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[PROJECT TITLE]

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SUBMITTED BY



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PROJECT REF.: SM 2023/09/1083

REVISION NO. & DATE OF SUBMISSION:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Revision | 0 |  |  |  |  |
| Date |  |  |  |  |  |
| Author |  |  |  |  |  |
| Approved |  |  |  |  |  |
|  |  |  |  |  |  |

**Standard Certification by the Structural Engineer for Periodic Inspection of Buildings**

In accordance with Section 28(6) of the Building Control Act 1989 (the “Act”) and Regulations 6 and 7 of The Building Control (Periodic Inspection of Buildings and Building Façade) Regulations 2021 (the “Regulations”). I [ENGINEER NAME] the Structural Engineer appointed by the building owner under section 28(3) of the Act have personally, conducted a structural inspection of the building located at **[BUILDING ADDRESS]** (“Building”), including a visual survey carried out personally, and hereby submit the report of my inspection of the building. I certify and declare that the inspection of the building was carried out and the report was prepared by me in accordance with the Act and the Regulations.



Structural Engineer Date

For Periodic Inspection of Buildings

(Signature and Stamp)

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[PROJECT TITLE]

# Introduction

M/s ECAS Consultants Pte Ltd was appointed by The Institute of Engineers Singapore to perform a visual inspection for [PROJECT ADDRESS]. A building inspection was conducted on [INSPECTION DATE] by [ENGINEER CONDUCTING INSPECTION] from ECAS Consultants Pte Ltd. The team was accompanied by the staff from the building Management throughout the inspection. Observations are presented in this report.

# Reference

Structural plans are purchased from BCA for our inspection. The plans are shown in Appendix 2. The drawings were reviewed to understand the structural system, identify critical structural elements, identify the design-imposed loads and determine if any addition and alteration works had been carried out.

UPDATE ACCORDING TO PROJECT.

Then delete this text box

# Building Layout / Structural System:

The building layout and structural system are as below:

* + The building consists of two parts, old building is a single-storey structure with the Lower first level(basement) and the new is a 2-storey building with lower first level (basement) and roof level.
  + The roof of the building is mainly of reinforced concrete flat roof. In few locations metal roof is used which is supported by structural steel truss.
  + The building is supported by reinforced concrete piles.

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# Presence of Critical Structures and Structures without Redundancies:

The critical structures of the building, such as the roof steel truss members, were found to be in satisfactory condition during the inspection.

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# Usage of the Building:

The building is intended for commercial use and it serves as pre-school and for office purposes.

For IES building the lower 1st storey is used for carpark, while Level 1 serves as office space. Level 2 is multipurpose, board room, training rooms, a store, and a lounge. The top level, Level 3 (roof level), is used for the roof garden.

Schoolhouse currently occupies Level 1 of the older building and is used for class rooms, reception area, Hall and open terrace. Lower 1st storey is used for Auditorium, office area, meeting rooms, and pump room.

# Loading on the Building Structure:

As surveyed, there is no deviation of use from the existing usage as reflected in the drawings purchased from BCA. There is no sign of distress and overloading of structure at the point of inspection.

# Additions & Alteration Works to Building Structure:

There was no addition and alteration work observed during the inspection.

UPDATE ACCORDING TO PROJECT.

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# Signs of Structural Defects, Deformation and Deterioration:

In the process of structural Inspection, no major structural defects were found.

* No sign of building tilt or settlement at the time of visual inspection.
* No structural deformation was observed at the time of visual inspection.
* No signs of structural deterioration were observed.

Few minor defects which were found during the inspection are summarized in the table below and the pictures are shown in Appendix 1:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Defect No.** | **Defect Type** | **Description of the defect** | **Location of the defect** | **Photograph No.** |
| 1 | Non-structural | Base plate Rusty | Level 3, Roof Level | 43-44 |
| 2 | Non-structural | Plaster Defect | Level 1, Auditorium | 71-73 |

**9.** **Inspection Coverage:**

The entire area of the building was covered during the visual inspection, which includes IES building office area, pantry, lounge, boardroom, storeroom, training room, staircase, roof level, basement car park, Schoolhouse classrooms, hall area, open terrace, auditorium, meeting rooms and office area

# Termite Infestation:

During the visual inspection, no evidence of termite infestation was observed.

# Exposure to aggressive environment:

* + No columns were immersed in water at the time of visual inspection.
  + No aggressive chemical, which may accelerate the deterioration of elements, was found at the time of visual inspection.

# Retaining walls and slope protection structures:

* There were retaining walls in the level 1 to Lower 1st storey which are in good condition during the time of inspection.
* There are no slope protection structures observed during the inspection.

# Safety Barriers:

* + No defect of safety barriers (staircase parapet wall & steel railing) was found at the time of visual inspection.
  + The condition of the RC parapet barrier was found in good condition at the time of visual inspection.

# Record of previous strengthening works done:

No sign of previous strengthening works was found at the time of visual inspection.

# Survey & Assessment

We did not detect any structural defect in the building and the minor non-structural defects are summarized in the above table. The building is relatively well maintained. The structural elements including the columns, beams, slabs, walls, roofs are found to be in sound condition.

No cracks of structural significance were found during the inspection and there is no evidence of any deformity, damage or excessive deflection found on any of the structural elements.

# Recommendations & Conclusions

Based on the visual structural inspection conducted at that time, it is concluded that there are no structural defects.

# The minor non-structural defects are summarized in this report under item 8 table. It is recommended that these defects are to be rectified in accordance with Appendix 3 to prevent further deterioration.

In summary, the structural integrity and stability of the building appears to be in satisfactory condition. Nevertheless, property owner is encouraged to maintain a proactive approach to building maintenance and schedule regular assessments to address any minor issues promptly to ensure safety and longevity of the structure.

**ANNEX A – CHECKLISTA FOR PERIODIC STRUCTURAL INSPECTION OF EXISTING**

**BUILDING AT 30 Bencoolen**

Please tick Y or N/A, which are defined below, accordingly for all checklist items:

**Y** – Yes, I declare that I have checked and addressed the item in my report

**N/A** – Not applicable, I declare that I have checked and found the item to be not applicable (i.e., does not exist)

**1. Structural System of the Building**:

**Y N/A**

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| --- | --- |
| √ |  |

a) Reference to structural layout plans and details

|  |  |
| --- | --- |
| √ |  |

b) Description of foundation system

|  |  |
| --- | --- |
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c) Description of structural system (including storey height)

|  |  |
| --- | --- |
| √ |  |

d) Location of critical floor systems (e.g., flat slab, flat plate or pre-stressed

slab etc.), if any

**2.** **Special and Critical StructuresB**:

|  |  |
| --- | --- |
|  | √ |

a) Signs of distress, cracks, deformation or corrosion.

**3.** **Structures without Redundancies**:

|  |  |
| --- | --- |
|  | √ |

a) Signs of distress, cracks, deformation or corrosion

**4.** **Concealed Key Structural Elements and Connection Systems of Prefabricated**

**Prefinished Volumetric Construction (PPVC) Constructed Buildings:**

|  |  |
| --- | --- |
|  | √ |

1. Reference to approved structural plans for location and detail of inspection

Access points

|  |  |
| --- | --- |
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1. Signs of distress, deformation or corrosion on concealed structural elements

And connection systems

A This checklist is to be included in the report.

B Examples of special and critical structures are transfer girders /beams /trusses, small/ slender columns, long span structures, cable structures, inclined columns, etc.

C Examples of structures without redundancies are cantilever structures, cantilever structures without back span, cantilever balconies exposed to elements, tension columns, hanging/suspended structures, nibs and corbels, etc., Reference should be made to Annex C.

**5.** **Timber structures (including Mass Engineered Timber):**

|  |  |
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a) Signs of biological damage or decay (e.g., termite attack or fungus growth, etc.)

|  |  |
| --- | --- |
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b) Signs of deterioration (e.g., creep deformation, delamination, cracks, etc.)

|  |  |
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c) Areas prone to water leakage, accumulation of water that can result in ingress

of water (e.g., end cap protection remains intact and water tight, waterproofing

is still effective)

|  |  |
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1. Increase in moisture content beyond code and specialist recommendations

checked using devices such as moisture meters and scanners.

|  |  |
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1. Need for inspection and testing by a specialist (e.g., anti-termite, timber

specialist, etc.)

**6. Survey of Loading:**

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a) Compatibility of existing usage with the design loading

|  |  |
| --- | --- |
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b) Deviation from intended use or supporting higher imposed load as

recommended in the design codes (e.g., CP3, BS 6399 or SS EN 1991 and the

relevant national annexes)

|  |  |
| --- | --- |
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c) Signs of distress or deformation due to overloading (to show affected

location(s) on plan)

**7.** **Unauthorised WorksD:**

|  |  |
| --- | --- |
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1. Presence of unauthorised works (to show locations on plan)

|  |  |
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1. Impact of unauthorised works on the building structure

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1. Record of previous strengthening works without Approved Plans.

|  |  |
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d) Additional unauthorised floor within a high volume/headroom space

**8.** **Signs of structural defects and deterioration:**

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a) Building tilt/ settlement

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b) Structural deformation

|  |  |
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c) Major structural defects (e.g., structural cracks, decayed timber member, etc.)

|  |  |
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d) Minor structural defects (e.g., minor corrosion and minor spalling, etc.)

|  |  |
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e) Non-structural defects

D Examples of slope protection structures are soil nails, ground anchors, shotcrete slope, etc.

**9.** **Exposure to aggressive environment:**

|  |  |
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a) Column immersed in water (e.g., ground floor water tank, seawater, lakes, etc.)

|  |  |
| --- | --- |
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b) Aggressive chemicals or other similar substances which may accelerate the

deterioration of structural elements, particularly in industrial buildings

**10.** **Slope, Retaining Walls and Slope Protection StructuresE**:

|  |  |
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1. Signs of slope erosion

|  |  |
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1. Defects of retaining wall and other slope protection structures (e.g., cracks, tilt, displacement, etc.)

|  |  |
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1. Signs of undesirable condition surrounding retaining wall (e.g., tension cracks

in soil, choked weephole(s), presence of big trees nearby, inadequate surface

drainage etc.)

**11.** **Safety Barriers (i.e., parapets & railings):**

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1. Any signs of structural defect, deformation or deterioration

|  |  |
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1. Any continuous handrail for full glass barriers

**12. Other Surveys or Checks Carried Out**

|  |  |
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1. Presence of heavy suspended fixtures (e.g. thick cement plaster, large

cement-based or gypsum board over) in crowded locations, such as food

courts, atrium, waiting/seating areas

|  |  |
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1. Records of and comments on any known maintenance problems and previous

rectification carried out on the building structure.

**13. Inspection Coverage**

|  |  |
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1. Summarised list of units inspected

* Percentage of units inspected: 100%

|  |  |
| --- | --- |
|  | √ |

1. At least 30% of cladded columnsF are exposed for inspection

Percentage of cladded columnsF exposed: %

|  |  |
| --- | --- |
|  | √ |

c) Suspended ceiling accessed points are indicated on a structural/building layout plan

|  |  |
| --- | --- |
| √ |  |

d) Justification of inspection coverage

E Evidence of any structural works that are or were carried out without any prior approval of the plans of those works where prior approval is required by Part 2 of the Building Control Act

F Columns concealed behind architectural finishes with air gaps between the columns face and the finishes. It excludes those columns concealed with materials adhered fully to the column face, i.e., tiles, plaster, wallpaper

|  |  |
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14. **Recommended remedial actions for all defects detected**

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15. **Standard Certification on first and last page of report**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [DATE]

Structural Engineer Date

For Periodic Inspection of

(Signature and Stamp)

**Appendix 1 – Photographs**

**ECAS**Appendix 1 – Photographs

<<foreach [item in QRCodes]>>

|  |
| --- |
| Level: <<[item.Floor\_Number]>> |
| Str. Condition: << [item.Structural\_Condition]>> |
| <<image [item.Base64image] -keepRatio>> |

<</foreach>>

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