STRUCTURAL ASSESSMENT REPORT

DECEMBER 2022

DETAILS OF STUDY SITE

57 HARVEY STREET, UMKOMAAS

CADASTRAL DESCRIPTION

ERF 258 OF UMKOMAAS

Prepared For :

Krishna Govender Family Trust
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Umkomaas
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1. TERMS OF REFERENCE

Goldwire Consulting was appointed by the Krishna Govender Family Trust to conduct a structural assessment of a masonry dwelling situated at 57 Harvey Street, Umkomaas (hereinafter referred to as the subject site). The assessment was conducted along the external and internal envelope of the building.

The purpose of our study was to firstly assess the structural integrity of the dwelling and secondly recommend remedial measures, where necessary, to ensure compliance with SANS 10400. Pursuant to these instructions, a site visit was conducted on Saturday, 3rd December 2022.

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2. SCOPE OF WORKS

The structural engineering assessment of the building was limited to the following aspects, details of which are listed hereunder :

- Obtaining information relating to the design, construction, maintenance and history of the works relevant to the assessment;
- Assessing the structural adequacy of the building
- Assess the condition of the structural elements: identify types of structural defects, signs of structural distress and deformation, and signs of material deterioration;
- Additions or alteration works affecting building structures: identify additions or alteration works that can have adverse effects on the structural integrity of the existing building;
- Identify non-structural components that might affect the integrity of the structural system.
- Recommending appropriate safety precautionary and remedial measures to restore the structural stability and integrity of the structure.

3. METHODOLOGY

A visual inspection of the building was carried out with reasonable diligence and included an assessment of the following aspects:

(a) The condition of the structure:

- to identify the types of structural defects
- to identify any signs of structural distress and deformation
- to identify any signs of material deterioration

(b) Any addition or alteration works affecting the structure

- to identify any addition or alteration works which can result in adverse effects on the structure.

The purpose of the preliminary site visit was to conduct an initial visual survey of the construction of the building and their characteristics to obtain a view and understanding not attainable by office documents and data resources alone.

4. LOCATION

The subject site is situated along the coastal belt of KwaZulu Natal set within the suburb of Umkomaas. The region is noted for its subtropical climate characteristic of humid, hot and rainy summers contrasted by a mild and dry winter.

Topographically the site is situated on the eastern side of a moderate easterly slope, which is one of a series of dunes in proximity to the beach shoreline. The site itself is perched along the spur of a moderately descending south facing slope. In terms of its topography, the relief is generally gentle south to south easterly which coincides with the geological setting of the surrounding area which is made up of gentle to moderate and undulating topography with broad and rounded hilltops and ridge lines separated by broad, moderately sloping valleys and valley heads. .

The subject site is situated approximately 12.20km north of Scottsburgh and approximately 2.50km east of the N2 northbound carriageway. The site is bounded by Harvey Road along the northern margin and neighbouring stands along the eastern, western and southern cadastral boundaries.

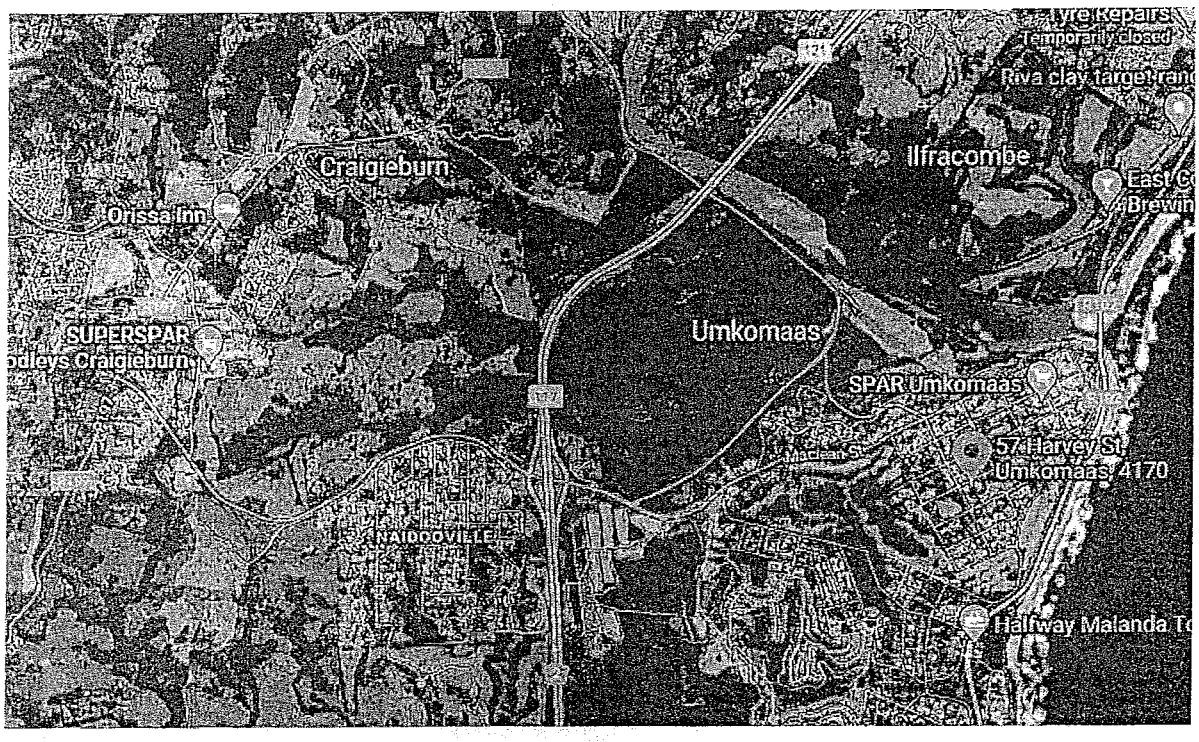
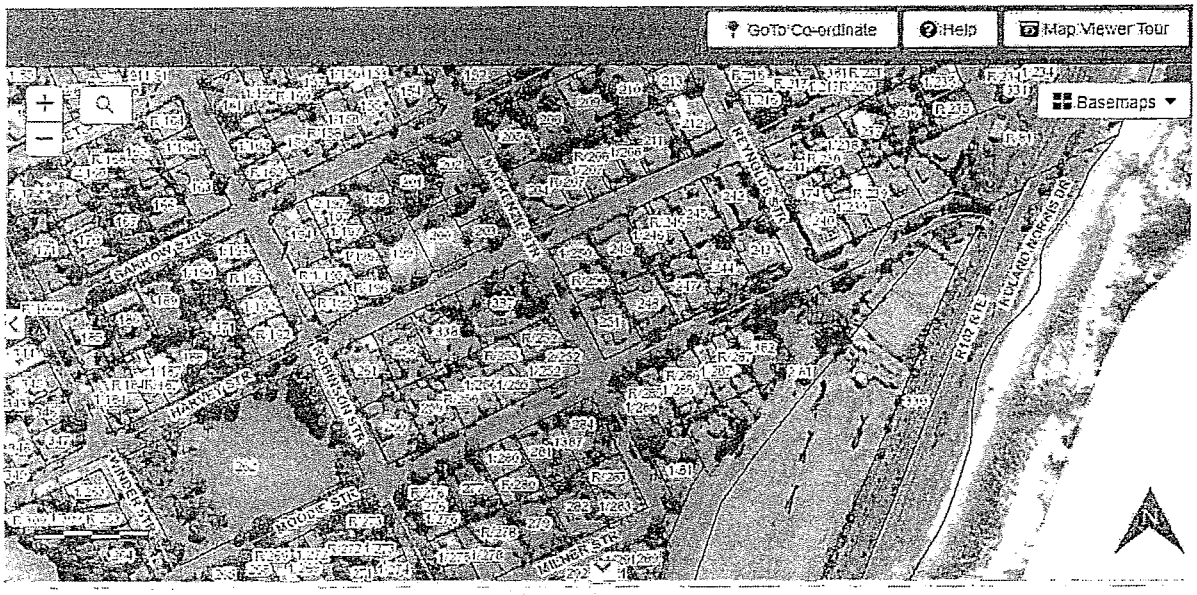


FIGURE 1 : REGIONAL CONTEXT



DOCREF	AREASG	STRNUM	STRNAME	STRTYPE	SUBURB	DISTRICT
SV 360/53	0.202	57	HARVEY	STREET	UMKOMAAS	UMKOMAAS

FIGURE 2 : STUDY SITE

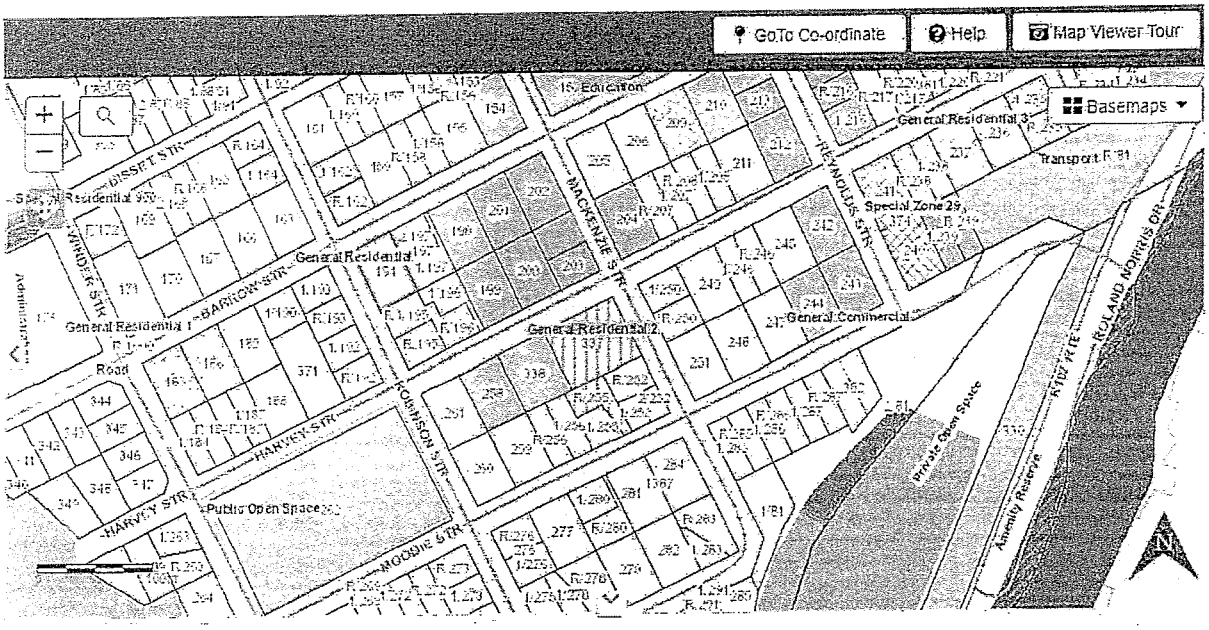


FIGURE 3 : CADASTRAL LAYOUT

5. VISUAL INSPECTION

A visual assessment of the building was conducted at ground level only. Our assessment included an appraisal of the external envelope, as well as an appraisal of the integrity of the internal envelope, including the roof assembly. In addition, an assessment was conducted to determine the level of compliance to SANS 10400, which forms a guideline to the Local Authority in assessing "works" of this nature.

6. LIMITATIONS

6.1 The investigation has been conducted in accordance with generally accepted engineering practice, and the opinions and conclusions expressed in the report are made in good faith based on the information at hand at the time of the investigation.
6.2 The contents of this report are valid as of the date of preparation. However, changes in the condition of the site can occur over time as a result or either natural processes or human activity. In addition, advancements in the practice of geotechnical & structural engineering and changes in applicable practice codes may affect the validity of this report. Consequently, this report should not be relied upon

after an eclipsed period of one year without a review by this firm for verification of validity.

6.3 Although the confidence in the information is reasonably high, some variation in the geotechnical and environmental conditions should be expected.

6.4 Geotechnical reports, and engineering layouts were not available at the time of preparation of this report.

7. GEOLOGY

From the regional geology map *2930 Durban 1:250 000* it can be inferred that the site is underlain by Quaternary dune deposits namely the Berea Formation. These deposits have been described as a cohesive unit of sediments comprising subangular to rounded quartz grains and considerable amounts of ilmenite and magnetite, with individual quartz coated in hematite or hydrated oxide.

According to the guidelines provided by the NHBRC, it is considered that the site classifies as C2. The parameters, as given by the NHBRC together with the foundation recommendations are given below in Tables 1 hereunder.

TABLE 1 : NHBRC RESIDENTIAL SITE CLASS DESIGNATIONS

TYPICAL FOUNDING MATERIAL	CHARACTER OF FOUNDING MATERIAL	EXPECTED RANGE OF TOTAL SOIL MOVEMENTS (mm)	ASSUMED DIFFERENTIAL MOVEMENT (% OF TOTAL)	SITE CLASS
Silty sands, sands, sandy and gravely soils	Compressible and potentially collapsible soils	>10	75%	C2

8. STRUCTURAL ASSESSMENT

At the time of our visit, the building was vacant. Our assessment was non intrusive and consisted primarily of a visual assessment of the internal and external envelope. The building has been severely vandalized with most of the roof and flooring stripped. The remnants of the building have suffered from both material deterioration and decay as

a consequence of a lack of maintenance and exposure to the elements, a direct result of the vandalism. The existing structure appears to be a traditional and dated double storey structure constructed in part with traditional clay bricks.
Our investigation commenced with an assessment of the external envelope of the building to ensure that the structure was stable before entering the unit.

8.1 FOUNDATIONS

An in depth exploration of the subsurface layers, founding conditions and existing foundations could not be carried out due to time constraints. In terms of SANS 10400 Part H, the foundation of any building shall be designed and constructed to safely transmit all the actions which can reasonably be expected to occur from such building to the ground and in such a manner that any local damage (including cracking), deformation or vibration do not compromise the efficient use of a building or the functioning of any element of a building or equipment within a building
The requirements of the NHBRC in so far as foundations are concerned, are aligned to the South African National Standards (SANS 10400 Part H). These requirements are included in Table 1 below and is site specific.

TABLE 2 : NHBRC PART 1 SUMMARY OF FOUNDATION DESIGN

SITE CLASS	ESTIMATED TOTAL HEAVE (mm)	CONSTRUCTION TYPE	FOUNDATION DESIGN & BUILDING PROCEDURES (expected damage limited to category 1)
R	-	Normal	Normal construction (strip footing or slab on ground foundation)
H1	7.5 - 15	Modified normal	Lightly reinforced strip footings. Articulation joints at all internal & external doors & openings. Light reinforcement in masonry Site drainage & plumbing/service precautions.

The subject site falls within the eThekwini Municipal area and are governed by the current requirements of the Local Authority which require that all structures are founded on an engineered foundation in terms of the National Building Regulations and Building Standards Act 103 of 1977 and that the founding solution be designed and certified by a registered engineer as required by section 14(2A) of the National Building Regulations and Building Standards Act 103 of 1977.

At this point, it is reasonable to assume that given the age of the building, it is unlikely that the existing foundations will comply with the current guidelines and standards enshrined within the NBR & Building Standards Act 103 of 1977. This, however, is subject to further scrutiny and investigation.

8.2 WALLS

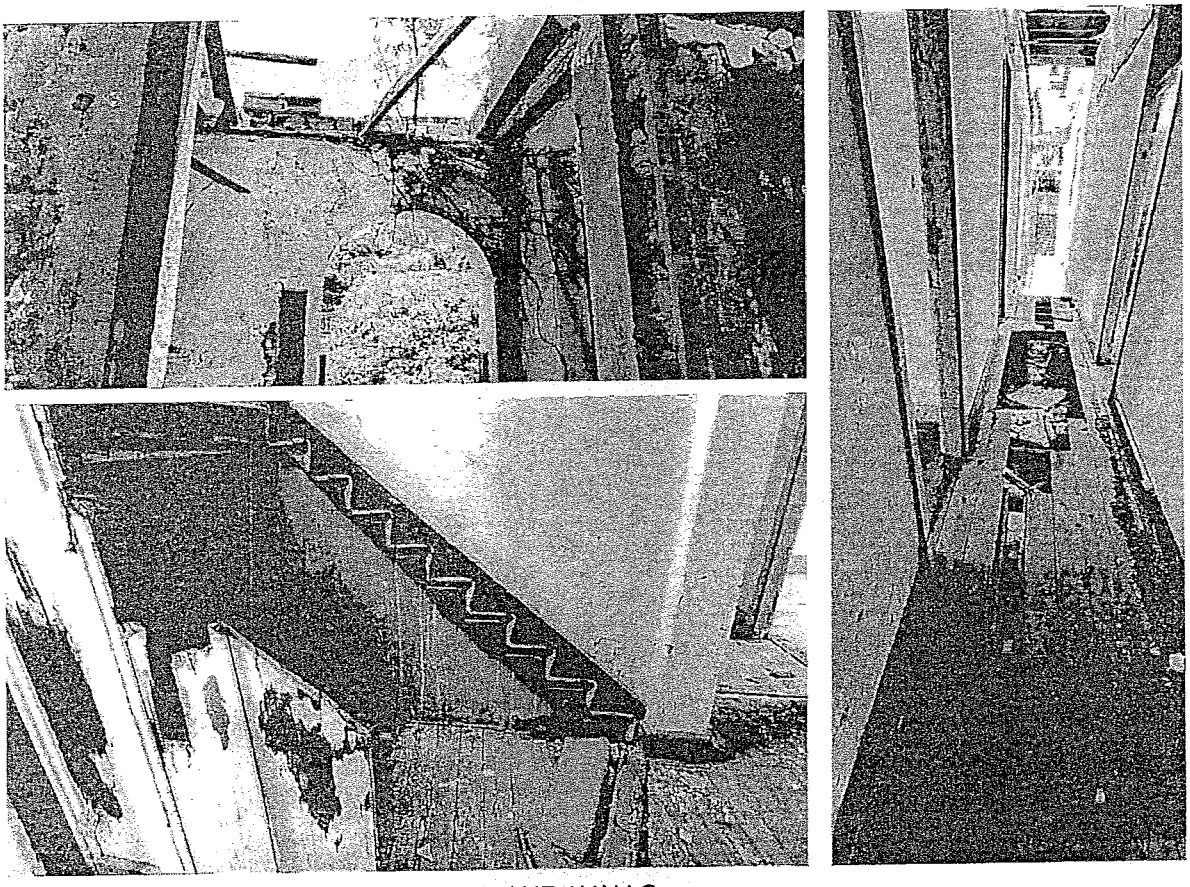
The external wall envelope was typically built with clay commons. Any wall must be capable of safely sustaining any loads to which it is likely to be subjected to and in the case of any structural wall, such wall must be capable of safely transferring such loads to the foundations supporting such wall.

SLIDE 1 : MOISTURE INTRUSION ALONG EXTERNAL ENVELOPE

SLIDE 2 : DEBONDED PLASTER ALONG EXTERNAL ENVELOPE

Localized cracks were encountered and noted. In certain instances, these were a result of saturation within the substrate and/or subsurface saturation which can be expected considering the geological profile of the area. Spalling and pitting along the soffits of the entrance slab was noted. For the most part, the walls appear to have been exposed to the elements both internally and externally. Localized signs of material deterioration through moisture intrusion along the mortar joints and plaster was noted with evident signs of material decay. Cracked, open, and debonded mortar joints have allowed increased levels of bulk water from rain accumulation to infiltrate the masonry. The significant distress observed along the internal envelope can be attributed to water flowing down the face of the wall and migration of water within the masonry due to gravity.

SLIDE 3 : SPALLING ALONG SOFFITS AND MOISTURE INDUCED DAMAGE



SLIDE 4 TO 6 : DAMAGE TO FLOORS AND WALLS

In certain instances, timber frames appear to be affected by both dry rot which typically occur when the timber becomes too wet with a moisture content of over 20%. In addition, there also appears to be signs of wood borer. This, however, needs to be confirmed by an entomologist. The suspended flooring over the basement has been stripped in most parts. Portions of the remaining timber flooring are in a poor condition.

8.3 ROOF

SLIDE 7 : DAMAGED TO ROOF AND INTERNAL ENVELOPE

The South African National Standards : SANS 10400 Part L states that:

"The roof of any building shall be so designed and constructed that it safely sustains any actions which can reasonably be expected to occur and in such a manner that any local damage (including cracking) or deformation do not compromise its functioning".

In other words, if there is a major wind or some other inclement weather conditions, the roofs of buildings are expected to be able to remain in place and protect the occupants from the elements without themselves being damaged. In addition to the roof being durable and watertight, the roof must be adequately anchored to protect against wind uplift.

Roof trusses are not only expected to be strong enough, but our Building Standards also expects them to perform under serviceability. Prolonged exposure causes timber to distort and sag. Pre-cambers are compromised and instead differential deflections between trusses or alternate timber assemblies can be expected.

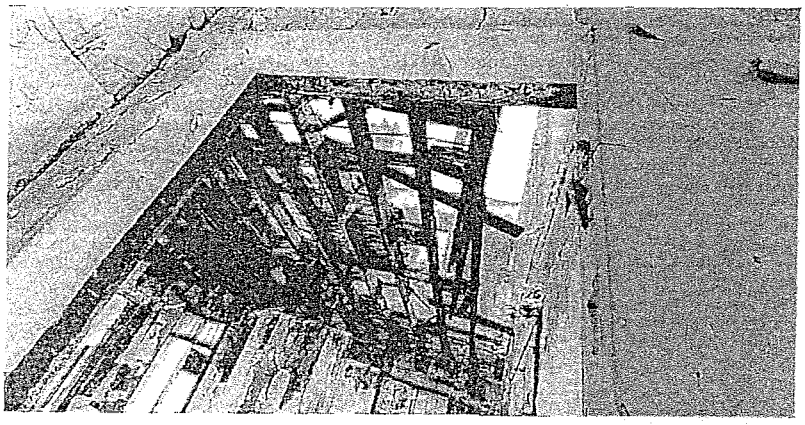
Firstly. Most of the roof has been stripped. Parts of the roof that remain are not compliant with our current guidelines due to design constraints and material deterioration.

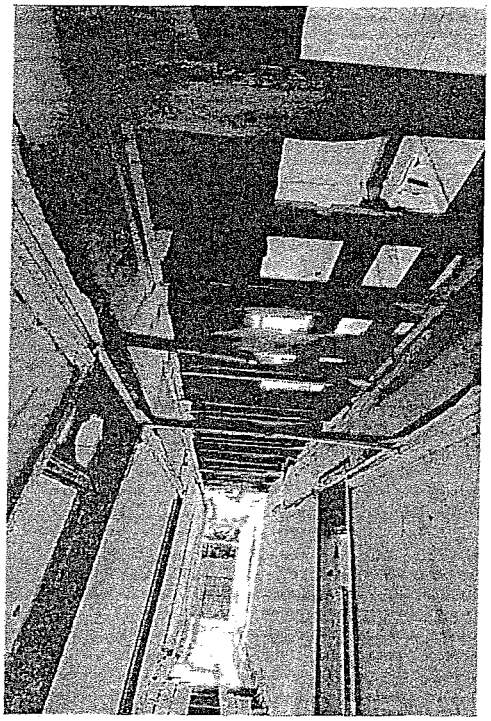
The changing moisture content of timber and timber products exposed to cycles of rain and sun can cause weathering and mechanical degradation of the timber including swelling and shrinkage. The degree to which this occurs will depend on various factors including the timbers inherent properties. Shrinkage and swelling can result in the timber cracking and splitting as well as connections being loosened.

Timber is typically hygroscopic suggesting they will take up or lose moisture in harmony with their surroundings. Where the timbers moisture content exceeds 20% for prolonged periods, there can be fungal degradation or decay, particularly in untreated timber of low natural durability.

Where moisture is present in timber for long periods of time, fungal damage or rot may begin. Rot can be deceptive, because whereas the timber may appear whole on the

surface, the insides could be eaten away by fungi. The discussion points do not imply that these symptoms are collectively prevalent within the roof assembly. It has been raised as points of concern during our examination. There are evident signs of dry rot and swelling which would suggest that these members will need to be removed and carted off site.





SLIDE 8 & 9 : DAMAGES TO ROOF

9. CONCLUSION

The subject unit has been assessed in line with the guidelines of SANS 10400 Parts H, K and L.

1. Further investigation is needed to determine whether the subject unit complies with SANS 10400 Part L since no foundation investigations along the subsurface levels were carried out. However, given the age of the building, it is unlikely that the foundations were designed to cope with the current guidelines where allowances are made to deal with unusual weather phenomena.

2. The current SANS requirements are quite clear in terms of what is considered acceptable within the ambit of the National Building Regulations 103 of 1977.

Apart from the compliance issues, the structural integrity and fabric of the walls have been compromised through moisture intrusion, a general lack of maintenance coupled with vandalism.

2. The roof has been stripped. Parts of the roof that are present do not comply with The South African National Standards : SANS 10400 Part L.

3. The subject unit is an old building and consideration was given to the age of the build. The structural fabric of the building has been compromised and continual exposure to the elements will lead to further structural deterioration and decay.

4. In terms of Section 14(2A) of The National Building Regulations & Building Standards Act 103 of 1977, the building cannot be considered or certified stable.

5. Considering the condition of the structure, the building falls within the ambit of Section 12 of the National Building Regulations and Building Standards Act 103 of 1977. All unstable portions of the building need to be decommissioned and removed by a specialist. The perimeter of the building must be cordoned off to prevent access into the building until the site is declared safe.

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Date : 12th December 2022