STRUCTURAL FLOOR INSPECTION OF EXISTING STRUCTURE (GROUP HOUSING BUILDING) NOIDA SECTOR XX, UTTAR PRADESH USING NON-DESTRUCTIVE TESTING AND VISUAL INSPECTION

OCT-2024

Table 1

STRUCTURAL INSPECTION AGENCY

PREPARED BY:-

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COMPLETE STRUCTURAL INSPECTION REPORT

CONTENT

TABLE 2

1. INTRODUCTION

&

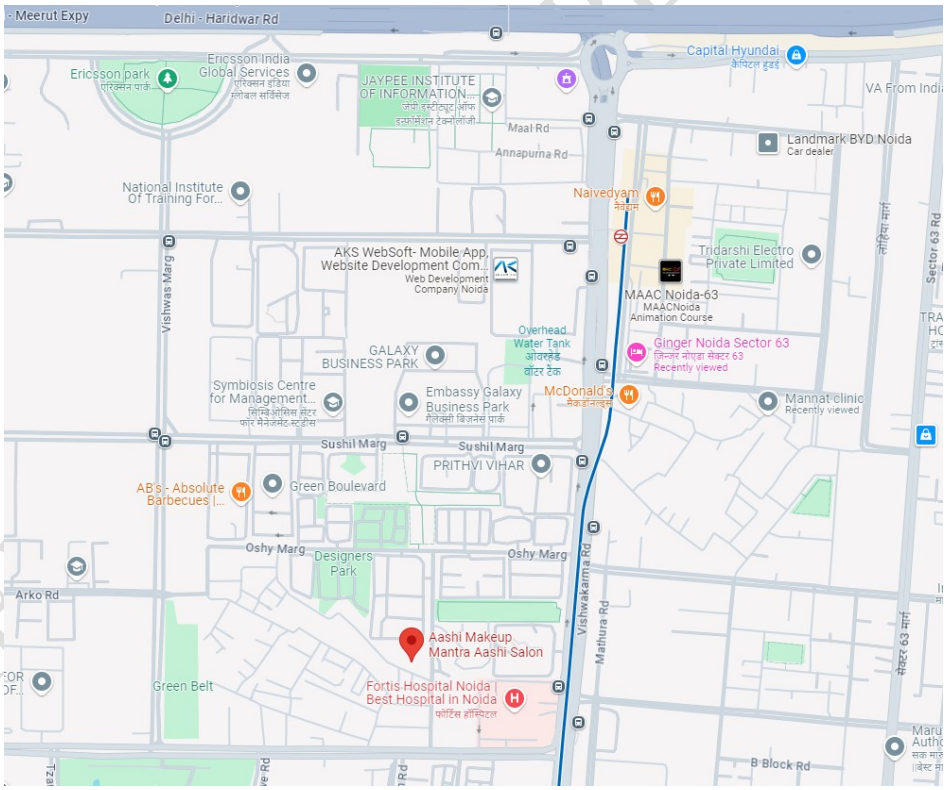
SCOPE OF WORK

1. Introduction

1.1 Information About Structure

Table 3

Type of Structure	RCC framed structure
Location of Structure	30 Years old structure located at Noida
Codes use during inspection	IS 800, IS 456, IS 1893, IS 875, IS 3025, IS 16168, NBC
Equipment used in Inspection	RCC Thermal Camera, Laser Tape, Pressure Meter, Digital Leveler, RCC Scanner, Moisture Meter, Voltage Checker



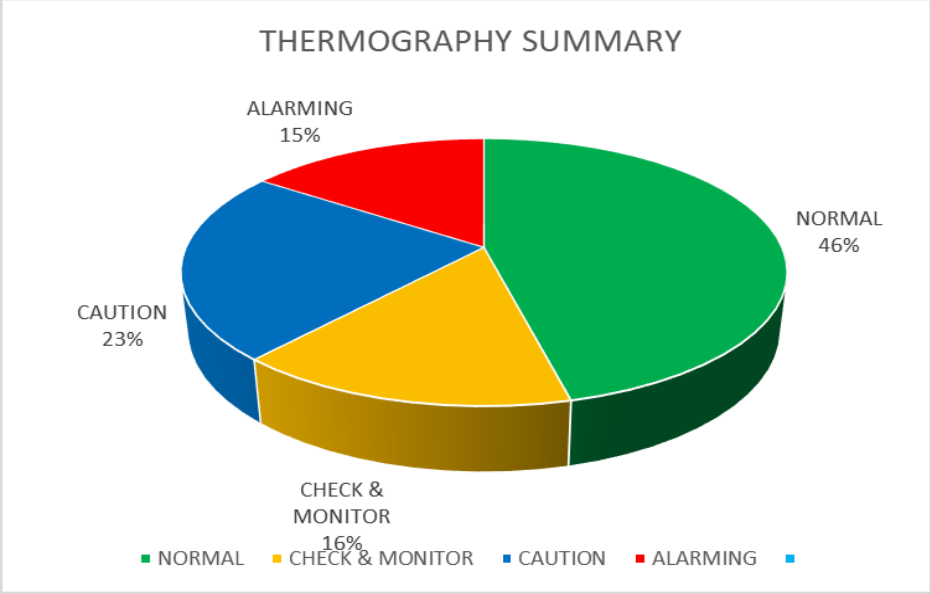
Location on Google Map

2. Electrical Inspection using Thermo Camera & Voltage Meter

1. CORPORATE SUMMARY

The salient findings, which require immediate attention of the management, are presented in this section. The HOTSPOTS detected were highlighted in discussion with technical staff after the Thermal Imaging Survey.

Total Areas/ Feeders Scanned	13
Total Thermal Images Captured	13
Risk Level	**Number**
Alarming	02
Caution	03
Check & Monitor	02
Normal	06



2. THERMAL IMAGING SURVEY–FUNDAMENTALS & METHODOLOGY

General:

The survey team visited he following areas/equipment and carried out T-Survey:

- **Ware house Area(Inside)**
- **Electrical Distribution Board**
- **Ware house Area(Outside)**
- **DG Room**

2.2.T-Survey Approach & Methodology:

Infrared T-surveys are conducted to capture heat images of equipment, etc. to identify hotspots, so that appropriate and timely action is taken to avoid breakdowns. T-survey results provide indications of potential failures.

During the initial discussion with the following in formation was collected to identify the equipment to be subjected to Thermal imaging:

- Critical Electrical equipment
- Critical panels(that feed essential services)

Infrared Thermal Imaging-Principle:

All objects that have a temperature above absolute zero (0 Degree Kelvin) emit infrared radiation, which can be measured on the infrared spectral band of the electromagnetic spectrum. The technique of measuring & viewing this energy is called infrared thermography or thermal imaging. Most thermal imaging systems respond to wavelengths of 3 - 5 micrometers or 8 –12 micrometers.

Why Thermal Imaging?

Thermography is nothing but *'capturing heat images onfilm'*.Swedish powerboard beganin specting a large number of electrical components (1.5 lakhs plus) way back in 1965 &UK power generation board began effectively utilizing Thermography for predictive maintenance of transmission lines.

The application of both Thermal imaging & Ultra sonic detection techniques are based on a fundamental principle, *'Electrical Failures are preceded by rise in temperature & sound'*. If you understand this basic principle, carry out effective techniques to detect these failure 'pre-cursors'and take timely corrective action, electrical equipment failures can be avoided. Although T-imaging applications are numerous (quality checks, tank level monitoring, detection of steam leaks, integrity of furnace refractory lining, etc.), we will discuss electrical applications in this application note.

The electrical maintenance practices evolved over a period of time. Breakdown to preventive to predictive to risk /reliability based maintenance practices. Logically, high reliability plant &equipment requires to be maintained accordingly. In countries like USA, UK, France, Netherlands, etc., infrared Inspections are now recognized and recommended as a best practice for the inspection of electrical installations. In order to assess the equipment condition by predicting failures, without losing production, applications such as thermal imaging are gaining importance.

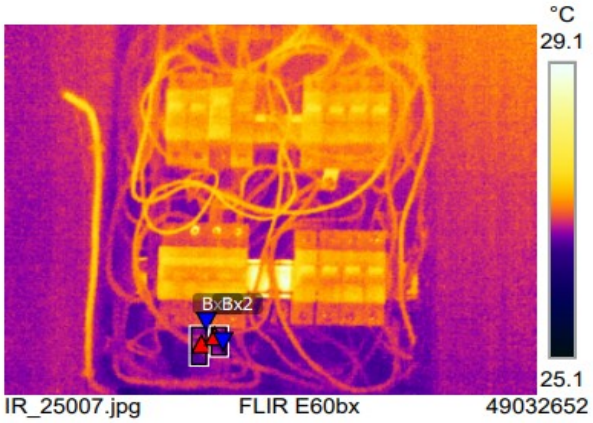
Objective of T-Survey:

Generally T-Surveys are conducted with the following objectives:

- To identify equipment/connections which requires Thermo-Survey
- To carryout infrared thermal imaging of equipment (process, electrical, Mechanical) in operation to identify hotspots.

DISCLAIMER

The recommendations made in the report are based on the best practices in the industry, national and international standards and good engineering judgment. Safesence does not hold responsibility for the results arising out of the implementation of the recommendations



IR_25007.jpg FLIR E60bx 49032652

DC_25008.jpg

Measurements

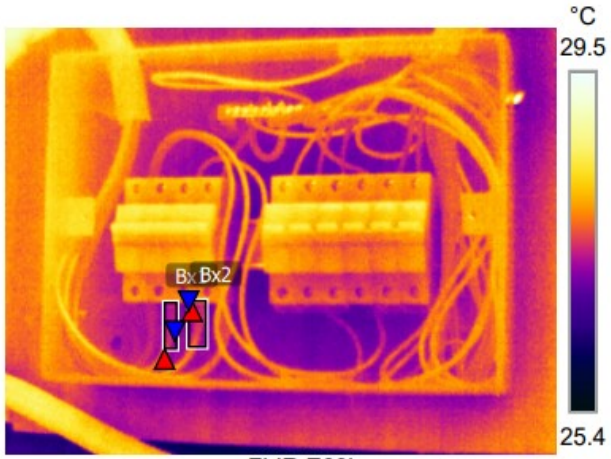
Bx1	Max	27.0 °C
	Min	26.6 °C
	Average	26.8 °C
Bx2	Max	27.1 °C
	Min	26.6 °C
	Average	26.8 °C
Dt1	Bx2.Max - Bx1.Max	0.1 °C

Parameters

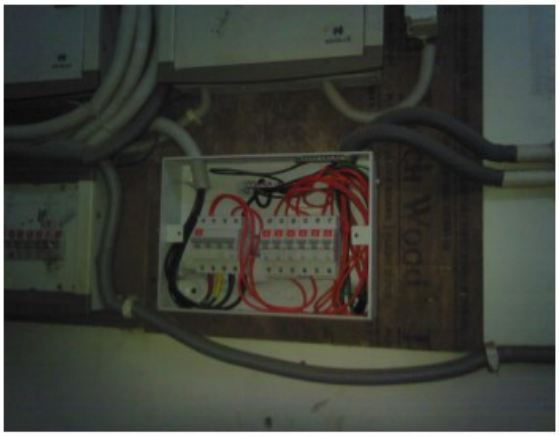
Emissivity	0.98
Refl. temp.	20 °C
Distance	1 m
Atmospheric temp.	20 °C
Ext. optics temp.	20 °C
Ext. optics trans.	1
Relative humidity	50 %

Text annotations

LOCATION	INSIDE WAREHOUSE, F&V AREA, LDB
Risk Category	NORMAL



FLIR E60bx



Measurements

Bx1	Max	27.7 °C
	Min	26.9 °C
	Average	27.3 °C
Bx2	Max	27.9 °C
	Min	26.9 °C
	Average	27.3 °C
Dt1	Bx2.Max - Bx1.Max	0.2 °C

Text annotations

LOCATION	INSIDE WAREHOUSE, ELECTRICAL DB/ SERVER AREA, LM DB
Risk Category	NORMAL

Parameters

Emissivity	0.98
Refl. temp.	20 °C
Distance	1 m
Atmospheric temp.	20 °C
Ext. optics temp.	20 °C
Ext. optics trans.	1
Relative humidity	50 %

Risk Levels:

ALARMING LEVEL:

- Delta temperature (differential temperature between the maximum & minimum / temperature near the object) more than 16 degree centigrade
- Failurecouldresultinmajorfire/explosion/over-pressuresituation/majorabnormality
- AnyofthehazardoussituationsmentionedinNote1

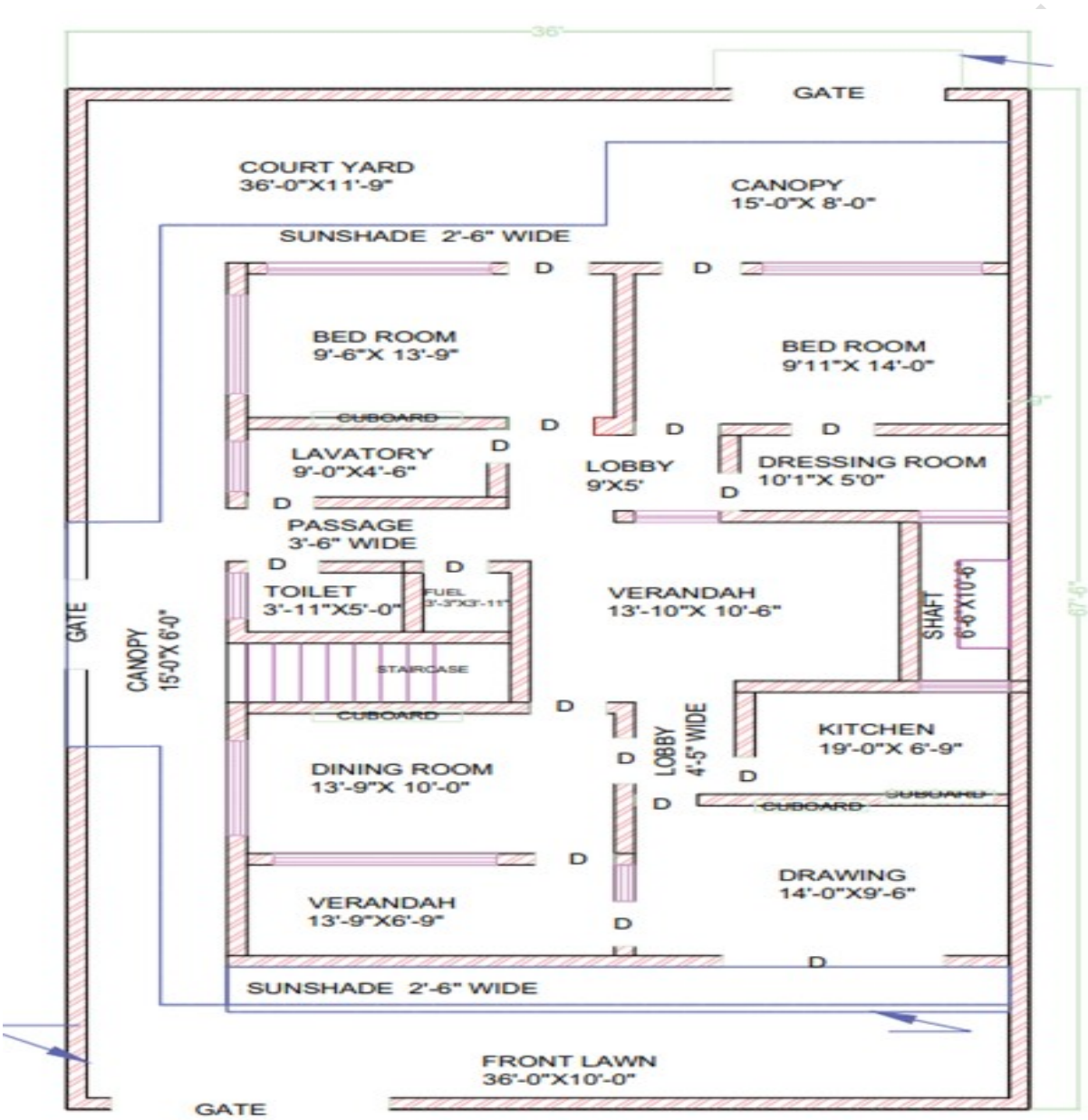
CAUTION:

- Delta temperature (differential temperature between the maximum & minimum temperature) between 4 to 15 degree centigrade
- Impact may be confined to the equipment
- Failure may not have a large impact on safety/environment/production but repair cost may not be insignificant

CHECK & MONITOR:

- Delta temperature (differential temperature between the maximum & minimum temperature) between 1 and 3 degree centigrade
- Mostly of a minor/regular disruption that will not affect safety/production/environment

3.As-Built/Carpet Area Drawing Preparation



GROUND FLOOR

4.Water Pressure and Quality Check

More than 15 litres of water per minute is considered the minimum water pressure for house. The recommended range is 10 to 15 litres per minute. Below 10 litres is not at all good.
The 2020 Indiana Residential Code states that the static water pressure in a home should not exceed 80 pounds per square inch (psi). If the main water pressure is higher than 80 psi, a pressure reducing valve (PRV) must be installed on the domestic water branch main or riser.

According to the Bureau of Indian Standards (BIS), the permissible limit for TDS in drinking water is 500 mg/L. However, the World Health Organization recommends a TDS level of less than 300 mg/L for drinking water. Minimum TDS of drinking water should not go below 50 ppm.

Water Pressure Check

Water TDS Check

Table	Quality Assurance in Concrete using Non Destructive Testing		
Client:- M/s			Consultant :- SafeSence
SL. No.	Sample Identification	TDS in mg/L	Water Pressure in PSI
GROUND FLOOR			
1	Kitchen Sink	125	40
2	Toilet Basin	175	42
3	Toilet Jet	135	44
4	Balcony Tap	150	40
5	Wash Basin	180	44

Result:- The TDS of water is ok and safe to use.

The water pressure is ok and no need to install any additional pump near tank.

5. Flooring and Leveling Check

Why Floor Levelling check

A level concrete floor provides a stable base for installing different types of flooring, such as tiles, hardwood, laminate, or carpets. Without a level surface, flooring materials can crack, warp, or shift, leading to costly repairs and unsightly appearances. Achieving a perfect level ensures that your flooring looks flawless and remains durable for years to come.

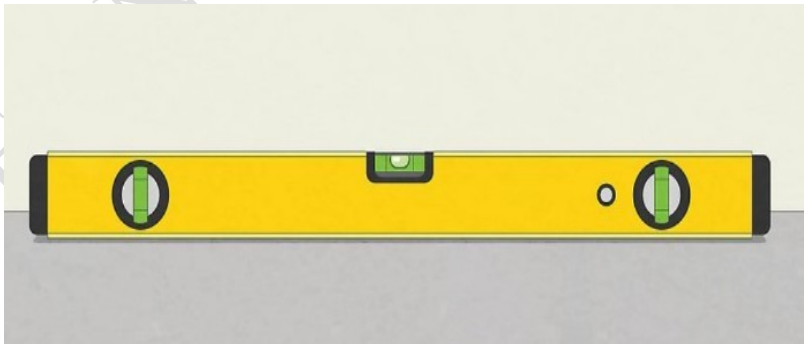
Ensuring the structural integrity of the building is paramount in construction. Uneven floors can lead to structural issues, as they may not distribute weight evenly, causing stress and potential damage to the building over time. A perfectly level floor not only looks great but also adds to the longevity and resilience of the entire structure

Process of leveling

1.Set a 4–8 ft (1.2–2.4 m) spirit level horizontally on the floor:- Pick a spot in the middle of the floor or against one of the walls. Lay a spirit level horizontally, so that the bubble is on top. Check the level by laying it on a surface, noting where the bubble in the middle is, flipping it over one end, and seeing if it's in the same place.

2. **Look where the bubble rests to see if the floor is sloping**:-If the bubble isn't in the lines in the middle, the floor isn't level. When the bubble touches the sides of the lines, it's off about 1 inch (2.5 cm) per 4 feet (1.2 m), sloping down in the opposite direction of the bubble

3. **Check for gaps and bumps underneath the level:-** Get down on the floor by the level and check if the bottom edge rests completely flush on the floor. Measure the depth of the dip from the level, or check the slope by lifting one end of the level until the bubble is centered and measuring the height of the raised end.



Floor level checking instrument

Benefits of a level floor

A level floor offers numerous incredible benefits, making it a crucial step in construction and renovation projects:

- **Enhanced Durability**: A level floor is less prone to damage and wear, ensuring a longer lifespan for both the subfloor and the finished flooring. This means fewer repairs and a more robust structure overall.
- **Improved Aesthetic Quality**: A smooth, level floor provides a better base for flooring materials, resulting in a more attractive and professional finish. The visual appeal of your space is significantly heightened.
- **Increased Safety**: Level floors reduce the risk of accidents, creating a safer environment for occupants and workers. Safety is paramount, and a level floor ensures peace of mind.
- **Cost-Effectiveness**: Investing in floor levelling during construction or renovation can save money in the long run by preventing future repairs and extending the lifespan of flooring materials. It's a smart investment that pays off over time.
- **Better Performance of Flooring Systems**: Floor levelling ensures that flooring systems perform as intended, providing comfort, insulation, and noise reduction. The overall experience of the space is greatly enhanced.

Levelling check

Sr.No.	Observation/ Reading	Identification	Impact	Photo
1	Uneven floor settlement at various locations	Living Room	High	
2	Damage tile and gap between tile and pipe junction	Toilet	High	

6. Door and Windows Inspection

Why Door & Windows Inspection are Necessary

Doors and Windows keep your home secured and safe. The exterior door i.e. your main door keeps you secured from unknown visitors, While the interior doors i.e. door of every room allows you to have your privacy. Similarly, Windows keep dust and pests away. They also help protect you home interiors from harmful UV rays. So As mentioned earlier, its very essential to check if Doors and Windows are in good shape.

Pointers to Window Door Inspection

- **Solidity –** Door, the most essential feature for security of occupants, needs to be firm and stable. For Stability look for any – Crumbling of plaster, clacking of frame and noticeable gap at frame joints. Other invisible flaws like deficient anchorage frame hardware like fasteners, clamps and other support concealed to side frame or base cannot be seen with naked eye. It therefore becomes difficult to judge solidity of door in new houses.
- **Decayed Frames** – Well it difficult to actually find out for any decay, since decay is often caused due to lack of seasoning of wood.
  What is seasoning of wood? Well seasoning is a process of drying solid wood/lumber to remove moisture contained in walls of wood cells to yield seasoned solid wood.
  For improper seasoning of wooden doors, you eventually find wet patches at bottom portions and sometimes wear-&-tear of paint at fastened walls. It also affects the stability of wood as moisture can lead to decay of wood.
- **Inspect for Rattling of Door and Door panels** – Rattling is caused due to poor workmanship. Poor Workmanship in fixing the panel rather then any door hardware. Rattling can eventually increase the gaps impacting the stability of door frame which can also cause the panel to bend.

Pointers to Window Inspection

Windows are biggest luxury you can have these days. Windows are big attraction. They grab attention. When you are doing nothing, chances are you are looking at window. They are biggest focal point. People tend to look at view outside window or balcony. Windows connect your home to outer world. Lastly, Windows bring in all the daylight inside. Therefore, it's very essential to inspect your windows before you move in.

- **Gap around Windows Frame** – Any kind of gaps in Window Frame will allow moisture to seep in through it, weakening the window frame fixed to adjacent walls.
- **Glass Fit to Frame Size** – Moving glass or improper glass size can cause the glass to break. On breaking, it can cause severe accidents to home owners or pedestrians below.
- **Sliding Window Hardware**– Sliding Windows is quite a modern trend over past few years. Open and shut the sliding Windows to check for easy movement. Try to shut the sliding completely and look for lock. Does the Window lock appropriately? If any of these are faulty, get it changed or repaired before you move in.

- **Mosquito Net** – Most builders provide mosquito net in every room. Well if not, inspect if you could have an additional channel for mosquito sliding or could it be installed in existing one.
- **Safety First** – If Window Sill are below a specific height, then an additional grill or panel shall be provided to avoid tripping. It could also be fatal to life. Check for, especially in bathrooms and common areas.
- **Drip mould at Chajja / overhanging roof space** – A drip mould especially on topmost floor is essential to restrict the water from splashing inside the unit that flows vertical om external wall. A window with no drip mould can cause seepage problems.

Door & window check				
Sr.No.	**Observation**	**Identification**	**Impact**	Photo
1	Door needs to be pushed to lock	Living Room	High	
2	Silicone not filled between wall and window frame, from outer side	Bed Room	High