                               | 0.61 x 0.91 | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 18    | 54         |

## TYPICAL SCHEDULE PREPARED FOR TOWER A

| BLOCK -A1 First Floor (Doors & Windows Details) |             |     |     |     |     |     |     |     |     |       |            |
|-------------------------------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-------|------------|
| Flat No                                         | Sizes       | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | TOTAL | Gran Total |
| D1                                              | 1.07 x 2.20 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8     | 8          |
| D2                                              | 0.91 x 2.20 | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 18    | 18         |
| D3                                              | 0.75 x 2.20 | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 18    | 18         |
| D4                                              | 0.75 x 2.20 |     |     |     |     |     |     |     |     | 0     | 0          |
| DW1                                             | 1.83 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   |     | 7     | 7          |
| DW2                                             | 2.13 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8     | 8          |
| DW3                                             | 1.22 x 2.10 |     | 1   | 1   | 1   | 1   | 1   | 1   |     | 6     | 6          |
| DW4                                             | 1.73 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8     | 8          |
| DW5                                             | 1.52 x 2.10 | 1   |     |     |     |     |     |     |     | 1     | 1          |
| DW7                                             | 1.63 x 2.10 |     |     |     |     |     |     |     | 1   | 1     | 1          |
| DW8                                             | 0.6 x 2.10  |     |     |     |     |     |     |     |     | 0     | 0          |
| W1                                              | 1.83 x 1.83 |     |     |     |     |     |     |     |     | 0     | 0          |
| W3                                              | 1.22 x 1.35 |     |     |     |     | 1   |     |     | 2   | 3     | 3          |
| W3a                                             | 1.17 x 1.35 | 1   |     |     |     |     |     |     |     | 1     | 1          |
| W5                                              | 1.52 x 1.35 |     |     |     |     |     |     |     |     | 0     | 0          |
| W7                                              | 1.63 x 1.83 |     |     |     |     |     |     |     |     | 0     | 0          |
| W6                                              | 1.22 x 1.22 |     |     |     |     |     |     |     |     | 0     | 0          |
| W8                                              | 1.50 x 1.22 |     |     |     |     |     |     |     |     | 0     | 0          |
| V                                               | 0.61 x 0.91 | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 18    | 18         |

## ORIENTATION SCHEDULE FOR ALL EXTERNAL DOORS AND WINDOWS

|     |   | 1st floor | 2nd floor | 2nd fl -4th | Total |
|-----|---|-----------|-----------|-------------|-------|
| DW1 | N | 3         | 0         | 0           | 3     |
| DW2 | N | 5         | 5         | 15          | 20    |
| DW3 | N | 2         | 0         | 0           | 2     |
| DW4 | N | 4         | 4         | 12          | 16    |
| DW5 | N | 1         | 0         | 0           | 1     |
| DW7 | N | 1         | 0         | 0           | 1     |
| W1  | N | 0         | 3         | 9           | 9     |
| W3  | N | 3         | 4         | 12          | 15    |
| W3a | N | 0         | 0         | 0           | 0     |
| W5  | N | 1         | 3         | 9           | 10    |
| W7  | N | 0         | 1         | 3           | 3     |
| W8  | N | 1         | 1         | 3           | 4     |
| V   | N | 9         | 9         | 27          | 36    |
| D   | N |           |           |             | 36    |

|     |   | 1st floor | 2nd floor | 2nd fl -4th | Total |
|-----|---|-----------|-----------|-------------|-------|
| DW1 | S | 4         | 0         | 0           | 4     |
| DW2 | S | 4         | 4         | 12          | 16    |
| DW3 | S | 4         | 0         | 0           | 4     |
| DW4 | S | 4         | 4         | 12          | 16    |
| W1  | S | 0         | 4         | 12          | 12    |
| W3  | S | 1         | 5         | 15          | 16    |
| W3a | S | 0         | 0         | 0           | 0     |
| W5  | S | 0         | 0         | 0           | 0     |
| W7  | S | 0         | 0         | 0           | 0     |
| W8  | S | 0         | 0         | 0           | 0     |
| V   | S | 6         | 5         | 15          | 21    |
| D   | S |           |           |             | 32    |

|     |   | 1st floor | 2nd floor | 2nd fl -4th | Total |
|-----|---|-----------|-----------|-------------|-------|
| DW1 | E | 3         | 0         | 0           | 3     |
| DW2 | E | 2         | 2         | 6           | 8     |
| DW3 | E | 3         | 0         | 0           | 3     |
| DW4 | E | 3         | 3         | 9           | 12    |
| W1  | E | 0         | 3         | 9           | 9     |
| W3  | E | 0         | 3         | 9           | 9     |
| W3a | E | 1         | 1         | 3           | 4     |
| W5  | E | 0         | 0         | 0           | 0     |
| W7  | E | 0         | 0         | 0           | 0     |
| W8  | E | 0         | 0         | 0           | 0     |
| V   | E | 10        | 8         | 24          | 34    |
| D   | E |           |           |             | 20    |

|     |   | 1st floor | 2nd floor | 2nd fl -4th | Total |
|-----|---|-----------|-----------|-------------|-------|
| DW1 | W | 4         | 0         | 0           | 4     |
| DW2 | W | 4         | 4         | 12          | 16    |
| DW3 | W | 4         | 0         | 0           | 4     |
| DW4 | W | 4         | 4         | 12          | 16    |
| W1  | W | 0         | 4         | 12          | 12    |
| W3  | W | 0         | 4         | 12          | 12    |
| W3a | W | 0         | 0         | 0           | 0     |
| W5  | W | 1         | 0         | 0           | 1     |
| W7  | W | 0         | 0         | 0           | 0     |
| W8  | W | 0         | 0         | 0           | 0     |
| V   | W | 8         | 12        | 36          | 44    |
| D   | W |           |           |             | 32    |



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## TYPICAL SCHEDULE PREPARED FOR TOWER B

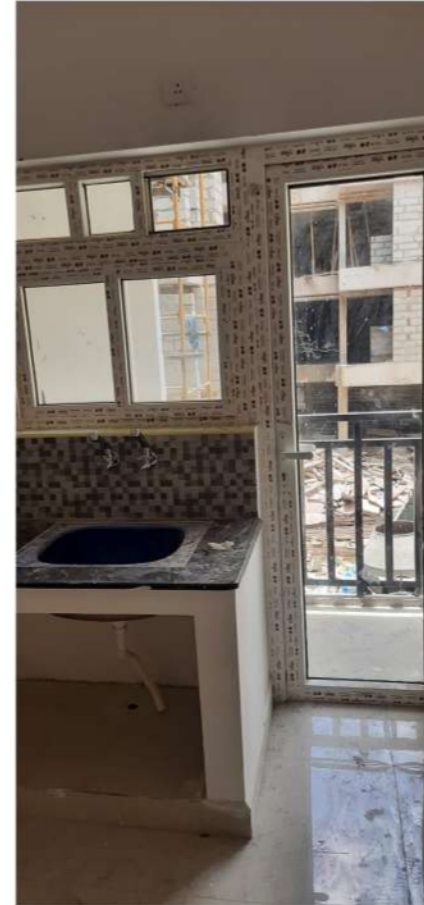
| BLOCK-B First Floor (Doors & Windows Details) |             |     |     |     |     |     |     |       |
|-----------------------------------------------|-------------|-----|-----|-----|-----|-----|-----|-------|
| Flat No                                       | Sizes       | 101 | 102 | 103 | 104 | 105 | 106 | TOTAL |
| D1                                            | 1.07 x 2.20 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| D2                                            | 0.91 x 2.20 | 3   | 3   | 2   | 2   | 3   | 2   | 15    |
| D3                                            | 0.75 x 2.20 | 3   | 3   | 2   | 2   | 3   | 2   | 15    |
| D4                                            | 0.75 x 2.20 |     |     |     |     |     |     | 0     |
| DW1                                           | 1.83 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| DW2                                           | 2.13 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| DW3                                           | 1.22 x 2.10 | 1   |     | 1   | 1   |     | 1   | 4     |
| DW4                                           | 1.73 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| DW5                                           | 1.52 x 2.10 |     |     |     |     |     |     | 0     |
| DW7                                           | 1.63 x 2.10 |     |     |     |     |     |     | 0     |
| DW8                                           | 0.6 x 2.10  |     |     |     |     |     |     | 0     |
| W1                                            | 1.83 x 1.83 |     |     |     |     | 1   |     | 1     |
| W3                                            | 1.22 x 1.35 | 1   |     |     |     |     |     | 1     |
| W3a                                           | 1.17 x 1.35 |     |     |     |     |     |     | 0     |
| W5                                            | 1.52 x 1.35 | 1   | 2   |     |     | 2   |     | 5     |
| W7                                            | 1.63 x 1.83 |     |     |     |     |     |     | 0     |
| W6                                            | 1.22 x 1.22 |     |     |     |     |     |     | 0     |
| W8                                            | 1.50 x 1.22 |     |     |     |     |     |     | 0     |
| V                                             | 0.61 x 0.91 | 3   | 3   | 2   | 2   | 3   | 2   | 15    |

| BLOCK-B Second,Third & Fourth Floor (Doors & Windows Details) |             |     |     |     |     |     |     |       |
|---------------------------------------------------------------|-------------|-----|-----|-----|-----|-----|-----|-------|
| Flat No                                                       | Sizes       | 101 | 102 | 103 | 104 | 105 | 106 | TOTAL |
| D1                                                            | 1.07 x 2.20 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| D2                                                            | 0.91 x 2.20 | 3   | 3   | 2   | 2   | 3   | 2   | 15    |
| D3                                                            | 0.75 x 2.20 | 3   | 3   | 2   | 2   | 3   | 2   | 15    |
| D4                                                            | 0.75 x 2.20 |     |     |     |     |     |     | 0     |
| DW1                                                           | 1.83 x 2.10 |     |     |     |     |     |     | 0     |
| DW2                                                           | 2.13 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| DW3                                                           | 1.22 x 2.10 |     |     |     |     |     |     | 0     |
| DW4                                                           | 1.73 x 2.10 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| DW5                                                           | 1.52 x 2.10 |     |     |     |     |     |     | 0     |
| DW7                                                           | 1.63 x 2.10 |     |     |     |     |     |     | 0     |
| DW8                                                           | 0.6 x 2.10  |     |     |     |     |     |     | 0     |
| W1                                                            | 1.83 x 1.83 | 1   | 1   | 1   | 1   | 1   | 1   | 6     |
| W3                                                            | 1.22 x 1.35 | 2   |     | 1   | 1   |     | 1   | 5     |
| W3a                                                           | 1.17 x 1.35 |     |     |     |     |     |     | 0     |
| W5                                                            | 1.52 x 1.35 | 1   | 2   |     |     | 2   |     | 5     |
| W7                                                            | 1.63 x 1.83 |     |     |     |     |     |     | 0     |
| W6                                                            | 1.52 x 1.22 |     |     |     |     |     |     | 0     |
| W8                                                            | 1.50 x 1.22 |     |     |     |     |     |     | 0     |
| V                                                             | 0.61 x 0.91 | 3   | 3   | 2   | 2   | 3   | 2   | 15    |

## TOTAL NO.OF WINDOWS AND DOORS

| Description | Size        | A   | B  | C  | Total |
|-------------|-------------|-----|----|----|-------|
| D1          | 1.07 x 2.20 | 60  | 24 | 18 | 102   |
| D2          | 0.91 x 2.20 | 82  | 60 | 49 | 191   |
| D3          | 0.75 x 2.20 | 136 | 60 | 50 | 246   |
| D4          | 0.75 x 2.20 | 0   | 0  | 1  | 1     |
| DW1         | 1.83 x 2.10 | 14  | 6  | 6  | 26    |
| DW2         | 2.13 x 2.10 | 60  | 24 | 12 | 96    |
| DW3         | 1.22 x 2.10 | 13  | 4  | 1  | 18    |
| DW4         | 1.73 x 2.10 | 60  | 24 | 24 | 108   |
| DW5         | 1.52 x 2.10 | 1   | 0  | 5  | 6     |
| DW7         | 1.63 x 2.10 | 1   | 0  | 0  | 1     |
| DW8         | 0.6 x 2.10  | 0   | 0  | 0  | 0     |
| W1          | 1.83 x 1.83 | 42  | 19 | 12 | 73    |
| W3          | 1.22 x 1.35 | 55  | 16 | 5  | 76    |
| W3a         | 1.17 x 1.35 | 4   | 0  | 0  | 4     |
| W5          | 1.52 x 1.35 | 11  | 20 | 25 | 56    |
| W7          | 1.63 x 1.83 | 3   | 0  | 0  | 3     |
| W6          | 1.22 x 1.22 | 0   | 0  | 0  | 0     |
| W8          | 1.50 x 1.22 | 4   | 0  | 0  | 4     |
| V           | 0.61 x 0.91 | 132 | 60 | 49 | 241   |

## PHOTO AT SITE



## TYPICAL SCHEDULE PREPARED FOR TOWER C - ORIENTATION INCLUDED

| BLOCK-C First Floor (Doors & Windows Details) |             |     |     |     |     |        |       |            |
|-----------------------------------------------|-------------|-----|-----|-----|-----|--------|-------|------------|
| Flat No                                       | Sizes       | 101 | 102 | 103 | 104 | M.Hall | TOTAL | Gran Total |
| D1                                            | 1.07 x 2.20 | 1   | 1   | 1   | 1   |        | 4     | 4          |
| D2                                            | 0.91 x 2.20 | 3   | 2   | 3   | 3   |        | 11    | 11         |
| D3                                            | 0.75 x 2.20 | 3   | 2   | 3   | 3   |        | 13    | 13         |
| D4                                            | 0.75 x 2.20 |     |     |     |     | 1      | 1     | 1          |
| DW1                                           | 1.83 x 2.10 | 1   | 1   | 1   | 1   |        | 4     | 4          |
| DW2                                           | 2.13 x 2.10 | 1   | 1   | 1   |     |        | 3     | 3          |
| DW3                                           | 1.22 x 2.10 |     | 1   |     |     |        | 1     | 1          |
| DW4                                           | 1.73 x 2.10 | 1   | 1   | 1   | 2   |        | 5     | 5          |
| DW5                                           | 1.52 x 2.10 |     |     | 1   |     |        | 1     | 1          |
| DW7                                           | 1.63 x 2.10 |     |     |     |     |        | 0     | 0          |
| DW8                                           | 0.6 x 2.10  |     |     |     |     |        | 0     | 0          |
| W1                                            | 1.83 x 1.83 |     |     |     |     |        | 0     | 0          |
| W3                                            | 1.22 x 1.35 |     |     |     |     | 1      | 1     | 1          |
| W3a                                           | 1.17 x 1.35 |     |     |     |     |        | 0     | 0          |
| W5                                            | 1.52 x 1.35 | 2   |     | 2   | 2   |        | 6     | 6          |
| W7                                            | 1.63 x 1.83 |     |     |     |     |        | 0     | 0          |
| W6                                            | 1.22 x 1.22 |     |     |     |     |        | 0     | 0          |
| W8                                            | 1.50 x 1.22 |     |     |     |     |        | 0     | 0          |
| V                                             | 0.61 x 0.91 | 3   | 2   | 3   | 3   | 1      | 12    | 12         |

|     |   | 1st floor | 2 & 3 Fl | 4th floor | Total |
|-----|---|-----------|----------|-----------|-------|
| DW1 | N | 0         | 2        | 0         | 2     |
| DW2 | N | 0         | 0        | 0         | 0     |
| DW3 | N | 0         | 0        | 0         | 0     |
| DW4 | N | 0         | 4        | 0         | 4     |
| DW5 | N | 0         | 2        | 0         | 2     |
| W1  | N | 0         | 0        | 0         | 0     |
| W3  | N | 0         | 0        | 0         | 0     |
| W5  | N | 1         | 2        | 1         | 4     |
| V   | N | 3         | 10       | 4         | 17    |
|     |   |           |          |           | 29    |

|     |   | 1st floor | 2 & 3 Fl | 4th floor | Total |
|-----|---|-----------|----------|-----------|-------|
| DW1 | E | 0         | 0        | 0         | 0     |
| DW2 | E | 0         | 0        | 0         | 0     |
| DW3 | E | 0         | 0        | 0         | 0     |
| DW4 | E | 0         | 0        | 0         | 0     |
| DW5 | E | 0         | 0        | 1         | 1     |
| W1  | E | 0         | 0        | 0         | 0     |
| W3  | E | 0         | 0        | 1         | 1     |
| W5  | E | 1         | 2        | 0         | 3     |
| V   | E | 1         | 2        | 0         | 3     |
|     |   |           |          |           | 8     |

|     |   | 1st floor | 2 & 3 Fl | 4th floor | Total |
|-----|---|-----------|----------|-----------|-------|
| DW1 | S | 3         | 0        | 0         | 3     |
| DW2 | S | 3         | 6        | 3         | 12    |
| DW3 | S | 1         | 0        | 0         | 1     |
| DW4 | S | 3         | 6        | 3         | 12    |
| DW5 | S | 1         | 0        | 1         | 2     |
| W1  | S | 0         | 6        | 3         | 9     |
| W3  | S | 0         | 2        | 1         | 3     |
| W5  | S | 1         | 4        | 1         | 6     |
| V   | S | 5         | 8        | 4         | 17    |
|     |   |           |          |           | 65    |

|     |   | 1st floor | 2 & 3 Fl | 4th floor | Total |
|-----|---|-----------|----------|-----------|-------|
| DW1 | W | 1         | 0        | 0         | 1     |
| DW2 | W | 0         | 0        | 0         | 0     |
| DW3 | W | 0         | 0        | 0         | 0     |
| DW4 | W | 2         | 4        | 2         | 8     |
| DW5 | W | 0         | 0        | 0         | 0     |
| W1  | W | 0         | 2        | 1         | 3     |
| W3  | W | 0         | 0        | 0         | 0     |
| W5  | W | 3         | 6        | 3         | 12    |
| V   | W | 2         | 6        | 3         | 11    |
|     |   |           |          |           | 35    |

**DW** - It is a combination of door and window together

**W** - Only Window size based on the location

**V**- Towards the duct





## Glazing Detail - Specification and Narrative

### Glazing proposed for project - Brief

RHW MR-1

The project has planned to use **Saint Gobain** glasses for the project. The following are the make & model proposed.

- SKN 154 II – Magma – 6mm Clear Glass (SGG Envision)** for Windows in all the dwelling units with VLT = 50%, SHGC = 0.28, U-value = 1.5 W/sq.m deg. K
- Equinox N – 10mm Coated Glass (SGG Equinox - Infinity)** for Glazing in Clubhouse & Gym with VLT = 30%, SHGC = 0.19, U-value = 1.6 W/sq.m deg. K

Manufacturer brochure/cut sheet of the product enclosed for the same.



### DON'T MISS THE VIEW

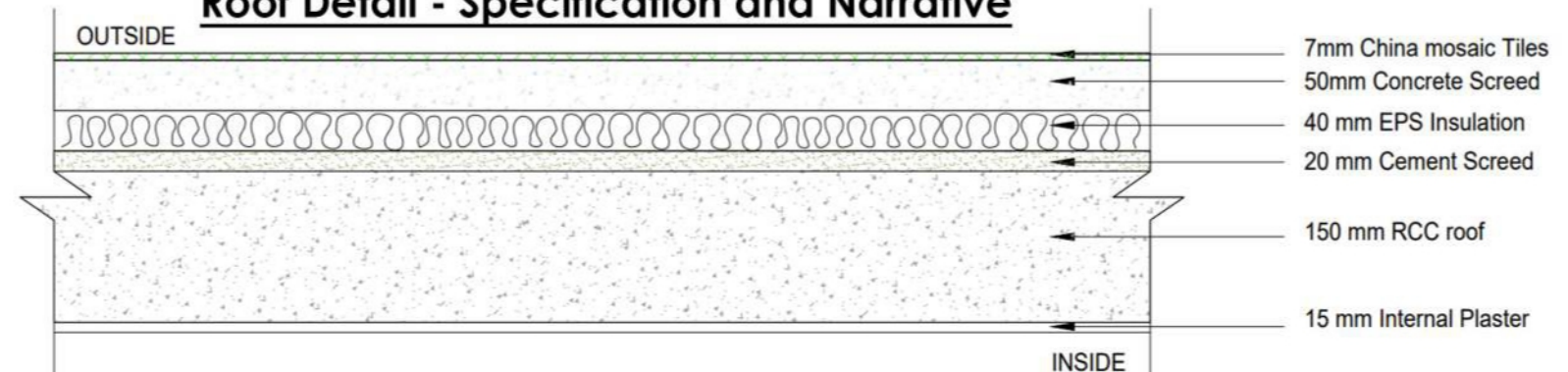
SGG Equinox is now available in jumbo sizes enabling facades with large panes so that one does not miss the view.



### Exemplary Performance: Documentation Required - Prescriptive Approach

- Details of proposed glazing along with the list of identified manufacturers and respective specifications of glazing (SHGC value, U-value and VLT). Also, specify window-to-wall ratio (WWR) for each building.
- Construction details of proposed roof (including roof insulation material, etc.) along with the U-value of the overall roof assembly of Sectional drawings of roof assembly.

## Roof Detail - Specification and Narrative



### CALCULATION OF THERMAL TRANSMITTANCE (U VALUE) OF ROOF

The roof comprises of 6 Layers and the R values of each layer is as below, The order is from outside to inside,

- Material 1- China Mosaic Tile –  $t$  (m) = 0.007, Thermal conductivity,  $k$  – 1.5 (W/m.K)  
 $R_1 = t_1/k_1 = 0.005 \text{ m}^2\text{K/W}$
- Material 2- Concrete (laid to slope) –  $t$  (m) = 0.05, Thermal conductivity,  $k$  – 1.74 (W/m.K)  
 $R_2 = t_2/k_2 = 0.05/1.74 = 0.029 \text{ m}^2\text{K/W}$
- Material 3-Expanded Polystyrene –  $t$  (m) = 0.04, Thermal conductivity,  $k$  – 0.035 (W/m.K)  
 $R_3 = t_3/k_3 = 0.04/0.035 = 1.143 \text{ m}^2\text{K/W}$
- Material 4-Cement Screed–  $t$  (m) = 0.02, Thermal conductivity,  $k$  – 0.72(W/m.K)  
 $R_4 = t_4/k_4 = 0.02/0.72 = 0.028 \text{ m}^2\text{K/W}$
- Material 5-RCC–  $t$  (m) = 0.15, Thermal conductivity,  $k$  – 1.58 (W/m.K)  
 $R_5 = t_5/k_5 = 0.15/1.58 = 0.095 \text{ m}^2\text{K/W}$
- Material 6-Internal Plaster–  $t$  (m) = 0.015, Thermal conductivity,  $k$  – 0.72(W/m.K)  
 $R_6 = t_6/k_6 = 0.015/0.72 = 0.021 \text{ m}^2\text{K/W}$

### The Total Resistance $R_t$ as follows :

$$R_t = R_{si} + R_{se} + R_1 + R_2 + R_3 + R_4 + R_5 + R_6$$

As per BEE code the Default value for  $R_{si} = 0.17 \text{ m}^2\text{K/W}$ ,  $R_{se} = 0.04 \text{ m}^2\text{K/W}$

$$R_t = 0.17 + 0.04 + 0.005 + 0.029 + 1.143 + 0.028 + 0.095 + 0.021 = 1.531 \text{ m}^2\text{K/W}$$

**Thermal Transmittance of Roof,  $U_{\text{roof}} = 1/R_t = 0.653 \text{ W/ m}^2\text{K}$**

**This value is less than the maximum U roof value of 1.2 W/m<sup>2</sup>K.**

Hence it complies with this requirement

### SUSTAINABILITY

As the world leader in glass manufacturing for the construction market, Saint-Gobain worldwide has set its sights on providing innovative solutions to two key challenges of the future:

- Environmental protection
- Energy saving

### FOR WELLBEING

Saint-Gobain's range of products and solutions, strive to bring wellbeing to each of us and the future of all by providing comfort, performance and safety.

SGG Equinox CONFIRMS TO:



To know more about glass for sustainable buildings, please visit:

[in.saint-gobain-glass.com](http://in.saint-gobain-glass.com)

### SAINT-GOBAIN GUARANTEE

**654 PPM** PURITY KA PERFECT MEASURE.

The base glass used to manufacture SGG Equinox has just about 654 PPM of iron content when compared to the industry standards which are in the order of over 1000 PPM. The lower the iron content, the glass is that much Clearer and Purer.

### PRODUCT PERFORMANCE

| GLASS DETAILS                                                      | LIGHT FACTORS     |                | ENERGY FACTORS |              |           |
|--------------------------------------------------------------------|-------------------|----------------|----------------|--------------|-----------|
|                                                                    | TRANSMITTANCE (%) | REFLECTION (%) |                | SOLAR FACTOR | U-VALUE   |
| PRODUCT                                                            |                   | EXTERNAL       | INTERNAL       | SHGC / SF    | (W/Sq.mK) |
| 6mm Coated Glass (Coating Face 2) - 12mm Air Gap - 6mm Clear Glass |                   |                |                |              |           |
| Equinox N                                                          | 30                | 13             | 10             | 0.19         | 1.6       |
| Equinox G                                                          | 25                | 10             | 10             | 0.16         | 1.6       |
| Equinox B                                                          | 19                | 8              | 10             | 0.15         | 1.6       |

Infinity range of products are manufactured in accordance with EN 1096 (Luminous and Solar Characteristics are determined as per EN 410) (Thermal Transmittance is determined as per EN 673). The performance values mentioned are based on Calumen files updates as on May 2019, and will be subject to future updates based on improved measurement systems.

SOURCE - IGBC Green Homes Rating System - Version 3.0



## Area Statement Calculation and Roof Area Calculation

Site Area = 4444.38 sq.m

Total Built-up area (excluding parking)  
= 7888.5 sq.m

No. of Dwelling Units (Flats) = 102

No. of Blocks/Towers = 3 (Tower A,  
Tower B and Tower C)

### Roof Area

#### 1. Tower A (A1 & A2)

Total Roof Area = 1266.90 sq.m (13,630 sq.ft)

Net Exposed Roof area = 957.28 sq.m  
(10,299 sq.ft)

#### 2. Tower B

Total Roof Area = 513.76 sq.m (5527.23 sq.ft)

Net Exposed Roof area = 393.05 sq.m  
(4229 sq.ft)

#### 3. Tower C

Total Roof Area = 467.90 sq.m (5034 sq.ft)

Net Exposed Roof area = 349.60 sq.m  
(3761 sq.ft)

Total Roof Area = 1266.90 + 513.76 + 467.90  
= 2247.65 sq.m

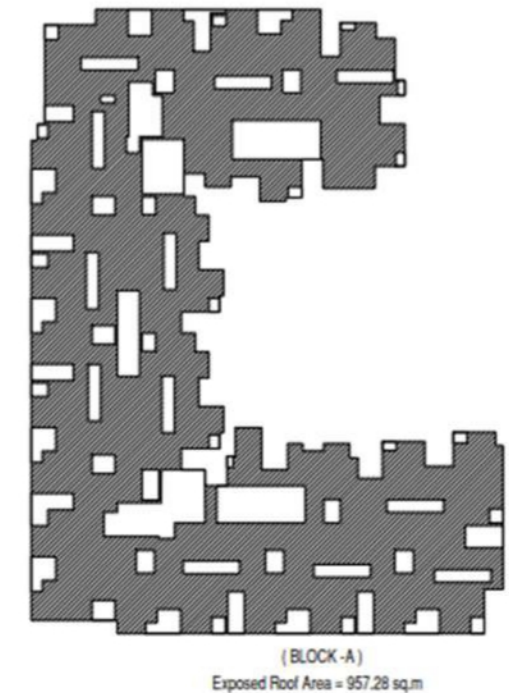
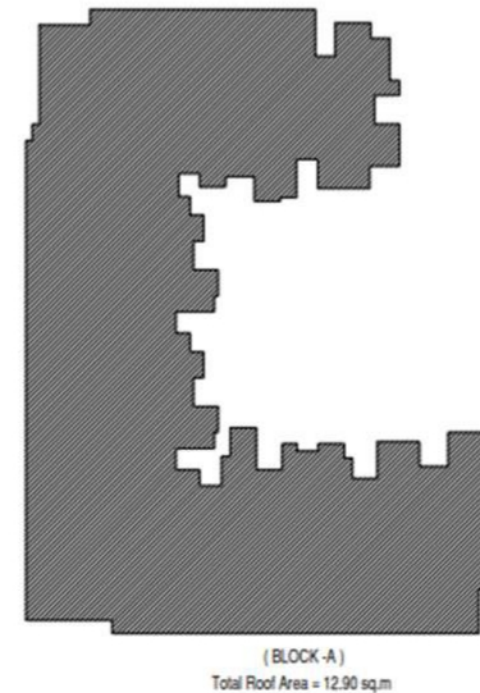
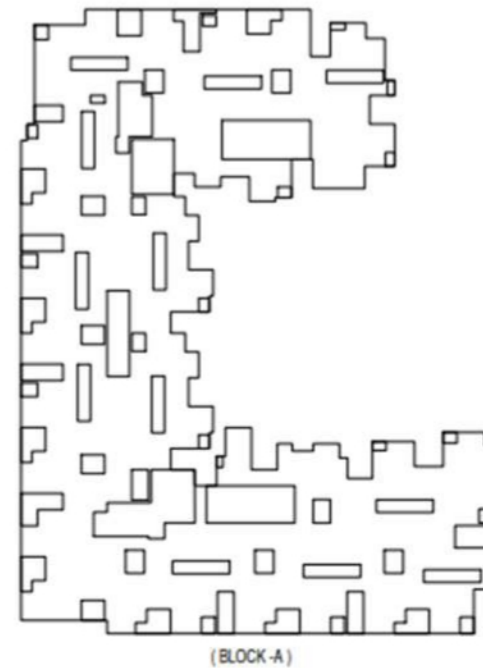
Total Exposed Roof Area = 957.28 + 393.05  
+ 349.60 = 1699.95 sq.m

(excluding OTS, Headroom or  
any other installation on roof)

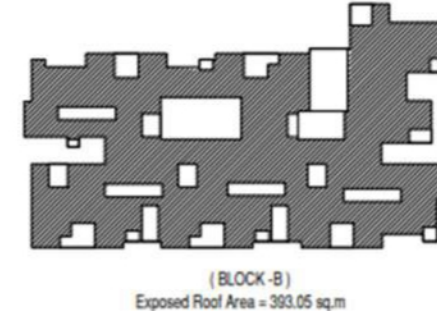
SOURCE - IGBC Green Homes Rating System - Version 3.0

## Scope of work : CADD plans for the Roof Area calculations and the narrative for the same

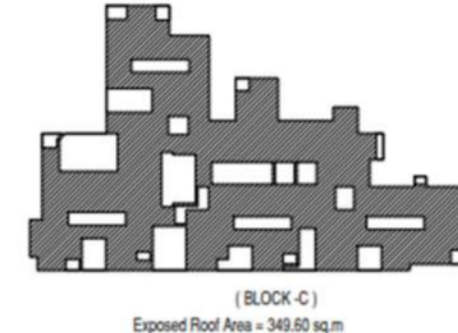
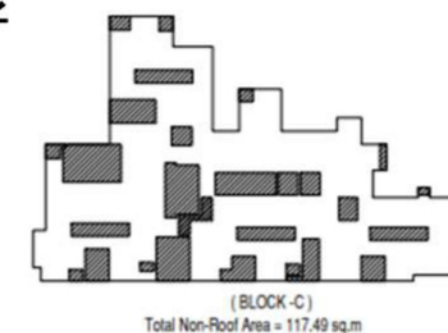
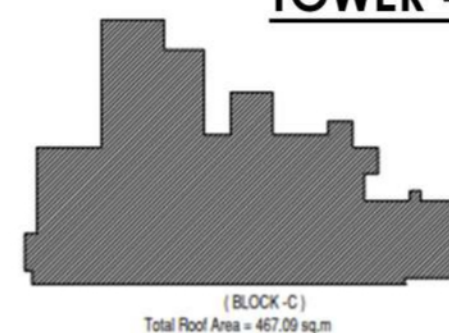
### TOWER - A



### TOWER - B



### TOWER - C





## Alternate Water Heating Systems

### EE Credit 2 Points: 3

Intent:

Encourage use of alternate water heating systems to improve energy efficiency.

Compliance Options:

Provide any one or combination of the below technologies for atleast 50 % of hot water requirement:

- ☑ Natural Gas (or) LPG based systems
- ☑ Heat pump with minimum of COP 3.2
- ☑ Solar water heating systems

Note:

- The minimum hot water requirement for domestic purposes should be considered as 20 liters per person per day.
- The minimum temperature requirement of hot water to be considered for domestic applications can range between 35-40 deg C.

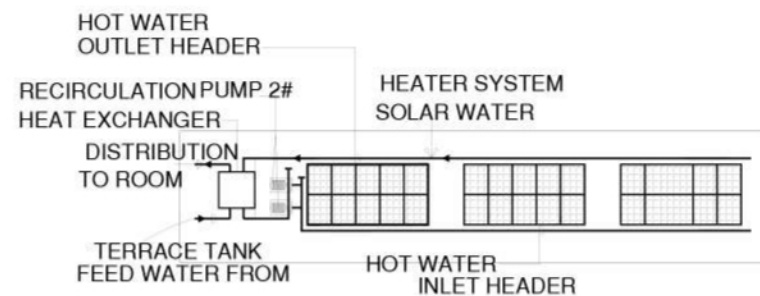
Points are awarded as below:

| Hot water through alternative heating systems as a percentage of total hot water requirement of the building(s) | Points |
|-----------------------------------------------------------------------------------------------------------------|--------|
| 50 %                                                                                                            | 1      |
| 75 %                                                                                                            | 2      |
| 95 %                                                                                                            | 3      |

## DOCUMENTATION:

For Solar Water Heater System

- No. of Dwelling Units = 102 (62 + 40)  
( 2-BHK = 62 Nos. & 3-BHK = 40 Nos.)
- Baseline Consideration of No. of Occupants as per IGBC  
2-BHK = 4 Occupants  
3-BHK = 5 Occupants



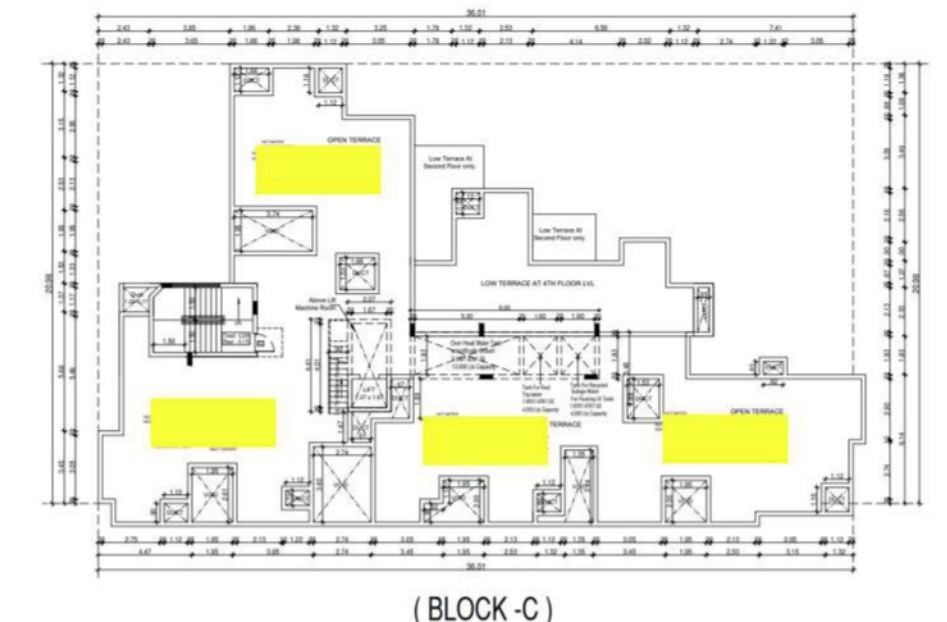
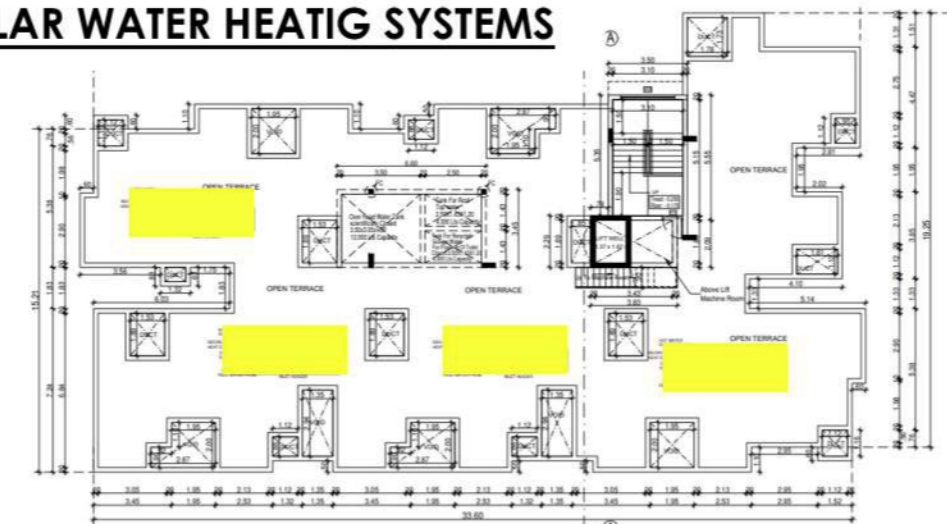
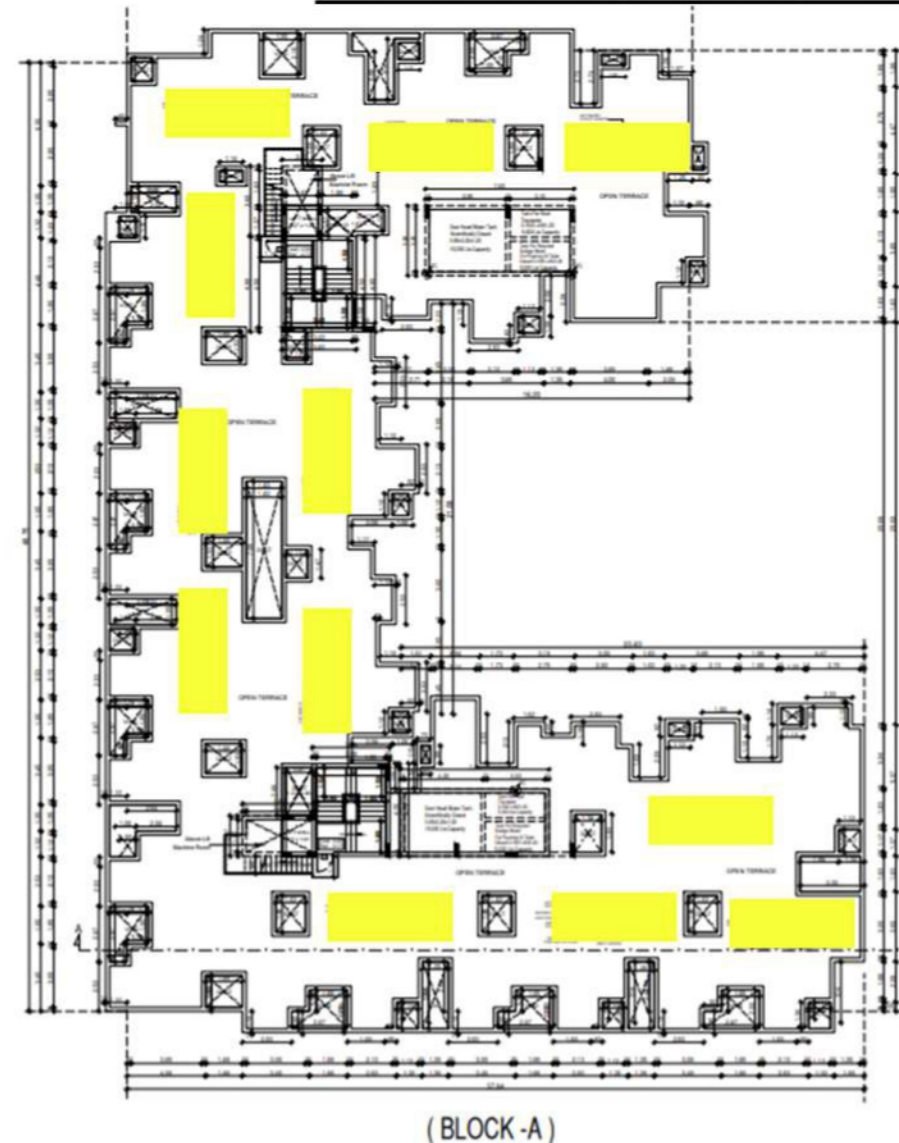
**Total Req. provision of Solar Hot water = 2560 + 1080 + 840**  
**= 4480 litres**

SOURCE - IGBC Green Homes Rating System - Version 3.0

## CALCULATION OF THE REQUIRED SOLAR HOT WATER

| Tower = A                 |                                                            | Tower = B                 |                                                            | Tower = C                 |                                                           |
|---------------------------|------------------------------------------------------------|---------------------------|------------------------------------------------------------|---------------------------|-----------------------------------------------------------|
| 2-BHK Flats               | 44                                                         | 2-BHK Flats               | 24                                                         | 2-BHK Flats               | 6                                                         |
| 3-BHK Flats               | 16                                                         | 3-BHK Flats               | 12                                                         | 3-BHK Flats               | 12                                                        |
| Total No. of Flats        | 60                                                         | Total No. of Flats        | 12                                                         | Total No. of Flats        | 18                                                        |
| Total No. of Occupants    | 256<br>( 2-BHK = 44X4 & 3-BHK = 16X5)                      | Total No. of Occupants    | 108<br>( 2-BHK = 12X4 & 3-BHK = 12X5)                      | Total No. of Occupants    | 84<br>( 2-BHK = 6X4 & 3-BHK = 12X5)                       |
| Min. Hot Water per person | 20 lit/person/day                                          | Min. Hot Water per person | 20 lit/person/day                                          | Min. Hot Water per person | 20 lit/person/day                                         |
| Total Hot water req.      | 5120 litres (256x20)                                       | Total Hot water req.      | 2160 litres (108x20)                                       | Total Hot water req.      | 1680 litres (84x20)                                       |
| Required Provision        | <b>2560 litres</b><br>(50% of total hot water requirement) | Required Provision        | <b>1080 litres</b><br>(50% of total hot water requirement) | Required Provision        | <b>840 litres</b><br>(50% of total hot water requirement) |

## TENTATIVE PLACEMENT OF THE SOLAR WATER HEATING SYSTEMS





# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## RETV CALCULATION BASED ON ECO-NIVAS SAMHITA

**Table 1 :** Calculation of Opaque area and Openable area

**Table 2 :** Calculation of Envelope Area

**Table 3:** Calculation of Openable Window to Floor Area Ratio

**Table 4:** Calculation of Window to wall Ratio

**Table 5:** Calculation of SHGC for Non- Opaque opening based on the orientations

**Table 6:** Calculation of the Term 1 - Area \* Opaque area \* Orientation factor

**Table 7:** Calculation of Term 2 - Area \* Non-Opaque area \* Orientation factor

**Table 8:** Calculation of Term 3 - Area \* Equivalent SHGC \* Orientation factor

## TOWER - A CALCULATIONS

| Door-Window Schedule |           |                 |                   |                    |                 |                  |
|----------------------|-----------|-----------------|-------------------|--------------------|-----------------|------------------|
| Window/Door          | Name      | No. of Openings | Opening width (m) | Opening height (m) | Glass width (m) | Glass height (m) |
| Door                 | DW1/3/5/7 | 29.00           | 1.83              | 2.13               | 1.65            | 1.92             |
| Window-Casement      | DW2       | 60.00           | 1.52              | 1.67               | 1.37            | 1.50             |
| Window-Casement      | DW4       | 60.00           | 1.00              | 1.37               | 0.90            | 1.23             |
| Window-Casement      | W1/7      | 45.00           | 1.83              | 1.83               | 1.65            | 1.65             |
| Window-Casement      | W3/3a/5   | 70.00           | 1.52              | 1.35               | 1.37            | 1.22             |
| Window-Casement      | W8        | 4.00            | 1.50              | 1.22               | 1.35            | 1.10             |
| Other                | V         | 132.00          | 0.61              | 0.91               | 0.61            | 0.91             |
| Door                 | D         | 120.00          | 0.76              | 2.13               | 0.68            | 1.92             |

| Material details |           |
|------------------|-----------|
| Glass            |           |
| U value (W/m2-K) | 1.5       |
| SHGC             | 0.28      |
| VLT              | 50        |
| Frame            |           |
| Material         | UPVC      |
| U value (W/m2-K) | 5.23      |
| Wall             |           |
| Material         | 200mm AAC |
| U value (W/m2-K) | 0.78      |

| Wall Details |                     |                     |                          |
|--------------|---------------------|---------------------|--------------------------|
| Orientation  | Envelope Length (m) | Envelope height (m) | Total Envelope Area (m2) |
| North        | 52.93               | 12.00               | 635.16                   |
| South        | 41.10               | 12.00               | 493.20                   |
| East         | 54.14               | 12.00               | 649.68                   |
| West         | 48.92               | 12.00               | 587.04                   |
| Total        |                     |                     | 2365.08                  |

| Opening Details |                             |                 |                   |                    |            |            | Non-Opaque (Glass) Area |                         |                 |                  |                            |                                  | Opaque Area 1 (Frame) |                        |
|-----------------|-----------------------------|-----------------|-------------------|--------------------|------------|------------|-------------------------|-------------------------|-----------------|------------------|----------------------------|----------------------------------|-----------------------|------------------------|
| Orientation     | Window/Door/Ventilator Name | No. of Openings | Opening width (m) | Opening height (m) | H overhang | V overhang | Opening area (m2)       | Total Opening area (m2) | Glass width (m) | Glass height (m) | Glass area in opening (m2) | Total Glass area in opening (m2) | Opaque area (m2)      | Total Opaque area (m2) |
| North           | DW1/3/5/7                   | 7.00            | 1.83              | 2.13               | 1.10       | 3.00       | 3.90                    | 27.29                   | 1.65            | 1.92             | 3.16                       | 22.14                            | 0.74                  | 5.15                   |
| North           | DW2                         | 20.00           | 1.52              | 1.67               | 1.10       | 2.54       | 2.54                    | 50.77                   | 1.37            | 1.50             | 2.06                       | 41.10                            | 0.48                  | 9.67                   |
| North           | DW4                         | 16.00           | 1.00              | 1.37               | 1.10       | 2.24       | 1.37                    | 21.92                   | 0.90            | 1.23             | 1.11                       | 17.71                            | 0.26                  | 4.21                   |
| North           | W1/7                        | 12.00           | 1.83              | 1.83               | 0.60       | 1.83       | 3.35                    | 40.19                   | 1.65            | 1.65             | 2.72                       | 32.67                            | 0.63                  | 7.52                   |
| North           | W3/3a/5                     | 25.00           | 1.52              | 1.35               | 0.60       | 1.35       | 2.05                    | 51.30                   | 1.37            | 1.22             | 1.67                       | 41.79                            | 0.38                  | 9.52                   |
| North           | W8                          | 4.00            | 1.50              | 1.22               | 0.60       | 1.22       | 1.83                    | 7.32                    | 1.35            | 1.10             | 1.49                       | 5.94                             | 0.35                  | 1.38                   |
| North           | V                           | 36.00           | 0.61              | 0.91               | 0.00       | 0.00       | 0.56                    | 19.98                   | 0.61            | 0.91             | 0.56                       | 19.98                            | 0.00                  | 0.00                   |
| North           | D                           | 36.00           | 0.76              | 2.13               | 1.10       | 3.00       | 1.62                    | 58.28                   | 0.68            | 1.92             | 1.31                       | 47.00                            | 0.31                  | 11.28                  |
| South           | DW1/3/5/7                   | 8.00            | 1.83              | 2.13               | 1.10       | 3.00       | 3.90                    | 31.18                   | 1.65            | 1.92             | 3.16                       | 25.30                            | 0.74                  | 5.89                   |
| South           | DW2                         | 16.00           | 1.52              | 1.67               | 1.10       | 2.54       | 2.54                    | 40.61                   | 1.37            | 1.50             | 2.06                       | 32.88                            | 0.48                  | 7.73                   |
| South           | DW4                         | 16.00           | 1.00              | 1.37               | 1.10       | 2.24       | 1.37                    | 21.92                   | 0.90            | 1.23             | 1.11                       | 17.71                            | 0.26                  | 4.21                   |
| South           | W1/7                        | 12.00           | 1.83              | 1.83               | 0.60       | 1.83       | 3.35                    | 40.19                   | 1.65            | 1.65             | 2.72                       | 32.67                            | 0.63                  | 7.52                   |
| South           | W3/3a/5                     | 16.00           | 1.52              | 1.35               | 0.60       | 1.35       | 2.05                    | 32.83                   | 1.37            | 1.22             | 1.67                       | 26.74                            | 0.38                  | 6.09                   |
| South           | W8                          | 0.00            | 1.50              | 1.22               | 0.60       | 1.22       | 1.83                    | 0.00                    | 1.35            | 1.10             | 1.49                       | 0.00                             | 0.35                  | 0.00                   |
| South           | V                           | 21.00           | 0.61              | 0.91               | 0.00       | 0.00       | 0.56                    | 11.66                   | 0.61            | 0.91             | 0.56                       | 11.66                            | 0.00                  | 0.00                   |
| South           | D                           | 32.00           | 0.76              | 2.13               | 1.10       | 3.00       | 1.62                    | 51.80                   | 0.68            | 1.92             | 1.31                       | 41.78                            | 0.31                  | 10.02                  |
| East            | DW1/3/5/7                   | 6.00            | 1.83              | 2.13               | 1.10       | 3.00       | 3.90                    | 23.39                   | 1.65            | 1.92             | 3.16                       | 18.97                            | 0.74                  | 4.41                   |
| East            | DW2                         | 8.00            | 1.52              | 1.67               | 1.10       | 2.54       | 2.54                    | 20.31                   | 1.37            | 1.50             | 2.06                       | 16.44                            | 0.48                  | 3.87                   |
| East            | DW4                         | 12.00           | 1.00              | 1.37               | 1.10       | 2.24       | 1.37                    | 16.44                   | 0.90            | 1.23             | 1.11                       | 13.28                            | 0.26                  | 3.16                   |
| East            | W1/7                        | 9.00            | 1.83              | 1.83               | 0.60       | 1.83       | 3.35                    | 30.14                   | 1.65            | 1.65             | 2.72                       | 24.50                            | 0.63                  | 5.64                   |
| East            | W3/3a/5                     | 13.00           | 1.52              | 1.35               | 0.60       | 1.35       | 2.05                    | 26.68                   | 1.37            | 1.22             | 1.67                       | 21.73                            | 0.38                  | 4.95                   |
| East            | W8                          | 0.00            | 1.50              | 1.22               | 0.60       | 1.22       | 1.83                    | 0.00                    | 1.35            | 1.10             | 1.49                       | 0.00                             | 0.35                  | 0.00                   |
| East            | V                           | 34.00           | 0.61              | 0.91               | 0.00       | 0.00       | 0.56                    | 18.87                   | 0.61            | 0.91             | 0.56                       | 18.87                            | 0.00                  | 0.00                   |
| East            | D                           | 20.00           | 0.76              | 2.13               | 1.10       | 3.00       | 1.62                    | 32.38                   | 0.68            | 1.92             | 1.31                       | 26.11                            | 0.31                  | 6.26                   |
| West            | DW1/3/5/7                   | 8.00            | 1.83              | 2.13               | 1.10       | 3.00       | 3.90                    | 31.18                   | 1.65            | 1.92             | 3.16                       | 25.30                            | 0.74                  | 5.89                   |
| West            | DW2                         | 16.00           | 1.52              | 1.67               | 1.10       | 2.54       | 2.54                    | 40.61                   | 1.37            | 1.50             | 2.06                       | 32.88                            | 0.48                  | 7.73                   |
| West            | DW4                         | 16.00           | 1.00              | 1.37               | 1.10       | 2.24       | 1.37                    | 21.92                   | 0.90            | 1.23             | 1.11                       | 17.71                            | 0.26                  | 4.21                   |
| West            | W1/7                        | 12.00           | 1.83              | 1.83               | 0.60       | 1.83       | 3.35                    | 40.19                   | 1.65            | 1.65             | 2.72                       | 32.67                            | 0.63                  | 7.52                   |
| West            | W3/3a/5                     | 13.00           | 1.52              | 1.35               | 0.60       | 1.35       | 2.05                    | 26.68                   | 1.37            | 1.22             | 1.67                       | 21.73                            | 0.38                  | 4.95                   |
| West            | W8                          | 0.00            | 1.50              | 1.22               | 0.60       | 1.22       | 1.83                    | 0.00                    | 1.35            | 1.10             | 1.49                       | 0.00                             | 0.35                  | 0.00                   |
| West            | V                           | 44.00           | 0.61              | 0.91               | 0.00       | 0.00       | 0.56                    | 24.42                   | 0.61            | 0.91             | 0.56                       | 24.42                            | 0.00                  | 0.00                   |
| West            | D                           | 32.00           | 0.76              | 2.13               | 1.10       | 3.00       | 1.62                    | 51.80                   | 0.68            | 1.92             | 1.31                       | 41.78                            | 0.31                  | 10.02                  |

| Calculation of equivalent SHGC of non-opaque openings for each orientation |                                 |                    |                    |                |          |         |                 |           |             |                 |           |         |
|----------------------------------------------------------------------------|---------------------------------|--------------------|--------------------|----------------|----------|---------|-----------------|-----------|-------------|-----------------|-----------|---------|
| Orientation                                                                | Window/Door/V<br>entilator Name | No. of<br>Openings | Glass area<br>(m2) | PF<br>overhang | PF right | PF left | ESF<br>overhang | ESF right | ESF<br>left | ESF side<br>fin | ESF total | SHGC eq |
| North                                                                      | DW1/3/5/7                       | 7.00               | 3.16               | 0.37           | 0        | 0       | 0.860           | 1         | 1           | 1               | 0.86      | 0.2408  |
| North                                                                      | DW2                             | 20.00              | 2.06               | 0.43           | 0        | 0       | 0.838           | 1         | 1           | 1               | 0.838     | 0.23464 |
| North                                                                      | DW4                             | 16.00              | 1.11               | 0.49           | 0        | 0       | 0.820           | 1         | 1           | 1               | 0.82      | 0.2296  |
| North                                                                      | W1/7                            | 12.00              | 2.72               | 0.33           | 0        | 0       | 0.860           | 1         | 1           | 1               | 0.86      | 0.2408  |
| North                                                                      | W3/3a/5                         | 25.00              | 1.67               | 0.44           | 0        | 0       | 0.838           | 1         | 1           | 1               | 0.838     | 0.23464 |
| North                                                                      | W8                              | 4.00               | 1.49               | 0.49           | 0        | 0       | 0.820           | 1         | 1           | 1               | 0.82      | 0.2296  |
| North                                                                      | V                               | 36.00              | 0.56               | 0              | 0        | 0       | 1               | 1         | 1           | 1               | 1         | 0.28    |
| North                                                                      | D                               | 36.00              | 1.31               | 0.37           | 0        | 0       | 0.860           | 1         | 1           | 1               | 0.86      | 0.2408  |
| South                                                                      | DW1/3/5/7                       | 8.00               | 3.16               | 0.37           | 0        | 0       | 0.754           | 1         | 1           | 1               | 0.754     | 0.21112 |
| South                                                                      | DW2                             | 16.00              | 2.06               | 0.43           | 0        | 0       | 0.708           | 1         | 1           | 1               | 0.708     | 0.19824 |
| South                                                                      | DW4                             | 16.00              | 1.11               | 0.49           | 0        | 0       | 0.675           | 1         | 1           | 1               | 0.675     | 0.189   |
| South                                                                      | W1/7                            | 12.00              | 2.72               | 0.33           | 0        | 0       | 0.754           | 1         | 1           | 1               | 0.754     | 0.21112 |
| South                                                                      | W3/3a/5                         | 16.00              | 1.67               | 0.44           | 0        | 0       | 0.708           | 1         | 1           | 1               | 0.708     | 0.19824 |
| South                                                                      | W8                              | 0.00               | 1.49               | 0.49           | 0        | 0       | 0.675           | 1         | 1           | 1               | 0.675     | 0.189   |
| South                                                                      | V                               | 21.00              | 0.56               | 0              | 0        | 0       | 1               | 1         | 1           | 1               | 1         | 0.28    |
| South                                                                      | D                               | 32.00              | 1.31               | 0.37           | 0        | 0       | 0.754           | 1         | 1           | 1               | 0.754     | 0.21112 |
| East                                                                       | DW1/3/5/7                       | 6.00               | 3.16               | 0.37           | 0        | 0       | 0.797           | 1         | 1           | 1               | 0.797     | 0.22316 |
| East                                                                       | DW2                             | 8.00               | 2.06               | 0.43           | 0        | 0       | 0.747           | 1         | 1           | 1               | 0.747     | 0.20916 |
| East                                                                       | DW4                             | 12.00              | 1.11               | 0.49           | 0        | 0       | 0.705           | 1         | 1           | 1               | 0.705     | 0.1974  |
| East                                                                       | W1/7                            | 9.00               | 2.72               | 0.33           | 0        | 0       | 0.797           | 1         | 1           | 1               | 0.797     | 0.22316 |
| East                                                                       | W3/3a/5                         | 13.00              | 1.67               | 0.44           | 0        | 0       | 0.747           | 1         | 1           | 1               | 0.747     | 0.20916 |
| East                                                                       | W8                              | 0.00               | 1.49               | 0.49           | 0        | 0       | 0.705           | 1         | 1           | 1               | 0.705     | 0.1974  |
| East                                                                       | V                               | 34.00              | 0.56               | 0              | 0        | 0       | 1               | 1         | 1           | 1               | 1         | 0.28    |
| East                                                                       | D                               | 20.00              | 1.31               | 0.37           | 0        | 0       | 0.797           | 1         | 1           | 1               | 0.797     | 0.22316 |
| West                                                                       | DW1/3/5/7                       | 8.00               | 3.16               | 0.37           | 0        | 0       | 0.796           | 1         | 1           | 1               | 0.796     | 0.22288 |
| West                                                                       | DW2                             | 16.00              | 2.06               | 0.43           | 0        | 0       | 0.746           | 1         | 1           | 1               | 0.746     | 0.20888 |
| West                                                                       | DW4                             | 16.00              | 1.11               | 0.49           | 0        | 0       | 0.705           | 1         | 1           | 1               | 0.705     | 0.1974  |
| West                                                                       | W1/7                            | 12.00              | 2.72               | 0.33           | 0        | 0       | 0.796           | 1         | 1           | 1               | 0.796     | 0.22288 |
| West                                                                       | W3/3a/5                         | 13.00              | 1.67               | 0.44           | 0        | 0       | 0.746           | 1         | 1           | 1               | 0.746     | 0.20888 |
| West                                                                       | W8                              | 0.00               | 1.49               | 0.49           | 0        | 0       | 0.705           | 1         | 1           | 1               | 0.705     | 0.1974  |
| West                                                                       | V                               | 44.00              | 0.56               | 0              | 0        | 0       | 1               | 1         | 1           | 1               | 1         | 0.28    |
| West                                                                       | D                               | 32.00              | 1.31               | 0.37           | 0        | 0       | 0.796           | 1         | 1           | 1               | 0.796     | 0.22288 |

SOURCE - IGBC Green Homes Rating System - Version 3.0, Eco-Niwas Samhita 2018



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## CALCULATION OF TERM -1, 2 AND 3

| Calculation for Term-I |                                         |          |               |                        |           |
|------------------------|-----------------------------------------|----------|---------------|------------------------|-----------|
| Orientation            | Component                               | Area (a) | U - value (b) | Orientation factor (c) | a x b x c |
| North                  | Opaque Area 2 ( Frame in Windows/Doors) | 48.71    | 5.23          | 0.659                  | 167.8915  |
| North                  | Opaque Area 1 (Wall)                    | 358.12   | 0.78          | 0.659                  | 184.0806  |
| South                  | Opaque Area 2 ( Frame in Windows/Doors) | 41.46    | 5.23          | 0.966                  | 209.4456  |
| South                  | Opaque Area 1 ( Wall)                   | 263.00   | 0.78          | 0.966                  | 198.1689  |
| East                   | Opaque Area 2 (Frame in Windows/Doors)  | 28.29    | 5.23          | 1.155                  | 170.8692  |
| East                   | Opaque Area 1 ( Wall)                   | 481.48   | 0.78          | 1.155                  | 433.7652  |
| West                   | Opaque Area 2 (Frame in Windows/Doors)  | 40.31    | 5.23          | 1.156                  | 243.7377  |
| West                   | Opaque Area 1 ( Wall)                   | 350.23   | 0.78          | 1.156                  | 315.7986  |
| North-East             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 0.906                  | 0         |
| North-East             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 0.906                  | 0         |
| North-West             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 0.908                  | 0         |
| North-West             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 0.908                  | 0         |
| South-East             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 1.125                  | 0         |
| South-East             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 1.125                  | 0         |
| South-West             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 1.124                  | 0         |
| South-West             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 1.124                  | 0         |
| Total A                |                                         |          |               |                        | 1923.76   |

| Calculation for Term-II |                         |          |               |                        |           |
|-------------------------|-------------------------|----------|---------------|------------------------|-----------|
| Orientation             | Component               | Area (a) | U - value (b) | Orientation factor (c) | a x b x c |
| North                   | Non opaque (Glass) Area | 228.33   | 1.50          | 0.66                   | 225.70    |
| South                   | Non opaque (Glass) Area | 188.74   | 1.50          | 0.97                   | 273.48    |
| East                    | Non opaque (Glass) Area | 139.91   | 1.50          | 1.16                   | 242.40    |
| West                    | Non opaque (Glass) Area | 196.49   | 1.50          | 1.16                   | 340.72    |
| North-East              | Non opaque (Glass) Area | 0.00     | 1.50          | 0.91                   | 0.00      |
| North-West              | Non opaque (Glass) Area | 0.00     | 1.50          | 0.91                   | 0.00      |
| South-East              | Non opaque (Glass) Area | 0.00     | 1.50          | 1.13                   | 0.00      |
| South-West              | Non opaque (Glass) Area | 0.00     | 1.50          | 1.12                   | 0.00      |
| Total B                 |                         |          |               |                        | 1082.30   |

### RET<sub>V</sub> for Design Case

| Calculation of RET <sub>V</sub> |                                                 |                  |
|---------------------------------|-------------------------------------------------|------------------|
| RET <sub>V</sub>                | [(a x Total A) + (b x Total B) + (c x Total C)] |                  |
|                                 | A <sub>ev</sub>                                 |                  |
| a                               | 5.15                                            |                  |
| b                               | 1.31                                            |                  |
| c                               | 65.21                                           |                  |
| RET <sub>V</sub> Obtained       | 8.02                                            | W/m <sup>2</sup> |
| Max RET <sub>V</sub>            | 15                                              | W/m <sup>2</sup> |

|                  |     |
|------------------|-----|
| Compliance Check | Yes |
|------------------|-----|

| Calculation for Term-III |           |          |             |                        |           |
|--------------------------|-----------|----------|-------------|------------------------|-----------|
| Orientation              | Component | Area (a) | SHGC eq (b) | Orientation factor (c) | a x b x c |
| North                    | DW1/3/5/7 | 22.14    | 0.2408      | 0.659                  | 3.512649  |
| North                    | DW2       | 41.10    | 0.23464     | 0.659                  | 6.355201  |
| North                    | DW4       | 17.71    | 0.2296      | 0.659                  | 2.679939  |
| North                    | W1/7      | 32.67    | 0.2408      | 0.659                  | 5.184311  |
| North                    | W3/3a/5   | 41.79    | 0.23464     | 0.659                  | 6.461121  |
| North                    | W8        | 5.94     | 0.2296      | 0.659                  | 0.89876   |
| North                    | V         | 19.98    | 0.28        | 0.659                  | 3.687374  |
| North                    | D         | 47.00    | 0.2408      | 0.659                  | 7.458552  |
| South                    | DW1/3/5/7 | 25.30    | 0.21112     | 0.966                  | 5.159306  |
| South                    | DW2       | 32.88    | 0.19824     | 0.966                  | 6.296515  |
| South                    | DW4       | 17.71    | 0.189       | 0.966                  | 3.233751  |
| South                    | W1/7      | 32.67    | 0.21112     | 0.966                  | 6.662783  |
| South                    | W3/3a/5   | 26.74    | 0.19824     | 0.966                  | 5.121165  |
| South                    | W8        | 0.00     | 0.189       | 0.966                  | 0         |
| South                    | V         | 11.66    | 0.28        | 0.966                  | 3.153012  |
| South                    | D         | 41.78    | 0.21112     | 0.966                  | 8.52053   |
| East                     | DW1/3/5/7 | 18.97    | 0.22316     | 1.155                  | 4.8904    |
| East                     | DW2       | 16.44    | 0.20916     | 1.155                  | 3.971572  |
| East                     | DW4       | 13.28    | 0.1974      | 1.155                  | 3.028712  |
| East                     | W1/7      | 24.50    | 0.22316     | 1.155                  | 6.315514  |
| East                     | W3/3a/5   | 21.73    | 0.20916     | 1.155                  | 5.249094  |
| East                     | W8        | 0.00     | 0.1974      | 1.155                  | 0         |
| East                     | V         | 18.87    | 0.28        | 1.155                  | 6.103658  |
| East                     | D         | 26.11    | 0.22316     | 1.155                  | 6.730363  |
| West                     | DW1/3/5/7 | 25.30    | 0.22288     | 1.156                  | 6.517991  |
| West                     | DW2       | 32.88    | 0.20888     | 0                      | 0         |
| West                     | DW4       | 17.71    | 0.1974      | 0                      | 0         |
| West                     | W1/7      | 32.67    | 0.22288     | 0                      | 0         |
| West                     | W3/3a/5   | 21.73    | 0.20888     | 0                      | 0         |
| West                     | W8        | 0.00     | 0.1974      | 0                      | 0         |
| Total C                  |           |          |             |                        | 117.19    |

### RET<sub>V</sub> for Conventional Case

| Calculation of RET <sub>V</sub> |                                                 |                  |
|---------------------------------|-------------------------------------------------|------------------|
| RET <sub>V</sub>                | [(a x Total A) + (b x Total B) + (c x Total C)] |                  |
|                                 | A <sub>ev</sub>                                 |                  |
| a                               | 5.15                                            |                  |
| b                               | 1.31                                            |                  |
| c                               | 65.21                                           |                  |
| RET <sub>V</sub> Obtained       | 15.74                                           | W/m <sup>2</sup> |
| Max RET <sub>V</sub>            | 15                                              | W/m <sup>2</sup> |

|                  |    |
|------------------|----|
| Compliance Check | No |
|------------------|----|

### Exemplary Performance:

#### 1. Prescriptive Approach:

- Building Envelope: RET<sub>V</sub> value of 12.0 W/m<sup>2</sup>

SOURCE - IGBC Green Homes Rating System - Version 3.0, Eco-Niwas Samhita 2018



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## TOWER -B - CALCULATION OF TERM -1, 2 AND 3

| Calculation for Term-I |                                         |          |               |                        |           |
|------------------------|-----------------------------------------|----------|---------------|------------------------|-----------|
| Orientation            | Component                               | Area (a) | U - value (b) | Orientation factor (c) | a x b x c |
| North                  | Opaque Area 2 ( Frame in Windows/Doors) | 22.29    | 5.23          | 0.659                  | 76.83335  |
| North                  | Opaque Area 1 ( Wall)                   | 269.65   | 0.78          | 0.659                  | 138.6065  |
| South                  | Opaque Area 2 ( Frame in Windows/Doors) | 29.08    | 5.23          | 0.966                  | 146.9179  |
| South                  | Opaque Area 1 ( Wall)                   | 232.02   | 0.78          | 0.966                  | 174.819   |
| East                   | Opaque Area 2 (Frame in Windows/Doors)  | 11.25    | 5.23          | 1.155                  | 67.96396  |
| East                   | Opaque Area 1 ( Wall)                   | 159.85   | 0.78          | 1.155                  | 144.0104  |
| West                   | Opaque Area 2 (Frame in Windows/Doors)  | 1.52     | 5.23          | 1.156                  | 9.204248  |
| West                   | Opaque Area 1 ( Wall)                   | 216.69   | 0.78          | 1.156                  | 195.3813  |
| North-East             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 0.906                  | 0         |
| North-East             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 0.906                  | 0         |
| North-West             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 0.908                  | 0         |
| North-West             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 0.908                  | 0         |
| South-East             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 1.125                  | 0         |
| South-East             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 1.125                  | 0         |
| South-West             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 1.124                  | 0         |
| South-West             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 1.124                  | 0         |
| Total A                |                                         |          |               |                        | 953.74    |

| Calculation for Term-II |                         |          |               |                        |           |
|-------------------------|-------------------------|----------|---------------|------------------------|-----------|
| Orientation             | Component               | Area (a) | U - value (b) | Orientation factor (c) | a x b x c |
| North                   | Non opaque (Glass) Area | 102.26   | 1.50          | 0.66                   | 101.08    |
| South                   | Non opaque (Glass) Area | 133.10   | 1.50          | 0.97                   | 192.87    |
| East                    | Non opaque (Glass) Area | 59.90    | 1.50          | 1.16                   | 103.77    |
| West                    | Non opaque (Glass) Area | 12.79    | 1.50          | 1.16                   | 22.18     |
| North-East              | Non opaque (Glass) Area | 0.00     | 1.50          | 0.91                   | 0.00      |
| North-West              | Non opaque (Glass) Area | 0.00     | 1.50          | 0.91                   | 0.00      |
| South-East              | Non opaque (Glass) Area | 0.00     | 1.50          | 1.13                   | 0.00      |
| South-West              | Non opaque (Glass) Area | 0.00     | 1.50          | 1.12                   | 0.00      |
| Total B                 |                         |          |               |                        | 419.90    |

### RETv for Design Case

| Calculation of RETV |                                                 |      |
|---------------------|-------------------------------------------------|------|
| RETv                | [(a x Total A) + (b x Total B) + (c x Total C)] |      |
|                     | A ev                                            |      |
| a                   | 5.15                                            |      |
| b                   | 1.31                                            |      |
| c                   | 65.21                                           |      |
| RETv Obtained       | 7.42                                            | W/m2 |
| Max RETv            | 15                                              | W/m2 |

Compliance Check Yes

| Calculation for Term-III |           |          |             |                        |           |
|--------------------------|-----------|----------|-------------|------------------------|-----------|
| Orientation              | Component | Area (a) | SHGC eq (b) | Orientation factor (c) | a x b x c |
| North                    | DW1       | 3.17     | 0.2408      | 0.659                  | 0.502721  |
| North                    | DW3       | 2.11     | 0.21924     | 0.659                  | 0.30514   |
| North                    | DW2       | 16.44    | 0.23464     | 0.659                  | 2.54208   |
| North                    | DW4       | 8.86     | 0.2296      | 0.659                  | 1.339969  |
| North                    | W1        | 19.06    | 0.2408      | 0.659                  | 3.024181  |
| North                    | W3        | 25.07    | 0.23464     | 0.659                  | 3.876673  |
| North                    | V         | 6.66     | 0.28        | 0.659                  | 1.229125  |
| North                    | D         | 20.89    | 0.2408      | 0.659                  | 3.314912  |
| South                    | DW1       | 9.50     | 0.21112     | 0.966                  | 1.938264  |
| South                    | DW3       | 4.22     | 0.17584     | 0.966                  | 0.717495  |
| South                    | DW2       | 24.66    | 0.19824     | 0.966                  | 4.722386  |
| South                    | DW4       | 13.28    | 0.189       | 0.966                  | 2.425313  |
| South                    | W1        | 24.50    | 0.21112     | 0.966                  | 4.997087  |
| South                    | W3        | 16.71    | 0.19824     | 0.966                  | 3.200728  |
| South                    | V         | 8.88     | 0.28        | 0.966                  | 2.402295  |
| South                    | D         | 31.33    | 0.21112     | 0.966                  | 6.390398  |
| East                     | DW1       | 3.17     | 0.22316     | 1.155                  | 0.816551  |
| East                     | DW3       | 2.11     | 0.17248     | 1.155                  | 0.420741  |
| East                     | DW2       | 8.22     | 0.20916     | 1.155                  | 1.985786  |
| East                     | DW4       | 4.43     | 0.1974      | 1.155                  | 1.009571  |
| East                     | W1        | 8.17     | 0.22316     | 1.155                  | 2.105171  |
| East                     | W3        | 11.70    | 0.20916     | 1.155                  | 2.826435  |
| East                     | V         | 11.66    | 0.28        | 1.155                  | 3.769906  |
| East                     | D         | 10.44    | 0.22316     | 1.155                  | 2.692145  |
| West                     | DW1       | 0.00     | 0.22288     | 1.156                  | 0         |
| West                     | DW3       | 0.00     | 0.1722      | 0                      | 0         |
| West                     | DW2       | 0.00     | 0.20888     | 0                      | 0         |
| West                     | DW4       | 0.00     | 0.1974      | 0                      | 0         |
| West                     | W1        | 0.00     | 0.22288     | 0                      | 0         |
| West                     | W3        | 6.69     | 0.20888     | 0                      | 0         |
| Total C                  |           |          |             |                        | 58.56     |

### RETv for Conventional Case

| Calculation of RETV |                                                 |      |
|---------------------|-------------------------------------------------|------|
| RETv                | [(a x Total A) + (b x Total B) + (c x Total C)] |      |
|                     | A ev                                            |      |
| a                   | 5.15                                            |      |
| b                   | 1.31                                            |      |
| c                   | 65.21                                           |      |
| RETv Obtained       | 14.35                                           | W/m2 |
| Max RETv            | 15                                              | W/m2 |

Compliance Check Yes

### Exemplary Performance:

#### 1. Prescriptive Approach:

- Building Envelope: RETv value of 12.0 W/m2



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## TOWER -C - CALCULATION OF TERM -1, 2 AND 3

| Calculation for Term-I |                                         |          |               |                        |           |
|------------------------|-----------------------------------------|----------|---------------|------------------------|-----------|
| Orientation            | Component                               | Area (a) | U - value (b) | Orientation factor (c) | a x b x c |
| North                  | Opaque Area 2 ( Frame in Windows/Doors) | 6.77     | 5.23          | 0.659                  | 23.33273  |
| North                  | Opaque Area 1 ( Wall)                   | 386.93   | 0.78          | 0.659                  | 198.889   |
| South                  | Opaque Area 2 ( Frame in Windows/Doors) | 29.41    | 5.23          | 0.966                  | 148.5693  |
| South                  | Opaque Area 1 ( Wall)                   | 86.75    | 0.78          | 0.966                  | 65.36725  |
| East                   | Opaque Area 2 (Frame in Windows/Doors)  | 2.26     | 5.23          | 1.155                  | 13.64015  |
| East                   | Opaque Area 1 ( Wall)                   | 418.35   | 0.78          | 1.155                  | 376.8904  |
| West                   | Opaque Area 2 (Frame in Windows/Doors)  | 11.79    | 5.23          | 1.156                  | 71.29096  |
| West                   | Opaque Area 1 ( Wall)                   | 183.17   | 0.78          | 1.156                  | 165.1651  |
| North-East             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 0.906                  | 0         |
| North-East             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 0.906                  | 0         |
| North-West             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 0.908                  | 0         |
| North-West             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 0.908                  | 0         |
| South-East             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 1.125                  | 0         |
| South-East             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 1.125                  | 0         |
| South-West             | Opaque Area 2 (Frame in Windows/Doors)  | 0.00     | 5.23          | 1.124                  | 0         |
| South-West             | Opaque Area 1 ( Wall)                   | 0.00     | 0.78          | 1.124                  | 0         |
| Total A                |                                         |          |               |                        | 1063.14   |

| Calculation for Term-II |                         |          |               |                        |           |
|-------------------------|-------------------------|----------|---------------|------------------------|-----------|
| Orientation             | Component               | Area (a) | U - value (b) | Orientation factor (c) | a x b x c |
| North                   | Non opaque (Glass) Area | 38.42    | 1.50          | 0.66                   | 37.98     |
| South                   | Non opaque (Glass) Area | 135.60   | 1.50          | 0.97                   | 196.48    |
| East                    | Non opaque (Glass) Area | 11.51    | 1.50          | 1.16                   | 19.95     |
| West                    | Non opaque (Glass) Area | 56.79    | 1.50          | 1.16                   | 98.48     |
| North-East              | Non opaque (Glass) Area | 0.00     | 1.50          | 0.91                   | 0.00      |
| North-West              | Non opaque (Glass) Area | 0.00     | 1.50          | 0.91                   | 0.00      |
| South-East              | Non opaque (Glass) Area | 0.00     | 1.50          | 1.13                   | 0.00      |
| South-West              | Non opaque (Glass) Area | 0.00     | 1.50          | 1.12                   | 0.00      |
| Total B                 |                         |          |               |                        | 352.89    |

### RET V for Design Case

| Calculation of RETV |                                                 |      |
|---------------------|-------------------------------------------------|------|
| RET V               | [(a x Total A) + (b x Total B) + (c x Total C)] |      |
|                     | A ev                                            |      |
| a                   | 5.15                                            |      |
| b                   | 1.31                                            |      |
| c                   | 65.21                                           |      |
| RET V Obtained      | 6.14                                            | W/m2 |
| Max RETV            | 15                                              | W/m2 |

Compliance Check Yes

| Calculation for Term-III |           |          |             |                        |           |
|--------------------------|-----------|----------|-------------|------------------------|-----------|
| Orientation              | Component | Area (a) | SHGC eq (b) | Orientation factor (c) | a x b x c |
| North                    | DW1/3/5/7 | 12.65    | 0.2408      | 0.659                  | 2.007228  |
| North                    | DW2       | 0.00     | 0.23464     | 0.659                  | 0         |
| North                    | DW4       | 4.43     | 0.2296      | 0.659                  | 0.669985  |
| North                    | W1/7      | 0.00     | 0.2408      | 0.659                  | 0         |
| North                    | W3/3a/5   | 6.69     | 0.23464     | 0.659                  | 1.033779  |
| North                    | V         | 9.44     | 0.28        | 0.659                  | 1.74126   |
| North                    | D Kitchen | 5.22     | 0.2408      | 0.659                  | 0.828728  |
| North                    | D Bedroom | 0.00     | 0.2408      | 0.659                  | 0         |
| South                    | DW1/3/5/7 | 18.97    | 0.21112     | 0.966                  | 3.86948   |
| South                    | DW2       | 19.80    | 0.19824     | 0.966                  | 3.791697  |
| South                    | DW4       | 13.28    | 0.189       | 0.966                  | 2.425313  |
| South                    | W1/7      | 24.50    | 0.21112     | 0.966                  | 4.997087  |
| South                    | W3/3a/5   | 15.04    | 0.19824     | 0.966                  | 2.880655  |
| South                    | V         | 9.44     | 0.28        | 0.966                  | 2.552439  |
| South                    | D Kitchen | 15.67    | 0.21112     | 0.966                  | 3.195199  |
| South                    | D Bedroom | 18.89    | 0.21112     | 0.966                  | 3.853034  |
| East                     | DW1/3/5/7 | 3.16     | 0.22316     | 1.155                  | 0.815067  |
| East                     | DW2       | 0.00     | 0.20916     | 1.155                  | 0         |
| East                     | DW4       | 0.00     | 0.1974      | 1.155                  | 0         |
| East                     | W1/7      | 0.00     | 0.22316     | 1.155                  | 0         |
| East                     | W3/3a/5   | 6.69     | 0.20916     | 1.155                  | 1.615106  |
| East                     | V         | 1.67     | 0.28        | 1.155                  | 0.538558  |
| East                     | D Kitchen | 0.00     | 0.22316     | 1.155                  | 0         |
| East                     | D Bedroom | 0.00     | 0.22316     | 1.155                  | 0         |
| West                     | DW1/3/5/7 | 3.16     | 0.22288     | 1.156                  | 0.814749  |
| West                     | DW2       | 0.00     | 0.20888     | 0                      | 0         |
| West                     | DW4       | 8.86     | 0.1974      | 0                      | 0         |
| West                     | W1/7      | 8.17     | 0.22288     | 0                      | 0         |
| West                     | W3/3a/5   | 20.06    | 0.20888     | 0                      | 0         |
| West                     | V         | 6.11     | 0.28        | 0                      | 0         |
| Total C                  |           |          |             |                        | 37.63     |

### RET V for Conventional Case

| Calculation of RETV |                                                 |      |
|---------------------|-------------------------------------------------|------|
| RET V               | [(a x Total A) + (b x Total B) + (c x Total C)] |      |
|                     | A ev                                            |      |
| a                   | 5.15                                            |      |
| b                   | 1.31                                            |      |
| c                   | 65.21                                           |      |
| RET V Obtained      | 10.44                                           | W/m2 |
| Max RETV            | 15                                              | W/m2 |

Compliance Check Yes

### Exemplary Performance:

#### 1. Prescriptive Approach:

- Building Envelope: RETV value of 12.0 W/m2



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## TOWER A - Openable Window to Wall Ratio

| Orientation | Opening Name | Opening Area (m2) | Non-opaque(glass) area in opening (m2) | No.of Openings | Total Opening (glass) area (m2) | Total non-opaque (glass) area (m2) |
|-------------|--------------|-------------------|----------------------------------------|----------------|---------------------------------|------------------------------------|
| North       | DW1          | 3.90              | 3.16                                   | 3              | 11.70                           | 9.48                               |
| North       | DW2          | 2.54              | 2.06                                   | 20             | 50.80                           | 41.20                              |
| North       | DW3          | 2.60              | 2.10                                   | 2              | 5.20                            | 4.20                               |
| North       | DW4          | 1.37              | 1.11                                   | 16             | 21.92                           | 17.76                              |
| North       | DW5          | 3.24              | 2.62                                   | 1              | 3.24                            | 2.62                               |
| North       | DW7          | 3.47              | 2.81                                   | 1              | 3.47                            | 2.81                               |
| North       | W1           | 3.35              | 2.71                                   | 9              | 30.15                           | 24.39                              |
| North       | W3           | 1.65              | 1.33                                   | 15             | 24.75                           | 19.95                              |
| North       | W3a          | 1.58              | 1.28                                   | 0              | 0.00                            | 0.00                               |
| North       | W5           | 2.05              | 1.66                                   | 10             | 20.50                           | 16.60                              |
| North       | W7           | 2.98              | 2.42                                   | 3              | 8.94                            | 7.26                               |
| North       | W8           | 1.83              | 1.48                                   | 4              | 7.32                            | 5.92                               |
| North       | V            | 0.56              | 0.56                                   | 36             | 20.16                           | 20.16                              |
| North       | D            | 1.62              | 1.31                                   | 36             | 58.32                           | 47.16                              |
| South       | DW1          | 3.90              | 3.16                                   | 4              | 15.60                           | 12.64                              |
| South       | DW2          | 2.54              | 2.06                                   | 16             | 40.64                           | 32.96                              |
| South       | DW3          | 2.60              | 2.10                                   | 4              | 10.40                           | 8.40                               |
| South       | DW4          | 1.37              | 1.11                                   | 16             | 21.92                           | 17.76                              |
| South       | DW5          | 3.24              | 2.62                                   | 0              | 0.00                            | 0.00                               |
| South       | DW7          | 3.47              | 2.81                                   | 0              | 0.00                            | 0.00                               |
| South       | W1           | 3.35              | 2.71                                   | 12             | 40.20                           | 32.52                              |
| South       | W3           | 1.65              | 1.33                                   | 16             | 26.40                           | 21.28                              |
| South       | W3a          | 1.58              | 1.28                                   | 0              | 0.00                            | 0.00                               |
| South       | W5           | 2.05              | 1.66                                   | 0              | 0.00                            | 0.00                               |
| South       | W7           | 2.98              | 2.42                                   | 0              | 0.00                            | 0.00                               |
| South       | W8           | 1.83              | 1.48                                   | 0              | 0.00                            | 0.00                               |
| South       | V            | 0.56              | 0.56                                   | 21             | 11.76                           | 11.76                              |
| South       | D            | 1.62              | 1.31                                   | 32             | 51.84                           | 41.92                              |
| East        | DW1          | 3.90              | 3.16                                   | 3              | 11.70                           | 9.48                               |
| East        | DW2          | 2.54              | 2.06                                   | 8              | 20.32                           | 16.48                              |
| East        | DW3          | 2.60              | 2.10                                   | 3              | 7.80                            | 6.30                               |
| East        | DW4          | 1.37              | 1.11                                   | 12             | 16.44                           | 13.32                              |
| East        | DW5          | 3.24              | 2.62                                   | 0              | 0.00                            | 0.00                               |
| East        | DW7          | 3.47              | 2.81                                   | 0              | 0.00                            | 0.00                               |
| East        | W1           | 3.35              | 2.71                                   | 9              | 30.15                           | 24.39                              |
| East        | W3           | 1.65              | 1.33                                   | 9              | 14.85                           | 11.97                              |
| East        | W3a          | 1.58              | 1.28                                   | 4              | 6.32                            | 5.12                               |
| East        | W5           | 2.05              | 1.66                                   | 0              | 0.00                            | 0.00                               |
| East        | W7           | 2.98              | 2.42                                   | 0              | 0.00                            | 0.00                               |
| East        | W8           | 1.83              | 1.48                                   | 0              | 0.00                            | 0.00                               |
| East        | V            | 0.56              | 0.56                                   | 34             | 19.04                           | 19.04                              |
| East        | D            | 1.62              | 1.31                                   | 20             | 32.40                           | 26.20                              |
| West        | DW1          | 3.90              | 3.16                                   | 4              | 15.60                           | 12.64                              |
| West        | DW2          | 2.54              | 2.06                                   | 16             | 40.64                           | 32.96                              |
| West        | DW3          | 2.60              | 2.10                                   | 4              | 10.40                           | 8.40                               |
| West        | DW4          | 1.37              | 1.11                                   | 16             | 21.92                           | 17.76                              |
| West        | DW5          | 3.24              | 2.62                                   | 0              | 0.00                            | 0.00                               |
| West        | DW7          | 3.47              | 2.81                                   | 0              | 0.00                            | 0.00                               |
| West        | W1           | 3.35              | 2.71                                   | 12             | 40.20                           | 32.52                              |
| West        | W3           | 1.65              | 1.33                                   | 12             | 19.80                           | 15.96                              |
| West        | W3a          | 1.58              | 1.28                                   | 0              | 0.00                            | 0.00                               |
| West        | W5           | 2.05              | 1.66                                   | 1              | 2.05                            | 1.66                               |
| West        | W7           | 2.98              | 2.42                                   | 0              | 0.00                            | 0.00                               |
| West        | W8           | 1.83              | 1.48                                   | 0              | 0.00                            | 0.00                               |
| West        | V            | 0.56              | 0.56                                   | 44             | 24.64                           | 24.64                              |
| West        | D            | 1.62              | 1.31                                   | 32             | 51.84                           | 41.92                              |
| Total       |              |                   |                                        |                | 871.34                          | 719.51                             |

## TOWER A - Openable Window to Floor Ratio

| Opening Name                            | Opening Area (m2) | Openable area (m2) | No of openings | Total Openable Area |
|-----------------------------------------|-------------------|--------------------|----------------|---------------------|
| DW1                                     | 3.90              | 3.51               | 14             | 49.14               |
| DW2                                     | 2.54              | 2.29               | 60             | 137.16              |
| DW3                                     | 2.60              | 2.34               | 13             | 30.42               |
| DW4                                     | 1.37              | 1.23               | 60             | 73.98               |
| DW5                                     | 3.24              | 2.92               | 1              | 2.92                |
| DW7                                     | 3.47              | 3.12               | 1              | 3.12                |
| W1                                      | 3.35              | 3.02               | 42             | 126.63              |
| W3                                      | 1.65              | 1.49               | 55             | 81.68               |
| W3a                                     | 1.58              | 1.42               | 4              | 5.69                |
| W5                                      | 2.05              | 1.85               | 11             | 20.30               |
| W7                                      | 2.98              | 2.68               | 3              | 8.05                |
| W8                                      | 1.83              | 1.65               | 4              | 6.59                |
| V                                       | 0.56              | 0.50               | 132            | 66.53               |
| D                                       | 1.62              | 1.46               | 120            | 174.96              |
| Openable Area for all flats (Aopenable) |                   |                    | 520            | 787.15              |

| No.of Floors | Type of DU | No.of DU | Area of Dwelling Unit (m2) | Total Area |
|--------------|------------|----------|----------------------------|------------|
| 4            | 2-BHK      | 44       | 76.46                      | 3364.24    |
| 4            | 3-BHK      | 16       | 94.11                      | 1505.76    |
| Total        |            |          |                            | 4870       |

$$\text{WFR op} = \text{A openable} / \text{A carpet} = 787.15 / 4870$$

$$= 15.76\% = 16.16\%$$

$$\text{WWR} = \text{A non-opaque} / \text{A envelope} = 719.51 / 2365.08$$

$$= 0.30422 = 30.42\%$$

### Comparison of Proposed and Baseline Parameters

| Building Element                         | Proposed Design Input                                                                      | Baseline Design Inputs (Annexure - 1)                           |
|------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Envelope                                 |                                                                                            |                                                                 |
| Exterior wall Construction               | U-Factor = 0.775 W/(m2 .K) - (12mm Plaster on both sides of the AAC wall)                  | U-Factor = 5.6783 W/(m2 .K)                                     |
| Roof Construction                        | 15mm RCC Slab + 40mm EPS insulation + 7mm China mosaic Tiles - U- Factor = 0.653 W/(m2 .K) | Insulation entirely over the deck - U-Factor = 0.4997 W/(m2 .K) |
| Window-to-Gross wall ratio               | Tower A - 30.42% , Tower B - 21.46%, Tower C - 17.69%                                      | 19.20%                                                          |
| Fenestration Type                        | 6mm Single Glazed Unit                                                                     | All Orientations                                                |
| Fenestration U- Factor                   | 1.6 W/(m2 .K)                                                                              | 4.99 W/(m2 .K)                                                  |
| Fenestration SHGC North                  | 0.28                                                                                       | 0.38                                                            |
| Fenestration SHGC Non-North              | 0.28                                                                                       | 0.38                                                            |
| Fenestration visible Light Transmittance | 0.50                                                                                       | 0.30                                                            |
| Shading Devices                          | Yes in the form of Overhangs for windows of bedrooms and living rooms                      | None                                                            |

SOURCE - IGBC Green Homes Rating System - Version 3.0, Eco-Niwas Samhita 2018



# RESIDENTIAL PROJECT - DECCAN ESTATES - IGBC RATING

## Eco - Niwas Samhita Compliance Check Tool

▼ Deccan Prakruti

Check Compliance (Deccan Prakruti)

▼ Block-B

Check Compliance (Block-B)

Wall

Window

Ventilator

Door

Roof



Ministry of Power  
Government of India

सत्यमेव जयते

ECBC-R Compliance

Eco Niwas Compliance can be checked for Residential Project through this Tool. The 1 and 2nd Interface is for the Project Details and the other interfaces we input the Building parameters details. Finally the Report is generated to check for the compliance.

### Interface -1 - Details of Project

Project Name

Deccan Prakruti

State

Tamil Nadu

City

Chennai

Climate

WARM & HUMID

Latitude

< 23.5° N

Total no. of Residential Blocks

3

Block Type for Compliance Check

No. of Blocks

Add Block

Project Relocate

Block Type for Compliance Check

Number of Blocks

Block-B

1

### Interface -2 - Block Details

Dwelling Unit Details :

Type of Dwelling Unit

No. of Units

Carpet Area/DU (m²)

Add Unit

| S.No. | Type of DU | No. of Units | Carpet Area/DU (m²) | Total Area (m²) |
|-------|------------|--------------|---------------------|-----------------|
| 1     | 2-BHK      | 12           | 78.5                | 942.0           |
| 2     | 3-BHK      | 12           | 95.87               | 1150.44         |

### Window Details

No. of Window

PARENT WALL

IS SHADE PRESENT ?

Select

| S.No. | No. of Window | Wall Name | Shading present | Overhang | Sidelin-L | Sidelin-R | Depth (OH) | Distance (OH) | Depth (SF-L) | Distance (SF-L) | Depth (SF-R) | Distance (SF-R) |
|-------|---------------|-----------|-----------------|----------|-----------|-----------|------------|---------------|--------------|-----------------|--------------|-----------------|
| 1     | 1             | AAC       | ✓               | ✓        |           |           | 1.1        | 3.0           | 0.0          | 0.0             | 0.0          | 0.0             |

### Interface -3 - Wall Parameters Input & Envelope Area

Wall Construction Details:

Name

Define Wall

Wall Layers

Thickness(mm)

Uvalue(W/m².K)

Add Layer

| S.No.               | Wall Layer | Thickness (mm) | R Value (K.m²/W) |
|---------------------|------------|----------------|------------------|
| No content in table |            |                |                  |

Add Construction

Wall Area Details:

Wall Construction

Orientation

Height (m)

Width (m)

Area (m²)

Add Wall

| S.No. | Wall Name | Orientation         | Height(m) | Width(m) | Area(m²) | Delete |
|-------|-----------|---------------------|-----------|----------|----------|--------|
| 1     | AAC       | N (337.6° - 22.5°)  | 12.0      | 32.85    | 394.2    |        |
| 2     | AAC       | E (67.6° - 112.5°)  | 12.0      | 19.25    | 231.0    |        |
| 3     | AAC       | S (157.6° - 202.5°) | 12.0      | 32.85    | 394.2    |        |
| 4     | AAC       | W (247.6° - 292.5°) | 12.0      | 19.25    | 231.0    |        |

### Interface -4 - Window Construction and its Shading details

Window Construction Details:

Window Name

Window Shape

Height (m)

Width (m)

Area (m²)

No. of Windows

Window Type

Open %

Fixed %

Add Window

Glazing Details:

Glazing %

Height (m)

Height

Width (m)

Width

Define Glazing

Select

U-value(W/m².K)

0

SHGC

0

VLT %

0

Opaque Elements Details:

Opaque %

Definition Method

Material Type

Thickness (m)

U-value(W/m².K)

Add Window

| S.No. | Window Name | Window Shape | Height(m) | Width(m) | Area(m²) | No. of Window | Window Type |
|-------|-------------|--------------|-----------|----------|----------|---------------|-------------|
| 1     | DW1         | Rectangle    | 2.13      | 1.83     | 3.9      | 5             | Caseme      |
| 2     | DW2         | Rectangle    | 1.67      | 1.52     | 2.54     | 24            | Caseme      |
| 3     | DW3         | Rectangle    | 2.13      | 1.22     | 2.6      | 4             | Caseme      |
| 4     | DW4         | Rectangle    | 1.37      | 1.0      | 1.37     | 24            | Caseme      |
| 5     | W1          | Rectangle    | 1.83      | 1.83     | 3.35     | 19            | Caseme      |
| 6     | W3          | Rectangle    | 1.35      | 1.22     | 1.65     | 16            | Caseme      |
| 7     | W5          | Rectangle    | 1.35      | 1.52     | 2.05     | 20            | Caseme      |

Total No. of Windows 112

### Interface -5- Ventilator and Door Construction Details

Ventilator Construction Details:

Ventilator Name

Ventilator Shape

Height (m)

Width (m)

Area (m²)

No. of Ventilator

Ventilator Type

Open %

Fixed %

Add Ventilator

Glazing Details:

Glazing %

Height (m)

Height

Width (m)

Width

Define Glazing

Select

U-value(W/m².K)

0

SHGC

0

VLT %

0

Opaque Elements Details:

Opaque %

Definition Method

Material Type

Thickness (m)

U-value(W/m².K)

Add Ventilator

| S.No. | Ventilator Name | Ventilator Shape | Height(m) | Width(m) | Area(m²) | No. of Ventilator | Ventilator Type |
|-------|-----------------|------------------|-----------|----------|----------|-------------------|-----------------|
| 1     | V               | Rectangle        | 0.91      | 0.61     | 0.56     | 60                | Caseme          |

Door Construction Details:

Door Name

Door Shape

Height (m)

Width (m)

Area (m²)

No. of Door

Door Type

Open %

Fixed %

Add Door

Glazing Details:

Glazing %

Height (m)

Height

Width (m)

Width

Define Glazing

Select

U-value(W/m².K)

0

SHGC

0

VLT %

0

Opaque Elements Details:

Opaque %

Definition Method

Material Type

Thickness (m)

U-value(W/m².K)

Add Door

| S.No. | Door Name | Door Shape | Height(m) | Width(m) | Area(m²) | No. of Door | Door Type | % Fixed |
|-------|-----------|------------|-----------|----------|----------|-------------|-----------|---------|
| 1     | D         | Rectangle  | 2.13      | 0.76     | 1.62     | 48          | Casement  | 10.0    |

### Interface -6- COMPLIANCE REPORT

Eco-Niwas Samhita Compliance Result

Block Block-B

|                                                        | Calculated | Criteria | Status        |
|--------------------------------------------------------|------------|----------|---------------|
| WFRop (Window to Floor Area Ratio)                     | 15.75      | 16.66    | Non-Compliant |
| VLT (%) (Visible Light Transmittance)                  | 50.0       | 27.0     | Compliant     |
| Uroof (W/m².K) (Thermal Transmittance -Roof)           | 0.0        | 1.2      | Wrong Value   |
| RETV (W/m²) (Residential Envelope Transmittance Value) | 5.46       | 15.0     | Compliant     |

Generate Report



## FACTORY PROJECT - DETAILS

Prince pipes - Jaipur  
Site Area - 64493.91 sqm  
Climate Type - Hot and Dry  
Typology - Factory

**SCOPE OF WORK** - Marking the location of the LANDSCAPE ELEMENTS based on the Legends Given the classification was done. Also the Percentage area was calculated for different landscape elements.  
Lighting Analysis for the spaces.

### SITE SELECTION & PLANNING

Natural Topography and Landscape, 20%, 30%

Construction Submittal

SS Credit 4.0

Points: 2

#### Goal

Minimise disturbances to the factory building site so as to reduce long-term environmental impacts.

#### Compliance Options

Avoid site disturbance by retaining the natural topography of the site and / or landscape at least 20% of the site area or meet the local regulation, whichever is higher. Points are awarded as follows:

#### Points for retaining natural topography or landscaping

| Percentage of site area with natural topography and / or landscaped area | Points |
|--------------------------------------------------------------------------|--------|
| ≥ 20 %                                                                   | 1      |
| ≥ 30 %                                                                   | 2      |

#### Notes:

- Parking areas, walkways etc., are considered as site disturbances.
- Landscaped areas over built structures such as roofs, basement etc **cannot** be considered for the purpose of calculation of landscaped area.
- Potted plants will not be considered as landscape.

#### Documentation Required

Provide drawings, calculations and photographs indicating the site area with natural topography (and / or) landscaped area.

**SOURCE** : IGBC Green Factory Building Rating System Version 1.0

## LEGEND



## AREA STATEMENT

| Description            | SQ M     | SQ FT     |
|------------------------|----------|-----------|
| PLOT AREA              | 64493.91 | 694212.40 |
| BUILT UP AREA          | 14499.17 | 156069.10 |
| PARKING AREA           | 1329.00  | 14305.35  |
| CONCRETE AREA          | 9614.811 | 103492.96 |
| PP CONCRETE FIBRE ROAD | 4157.83  | 44754.50  |
| PATHWAY                | 2013.96  | 21678.09  |
| PAVER ROAD             | 1074.83  | 11569.37  |
| LAWN AREA              | 7808.2   | 84046.76  |
| TREES AND SHURBS AREA  | 7285.12  | 78416.38  |
| MUD COMPACTED AREA     | 4040.28  | 43489.21  |

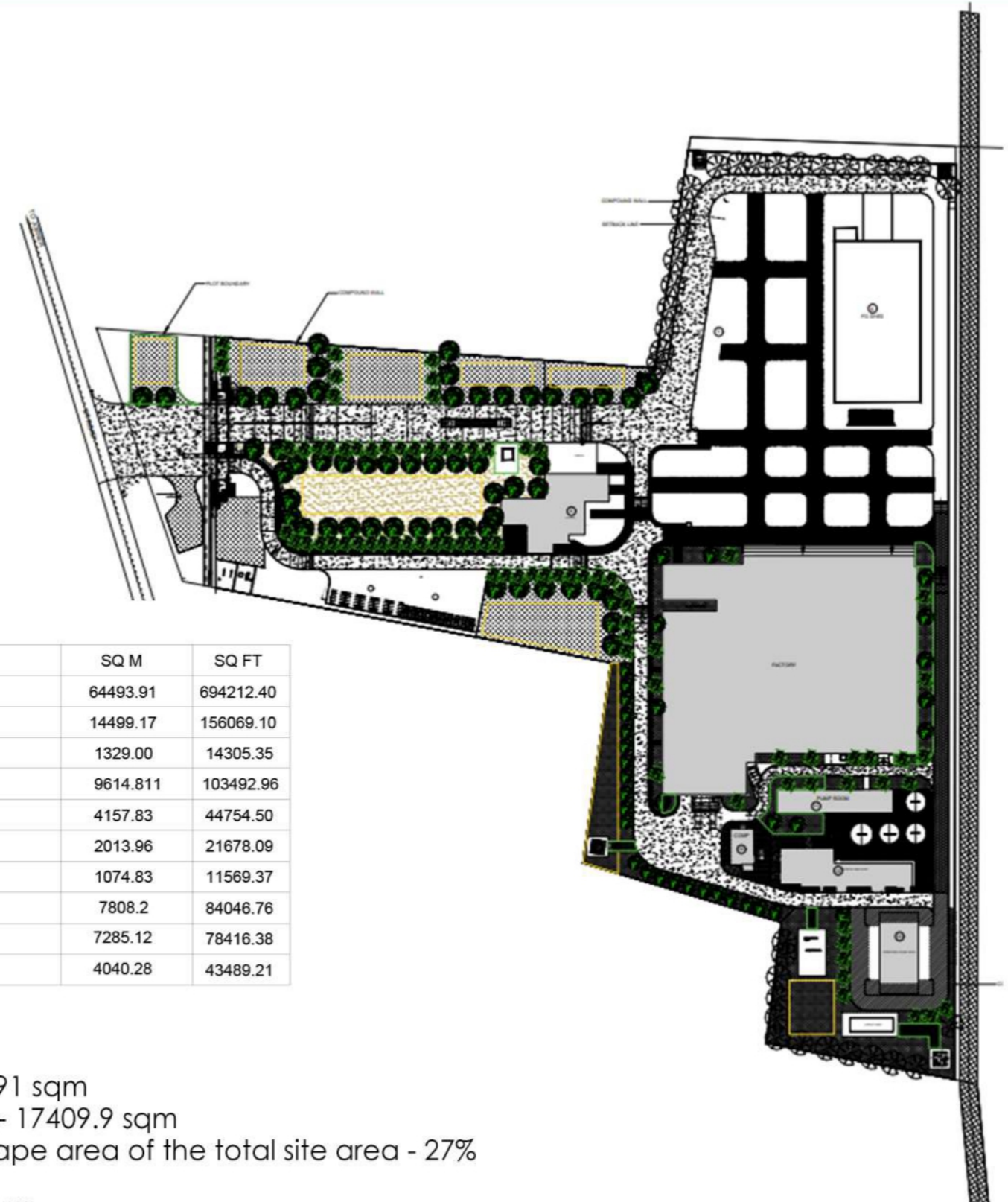
## DESCRIPTION

Total Site Area - 64493.91 sqm  
Total Landscape Area - 17409.9 sqm  
Percentage of Landscape area of the total site area - 27%

Total Lawn Area - 3732.72 sqm  
Percentage of Lawn Area - 21.44%

Total Trees, shrubs and native grass or mud Area - 12551.78  
Percentage of Trees, shrubs and native grass or mud - 72.1%

Total only mud compacted area without vegetation - 1125.4 sqm  
Percentage of only mud compacted area without vegetation - 6.46%





**COMPLIANCE FOR DROUGHT TOLERANT SPECIES****WATER CONSERVATION****Drought Tolerant Species, 30%, 40%***Design Submittal***WC Credit 2.0****Points: 2****Goal**

Landscape to be designed to ensure minimum consumption of water.

**Compliance Options:**

Ensure that atleast 30% of the landscaped area is planted with drought tolerant species. Points are awarded as specified below:

**Points for the use of drought tolerant species**

| Area of drought tolerant species as a percentage of total landscaped | Points |
|----------------------------------------------------------------------|--------|
| 30 %                                                                 | 1      |
| 40 %                                                                 | 2      |

**Notes:**

- This point is applicable only for those projects which have atleast 20% of the site / plot area landscaped.
- Drought tolerant species are those species that do not require supplemental irrigation. Generally accepted time frame for temporary irrigation is one to two years.

**Documentation Required:**

Provide a landscape plan indicating the percentage of landscaped area which uses drought tolerant species. Also provide a list of the species used and highlight their drought tolerant nature.

**POINTS WHICH THE PROJECT AIMS BASED ON THE CURRENT LANDSCAPE PROPOSAL - 2 Points****SOURCE :** IGBC Green Factory Building Rating System Version 1.0**COMPLIANCE FOR LIMITED USE OF TURF****WATER CONSERVATION****Limit Turf Area, 20%, 30%, 40%***Design Submittal***WC Credit 1.0****Points: 3****Goal**

To limit such landscapes which consume large quantities of water.

**Compliance Options**

Limit the use of turf on the site so as to conserve water. Points are awarded as specified below:

**Points for Limited Use of Turf**

| Turf area as a percentage of total landscaped area | Points |
|----------------------------------------------------|--------|
| ≤ 20 %                                             | 3      |
| ≤ 30 %                                             | 2      |
| ≤ 40 %                                             | 1      |

Areas planted with turf should not exceed a slope of 25 percent (i.e., a 4 to 1 slope)

**Note:** This point is applicable only for those projects which have 20% of the site area landscaped.

**Documentation Required**

Provide a landscape plan specifying the species used. Provide photographs.

**POINTS WHICH THE PROJECT AIMS BASED ON THE CURRENT LANDSCAPE PROPOSAL - 3 Points**



# PRINCE PIPES FACTORY PROJECT - JAIPUR - IGBC RATING - LIGHTING CALCULATION

## Indoor Environment Quality and Occupational Health

Day Lighting, 50%, 75%, 95%

IEQ Credit 3.0

Goal

To ensure connectivity between the interior and exterior environment, by providing good day lighting.

Compliance Options

Achieve a minimum average daylight factor of 2% for atleast 50% of the total floor area of all regularly occupied spaces.

Points for Day Light for regularly occupied Spaces

| Percentage of Lighting | Points |
|------------------------|--------|
| ≥ 50%                  | 2      |
| ≥ 75%                  | 4      |
| ≥ 95%                  | 6      |

Design Submittal

Points: 6

## DAYLIGHT FORMULAE ACCORDING TO IGBC

### Daylight Calculation

IEQ Credit 3

$$\text{Daylight Factor} = \frac{\text{Window Area (in sq.m)} \times \text{Glass VLT} \times \text{Constant} \times 100}{\text{Floor Area (in sq.m)}}$$

Constant Value :

Window on wall = 0.2

Window on roof (skylights) = 1.0

Required Daylight Factor to achieve : Min 2%

## NARRATIVE FOR PRESCRIPTIVE DAYLIGHT CALCULATIONS

Total Area of Regularly occupied space in the factory - 1630 sq.m

Area of Regularly occupied space provided with Daylight Factor 2% & Above -11061.3 sq.m

Percentage of Daylight provision out of total regularly occupied area - 95.11006%

POINTS FOR DAYLIGHT ABOVE 95% - 6POINTS

### Daylight Calculation - PPJ

SOURCE : IGBC Green Factory Building Rating System Version 1.0

| S.No                                         | Building                      |   | Overall Area | 01 Normal Windows on Walls |          |             | 02 Window on Side wall |          |             | 03 Window on Roof (Skylight) |          |             | DF 1                                              | DF 2  | DF 3  | Daylight Factory Achieved | Daylight Factory Required | Comply Yes/No | Percentage of Regularly occupied space | Remarks          |
|----------------------------------------------|-------------------------------|---|--------------|----------------------------|----------|-------------|------------------------|----------|-------------|------------------------------|----------|-------------|---------------------------------------------------|-------|-------|---------------------------|---------------------------|---------------|----------------------------------------|------------------|
|                                              |                               |   | Area (Sq.m)  | VLT                        | Constant | Area (sq.m) | VLT                    | Constant | Area (sq.m) | VLT                          | Constant | Area (sq.m) |                                                   |       |       |                           |                           |               |                                        |                  |
| 1                                            | Gate House S.C- 01            | 1 | 14.14        | 0.88                       | 0.2      | 4.56        | 0                      | 0        | 0           | 0                            | 0        | 0           | 5.674                                             | 0     | 0     | 5.673967                  | 2                         | Yes           | 0.12%                                  |                  |
|                                              | Gate House S.C - 02           | 1 | 14.14        | 0.88                       | 0.2      | 7.968       | 0                      | 0        | 0           | 0                            | 0        | 0           | 9.915                                             | 0     | 0     | 9.914512                  | 2                         | Yes           | 0.12%                                  |                  |
|                                              | Gate House Waiting Room       | 1 | 19.31        | 0.88                       | 0.2      | 6.38        | 0                      | 0        | 0           | 0                            | 0        | 0           | 5.816                                             | 0     | 0     | 5.815916                  | 2                         | Yes           | 0.17%                                  |                  |
| 2                                            | Canteen-hall                  | 1 | 284.23       | 0.88                       | 0.2      | 8.64        | 0                      | 0        | 0           | 0                            | 0        | 0           | 0.535                                             | 0     | 0     | 0.535001                  | 2                         | No            | 2.44%                                  | Canteen Building |
|                                              | Kitchen                       | 1 | 27.07        | 0.88                       | 0.2      | 3.456       | 0                      | 0        | 0           | 0                            | 0        | 0           | 2.247                                             | 0     | 0     | 2.246734                  | 2                         | Yes           | 0.23%                                  |                  |
|                                              | OHC                           | 1 | 43.48        | 0.88                       | 0.2      | 7.104       | 0                      | 0        | 0           | 0                            | 0        | 0           | 2.876                                             | 0     | 0     | 2.875816                  | 2                         | Yes           | 0.37%                                  |                  |
|                                              | CRECHE                        | 1 | 41.02        | 0.88                       | 0.2      | 3.456       | 0                      | 0        | 0           | 0                            | 0        | 0           | 1.483                                             | 0     | 0     | 1.483009                  | 2                         | No            | 0.35%                                  |                  |
|                                              | Visitors Lounge               | 1 | 21.84        | 0.88                       | 0.2      | 3.456       | 0                      | 0        | 0           | 0                            | 0        | 0           | 2.786                                             | 0     | 0     | 2.785613                  | 2                         | Yes           | 0.19%                                  |                  |
|                                              | CCTV                          | 1 | 6.20         | 0.88                       | 0.2      | 1.152       | 0                      | 0        | 0           | 0                            | 0        | 0           | 3.268                                             | 0     | 0     | 3.268085                  | 2                         | Yes           | 0.05%                                  |                  |
|                                              | Security office               | 1 | 21.61        | 0.88                       | 0.2      | 3.456       | 0                      | 0        | 0           | 0                            | 0        | 0           | 2.814                                             | 0     | 0     | 2.814085                  | 2                         | Yes           | 0.19%                                  |                  |
| 3                                            | FG Shed                       | 1 | 2258.35      | 0                          | 0        | 0           | 0                      | 0        | 0           | 0.9                          | 1        | 83          | 0                                                 | 0     | 3.308 | 3.307728                  | 2                         | Yes           | 19.42%                                 |                  |
| 4                                            | Despatch office               | 1 | 52.70        | 0.88                       | 0.2      | 7.83        | 0                      | 0        | 0           | 0                            | 0        | 0           | 2.615                                             | 0     | 0     | 2.614908                  | 2                         | Yes           | 0.45%                                  |                  |
| 5                                            | RM Store                      | 1 | 2343.03      | 0.88                       | 0.2      | 18.151      | 0.9                    | 0.2      | 227.81      | 0.9                          | 1        | 103         | 0.136                                             | 1.75  | 3.957 | 5.843638                  | 2                         | Yes           | 20.15%                                 |                  |
| 6                                            | Compounding/Mixer Area        | 1 | 1411.51      | 0.88                       | 0.2      | 12.887      | 0.9                    | 0.2      | 203.8       | 0.9                          | 1        | 72.72       | 0.161                                             | 2.599 | 4.637 | 7.396332                  | 2                         | Yes           | 12.14%                                 |                  |
| 7                                            | Extruder                      | 1 | 3106.81      | 0.88                       | 0.2      | 7.8651      | 0.9                    | 0.2      | 407.6       | 0.9                          | 1        | 154.5       | 0.045                                             | 2.362 | 4.477 | 6.882603                  | 2                         | Yes           | 26.71%                                 | Production floor |
| 8                                            | Compressor Room               | 1 | 137.33       | 0.88                       | 0.2      | 17.82       | 0                      | 0        | 0           | 0.9                          | 1        | 18.18       | 2.284                                             | 0     | 11.91 | 14.19833                  | 2                         | Yes           | 1.18%                                  |                  |
| 9                                            | Recycle shed                  | 1 | 451.29       | 0.88                       | 0.2      | 17.28       | 0                      | 0        | 0           | 0.9                          | 1        | 24.24       | 0.674                                             | 0     | 4.834 | 5.508043                  | 2                         | Yes           | 3.88%                                  |                  |
| 10                                           | Admin Building - Ground Floor | 1 | 402.80       | 0.38                       | 0.2      | 10.291      | 0.38                   | 0.2      | 231.22      | 0                            | 0        | 0           | 0.194                                             | 4.363 | 0     | 4.556756                  | 2                         | Yes           | 3.46%                                  |                  |
|                                              | Admin Building - First Floor  | 1 | 730.13       | 0.38                       | 0.2      | 15.71       | 0.38                   | 0.2      | 231.22      | 0                            | 0        | 0           | 0.164                                             | 2.407 | 0     | 2.570305                  | 2                         | Yes           | 6.28%                                  |                  |
| 11                                           | Operation,QA Lab room         | 1 | 243.20       | 0.88                       | 0.2      | 6.48        | 0                      | 0        | 0           | 0                            | 0        | 0           | 0.469                                             | 0     | 0     | 0.468956                  | 2                         | No            | 2.09%                                  |                  |
| Total - Regularly Occupied Area of Buildings |                               |   | 11,630.20    |                            |          |             |                        |          |             |                              |          |             | Percentage of Daylighted regularly occupied space |       |       |                           |                           | 95.11%        |                                        |                  |



## FACTORY PROJECT - DETAILS

Prince pipes - Chennai  
Site Area - 36987.94 sqm  
Climate Type - Warm and Humid  
Typology - Factory

**SCOPE OF WORK** - Marking the location of the LANDSCAPE ELEMENTS based on the Legends Given the classification was done. Also the Percentage area was calculated for different landscape elements. On site Visit for Landscape verification and Project details, Area Statement discussion.

## SITE SELECTION & PLANNING

Natural Topography and Landscape, 20%, 30%

Construction Submittal

SS Credit 4.0

Points: 2

### Goal

Minimise disturbances to the factory building site so as to reduce long-term environmental impacts.

### Compliance Options

Avoid site disturbance by retaining the natural topography of the site and / or landscape at least 20% of the site area or meet the local regulation, whichever is higher. Points are awarded as follows:

#### Points for retaining natural topography or landscaping

| Percentage of site area with natural topography and / or landscaped area | Points |
|--------------------------------------------------------------------------|--------|
| ≥ 20 %                                                                   | 1      |
| ≥ 30 %                                                                   | 2      |

### Documentation Required

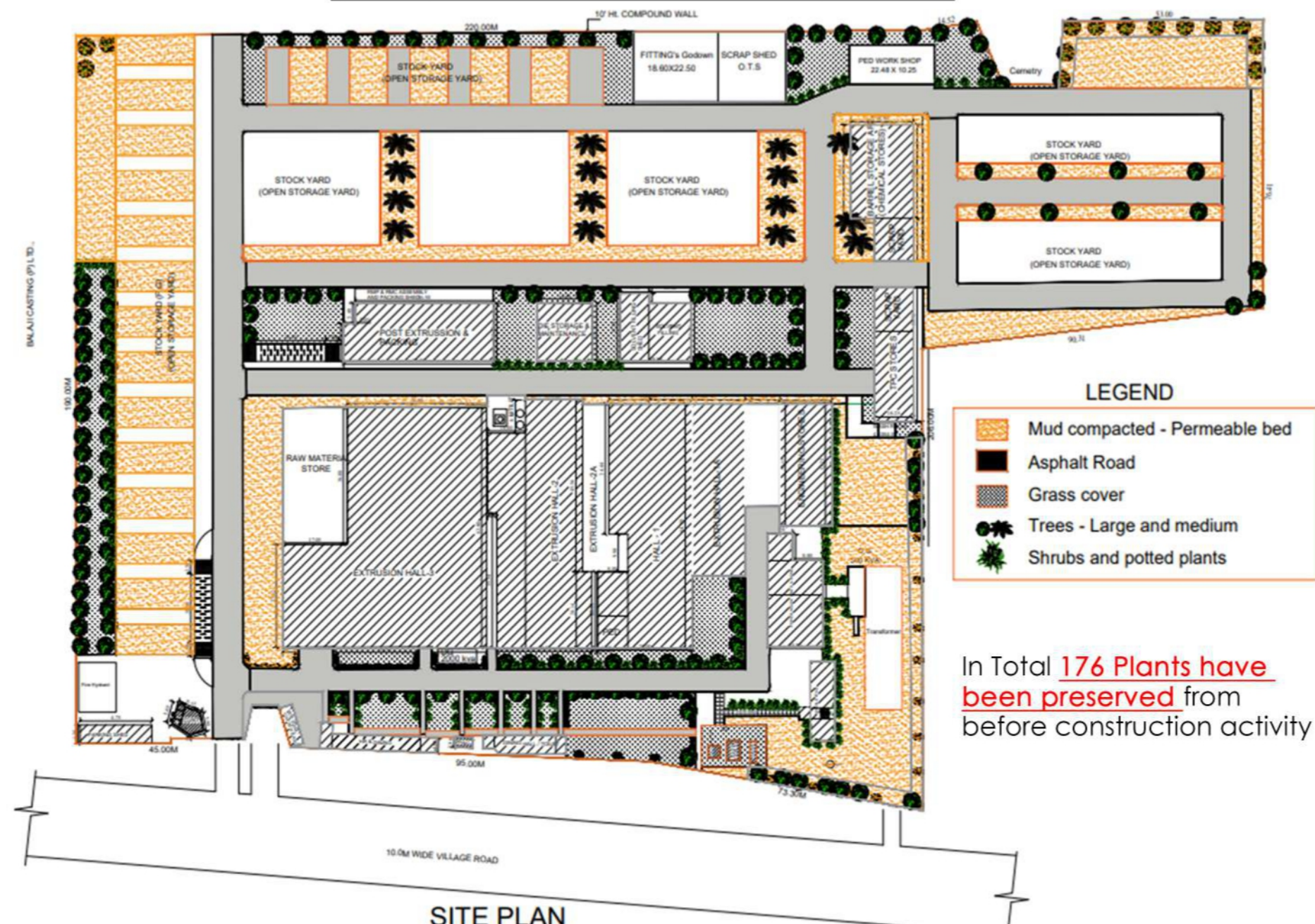
Provide drawings, calculations and photographs indicating the site area with natural topography (and / or) landscaped area.

### Notes:

- Parking areas, walkways etc., are considered as site disturbances.
- Landscaped areas over built structures such as roofs, basement etc cannot be considered for the purpose of calculation of landscaped area.
- Potted plants will not be considered as landscape.

**SOURCE** : IGBC Green Factory Building Rating System Version 1.0 Percentage of only Mud compacted Area - 51.22%

## LANDSCAPE PLAN - PROPOSED WITH INCORPORATION OF EXISTING TREES



In Total **176 Plants** have been preserved from before construction activity

### SITE PLAN

SCALE - Not to Scale

Total Site Area - 3128.54 sqm

Total Landscaped Area - 1088.12 sqm  
Percentage of Landscape area of the total Site Area - 34.78%

Total Lawn Area - 124.72 sqm  
Percentage of Lawn Area - 11.46%

Total Trees and Shrubs Area - 406.05 sqm  
Percentage of Trees and Shrubs - 37.32%

| Components                    | Area    | Percentage |
|-------------------------------|---------|------------|
| Mud compacted - Permeable bed | 708.289 | 22.63 %    |
| Landscape Area                | 379.829 | 12.46 %    |
| Asphalt Road                  | 643.051 | 20.24 %    |
| Built up area                 | 738.949 | 23.62 %    |
| Open space - Storage          | 658.421 | 21.05 %    |



LANDSCAPING NEAR THE ADMIN

The Admin Area was the only space with proper landscape provision as per given drawings from Client. There was only 9% Landscape area . After discussion with The IGBC Team we could include the mud compacted area in the landscape which helped acheive required 20%



SKYLIGHT AND TURBO VENT ON SITE

The Extrusion halls were the main Spaces of occupancy for the factory production. Optimal Daylight was seen as experinced by the workers due to provision of skylight and Turbovents . Also Roof Insulation helps to reduce heat gain.



| Description | L | B    | Area | Units   |
|-------------|---|------|------|---------|
| Sky Light   | 3 | 1.1  | 3.3  | Sq..Mts |
|             |   |      |      |         |
| TurboVent   |   | 0.28 |      | Sq..Mts |

MATERIALS REUSE ON SITE



WATER AUDIT FUNDAMENTALS

- 1.SOURCE** - Primary /Secondary - Borewells, Municipal Corporation, Recharge wells and Tubewells.
- 2.METERING SYSTEM** - Water meter - Digital - 85-90% efficiency.
- 3.APPLICATION** - Internal Domestic Usage , Landscaping & others
- 4. STORAGE** - Overhead Tank ,Sump and External tank
- 5.FLOW RATES OF PLUMBING FIXTURES** -Based on UPC (Uniform Plumbing Code ) LPF or LPM - Based on the model of the fixture.
- 6. USAGE PER CAPITA** - Baseline water fixture based on UPC and occupancy consumption is calculated.
- 7.WATER TREATMENT** - The treated water can be used for Flusing, Irrigation, Car Washing and Out -Sourcing. - In calculation can be used by subtracting it from the STP( Based on efficiency ) to get Actual Consumption.  
$$\frac{[Total\ Building\ Consumption] - [Treated\ Water\ use]}{Actual\ Water\ Consumption} * 100 = \text{Net water usage \%}$$
- 8.Water Performance Index - WPI (Net zero water consumption)**  
(l/person/ day)  
$$WPI = \frac{[Domestic\ water\ usage + Flush\ usage + Irrigation\ usage + Cooling\ Tower\ usage] - [Reuse\ of\ Treated\ Water + Stored\ Rain\ Water]}{Total\ No.of\ Occupants}$$