230 CURRIE RD DARD REPAIRS & RENOVATIONS DURBAN

DESIGN, PROJECT MANAGEMENT & CONSTRUCTION OF DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT RESTORATION PROJECT

WIMS: 069538

SITE INSPECTION REPORT

CIVIL AND STRUCTURAL WORKS

CLIENT
Department of Public Works
Kwazulu Natal Province, Ethekwini
Region Private Bag X54336 Durban
4000

PREPARED BY
Tectura Projects (Pty) Ltd

January 2023

Table of Contents

List of Annexures

List of Figures

1.0 INTRODUCTION

1.1 General

Tectura Projects have been appointed by the KZN Department of Public Works as the Principal Agent and Project Manager to oversee a multidisciplinary professional team to provide consultancy services for the repairs and renovations to the state building on 230 Currie Road, Durban for use by the Department of Agriculture and Rural Development (DARD), Kwa Zulu Natal Province.

This Site Inspection Report is submitted in line with the requirements of the terms of engagement for the consultancy services. The aim of the inspection was to assess the condition of the existing buildings and determine the potential for refurbishment of the buildings to meet the end user requirements.

The report gives a general description of the building and summarises the Consultant's findings after carrying out an extensive condition assessment survey of the existing buildings with respect to civil and structural engineering components.

1.2 Project Location

The project is located at street address 230 Currie Road, Musgrave, Berea, Durban. The site coordinates are 29°50'46.36"S, 31° 0'14.00"E. The general plan of the site based on a google aerial is shown in Figure 1 below.

The location map and plan of the site based on google aerials are shown in Figures 1 and 2.

Fig. 1: Location Map

Fig 2: General Site Layout Plan

2.0 SCOPE OF ASSESSMENT

The scope of work for the condition assessment included the following:

a) Assessment of the existing buildings for any civil and structural defects, distress, deformations as well any material deterioration.

b) To identify any systems deficiencies observed during the assessment.

c) Recommend the necessary action to be taken including remedial works or full structural investigations for all affected structural elements associated with the buildings.

d) Assess the potential for refurbishment of the existing buildings including additions and alterations to the buildings.

3.0 ASSESSMENT METHODOLOGY

3.1 Nature of Assessment

The condition assessment comprised the following activities:

a) Review of the existing drawings and available information for the buildings.

b) A visual inspection and detailed appraisal of the existing buildings and external services.

A Professional Civil / Structural Engineer and his technical support team were assigned to conduct the visual inspections and prepare the assessment report. A preliminary inspection was undertaken on 17 November 2022 followed by a detailed inspection on 12 December 2022. Photographic records of the general buildings status and key identified issues were taken and are provided in Annexure B of the report.

3.2 Limitations

The findings of the assessments have the following limitations:

a) Findings are based on visual observations only.

b) No as-built civil/structural engineering drawings were available at the time of inspection. The engineer's judgement on critical areas for inspection was relied upon.

c) Some parts of the structural system are covered by architectural finishes and debris hence defects and deficiencies that might have manifested in inaccessible areas may not be covered in this report.

d) We did not perform a full structural investigation nor any analysis of the existing structural members to confirm adequacy.

e) Professional opinions drawn in this report are based on and limited to the condition and visual observations made at the date of inspection.

4.0 DESCRIPTION OF THE EXISTING BUILDINGS

4.1 General Layout

There are several existing buildings on site. There are two main blocks, two outdoor buildings and a temporary timber structure. See figures 3 and 11 for an indicative site plan and figures 4 to 10 for a general view of the buildings. The as-built floor layout sketches for the four main blocks (A-D) are attached to this report as Annexure A.

The site measures approximately 0.75ha. It slopes down steeply from the west to east. The site altitude ranges from a high of about 74m at the north western corner to about 63m at the south eastern corner. The natural ground slope of the site is estimated at about 20% with some areas as steep as 24%.

The project site has historical significance as it was an observatory site in the 1980s and it later became a state veterinary building. The existing buildings are reportedly older than 65 years and are hence subject to Heritage Act provisions.

4.1 The Structural System

The type of structure for the buildings has been gleaned from the visual site assessments as no as-built structural drawings for the buildings were available.

From our observations, the Block A (see figures 2 and 3) is a 2-storey structure with a partial sub-basement. The building is constructed of a combination of brick masonry, reinforced concrete and structural timber. The main roof comprises of timber structure with concrete tiles. The walkway / verandah roofs comprise of timber structure with asbestos roof sheets. A combination of brick and reinforced concrete are used for the retaining and basement walls. The floor for the section without basement has a suspended timber floor over a concrete surface bed. The floor over the basements comprises of an RC beam and slab floor system. An RC staircase is provided as access to the basement area.

Block B (see figures 5 and 6) is a 2-storey reinforced concrete structure with brick masonry infill. The roof structure comprises of a timber structure but roof covering is missing but it would appear it was steel roof sheets. The suspended floor over the main building section is an RC beam and slab floor system while that of the verandah is composite steel slab. An RC staircase

is provided as access to the first floor area. A combination of brick and reinforced concrete are used for the retaining and basement walls on the rear side of the building.

The rest of the outbuildings on site are all single storey brick masonry structures with Block C (covered parking) having a timber structure and asbestos roof sheets. Block D has a concrete roof slab. There is also a timber building on site which has asbestos roof sheets.

The foundations types for all the buildings could not be determined immediately.

Numerous steps and retaining walls across the site catering for the steep nature of the site.

Fig 3: External View of Main Block A

Fig 4: Typical Interior View Block A

Fig 5: External View of Main Block B

Fig 6: Internal View of Block B

Fig 7: External View of Block C

Fig 8: Internal View of Block C

Fig 9: External View of Block D

Fig 10: External View of Timber Structure

5.0 SUMMARY OF OBSERVATIONS AND FINDINGS

During the assessment, the following observations of significance to the structural integrity of the buildings were noted. A photographic record of the general building status and identified issues is provided in Annexure B of this report.

5.1 Block A

Major structural defects were observed for this building as detailed hereunder.

Roofs

The timber roof structures and coverings for the building have largely collapsed due to decay and rotting of the structure. See photos 1 to 4.

The walkway roof was observed to be of asbestos material hence a health hazard and must therefore be removed as per current OHS requirements. The timber structure for this roof is also collapsing.

Reinforced Concrete Structure

There are numerous concrete elements where signs of structural deterioration was noted. See photos 5 to 16. The defects include spalling of concrete, rusting of reinforcement and cracks on beams and slabs. We could not determine whether these cracks extend to the top of the slabs as there was no access due to the floor finishes (suspended timber floor) at the ground floor level.

Water ingress is a very serious problem affecting the building. It was raining on the day of the inspection and the suspended slab for the basement was very damp and evidence of water ingress could be seen.

Suspended Timber Floors

Extensive damage was noted on the suspended timber for the ground floor areas. The timber has rotten and collapsed in most areas. Certain areas of the floors are inaccessible due to this collapse. See photo 20.

Walls

Major cracks were noted on some walls especially on the rear section of the block. Though the outer skin of the exterior facebrick walls for the building appears not to be in a very bad condition, the inner face of the walls was noted to have problems. Water damage to walls was also noted on numerous walls across the building. The damage could largely be attributed to the continued

exposure of the walls to inclement weather for an extended period of time. There are also waterproofing problems on the basement walls. Rising damp on walls was also noted. A number of walls have also been damaged during theft of fittings. See photos 13 to 18.

Retaining Walls

The facebrick retaining wall at the front of the building was noted to have horizontal cracks indicating push out by the retained earth.

Foundations

No noticeable defects above the ground could be attributed to foundation problems. The foundations are therefore deemed adequate for the current building.

5.2 Block B

Major structural defects were observed for this building and it has fallen into a serious state of disrepair rendering the building unsafe. The entire first floor level was not accessible during the inspection due to collapsed link walkway at that level. The major defects noted are detailed hereunder.

Roofs

The roof coverings for the building are non-existent leaving the entire structure exposed to inclement weather for extended period of time. Timber roof structures are collapsing due to decay and rotting of the timber. See photos 25 to 28.

Reinforced Concrete Structure

Numerous concrete elements with signs of structural deterioration were noted. See photos 29 to 34. The defects include spalling of concrete, rusting of reinforcement and composite steel deck and cracks on slabs, beams and columns. The slab cracks were noticeable across the entire span of the slab and at regular intervals. We also could not determine whether the suspended slabs cracks extend to the top of the slabs as there was no access from above due to collapsed walkway at the first floor level.

Water ingress is a very serious problem affecting the building. It was raining on the day of the inspection and the suspended slabs for the first floor slabs were very damp and evidence of water ingress could be seen from below.

Walls

Most of the building walls are in a very poor condition. See photos 35 to 40. Major cracks were noted on numerous walls across the building. Water damage to walls was also noted on numerous walls. The bricks for the walls were observed to be deteriorating by spalling (surface flake off) as a result of the water damage. Signs of rising damp on the walls was noted.

Retaining Walls

The wall at the rear of the building was also noted to have horizontal cracks indicating push out by the retained earth.

Foundations

Though no major defects above the ground could be directly attributed to foundation problems, the poor state of the building may also be due to issues stemming from foundation problems especially the cracks on walls.

5.3 Block C

Like the two main buildings, this building is also falling into a serious state of disrepair. See photos 43 to 50. Timber roof structure is showing signs of decay and rotting of the timber. The roof covering is of asbestos material hence a health hazard.

The rear wall of the building, which serves as retaining wall, has bulged out at mid-height and cracks have also developed on the wall. Numerous wall cracks were also noted on other walls. Rising damp on walls was also noted.

5.4 Block D

This is the only building that is in a fairly good condition on this site. See photos 51 to 54. The only defects noted related to roof slab waterproofing problems and a damaged lintel beam above the main door opening.

5.5 Timber Structure

This is a temporary timber structure that is also in a very poor condition. See photos 55 to 60. The defects mainly relate to decay and rotting of the timber. The roof covering is of asbestos material hence a health hazard.

5.6 External Works

Access Road

The tarred driveway that links both access gates is showing signs of surface failure with numerous crocodile cracks. There is vegetation growth on the road due to lack of maintenance of the road. See photos 61 to 64.

External Retaining Walls and Walkways

Majority of the walls are being undermined by trees behind the walls resulting in cracks. The brick retaining wall along the driveway by the main gate has a vertical crack over the full wall height. The foundations for this wall are also exposed. See photos 65 to 66.

The numerous walkways around the site are in a fairly good condition apart from some minor cracks on the slabs. See photos 67 to 68.

External Civil Services

At the time of the inspection most of the existing civil services were covered in vegetative debris and not very visible for a detailed assessment. The site toposurvey is expected to pick up the location of these services after which a further assessment will be undertaken. However, given the general poor condition of the site, it is not expected that the services are still in a serviceable condition and extensive remedial work would also be required.

6.0 BUILDINGS SUITABILITY FOR CONVERSION

Based on the DARD space requirements, the current form and configuration of the existing buildings cannot meet their requirements. The changes that would be required to adequately meet the end users' needs entail extensive changes to the buildings including structural re-configuration, retrofitting and extensions.

Given the current poor status of the key buildings (Block A and B), the advanced age of the buildings and the unknown nature of the existing structures, no major changes in terms of alterations should be introduced to the structures. Independent structural systems for the proposed changes / additions would have to be considered while maintaining the existing frames and walls. This is deemed impractical given the extent of the changes that would be required. Demolition of some of the existing walls and reinforced concrete elements like staircases would be required to make way for the changes.

Further, if changes were to be introduced to the buildings, the unknown nature of the existing structures would entail detailed structural diagnostic tests and further investigations be conducted in order to determine the adequacy of the structures.

It is considered more feasible that the buildings be demolished and reconstructed. The reconstruction would also give the Architect a chance to completely reorganise the spaces.

7.0 CONCLUSIONS

Based on the detailed structural condition assessment of the existing buildings and the subsequent analysis of the end users' needs, the following are our conclusions:

a) Generally, all the buildings are dilapidated and in a very poor state both structurally and aesthetically. All the key buildings are also not in use and have fallen into a serious state of disrepair rendering them unsafe. Most of the buildings finishes and fittings, like doors, windows, roof covers have been vandalised or have collapsed leaving the structures as bare shells.

b) Further and most importantly, numerous signs of structural failure were noted on a number of key building elements including suspended floors, false wooden floors, walls, roof structures and retaining structures.

c) Some of the roofs were observed to be of asbestos material hence a health hazard and must therefore be removed as per current OHS requirements.

d) The current buildings cannot adequately accommodate all the space requirements of the end user and some extensions of the buildings would be required.

e) It is apparent that the buildings in their current state may not be in full compliance with the minimum standards for such buildings as stipulated in the National Building Regulations. Consequently, substantial re-modelling of the existing buildings would be required in order to ensure compliance.

f) It is our considered opinion that the existing buildings in their current state cannot competently handle additional loading and it is therefore recommended that no extensive changes are considered for the buildings unless independent structural systems for these changes are introduced. However, introduction of independent structural systems is also not considered feasible given the impracticality of introducing such changes from both a functional and cost point of view.

g) It is deemed impractical, non-functional and not cost effective to attempt to convert the buildings for the new intended use unless the buildings are to be retained for purposes of ensuring compliance with the heritage restrictions with regards to demolition.

8.0 RECOMMENDATIONS

The following are our recommendations:

a) Based on the detailed structural condition assessment of the existing buildings and the subsequent assessment of the end users' needs, the current buildings even with extensive re-modelling will not adequately meet the needs of the end user, DARD.

b) A total re-development of the site is considered more feasible and it is therefore recommended that barring any heritage restrictions, the existing buildings be demolished to make way for a new development specifically designed to adequately meet all the needs of the end user and also comply with the current building regulations.

c) If the case for retention of the buildings for heritage purposes overrides the above considerations, then additional investigations and structural diagnostic testing of the buildings will be necessary in order to determine the adequacy of the existing structures given the extensive deterioration that has occurred to the buildings.

ANNEXURE A: AS-BUILT FLOOR LAYOUT SKETCHES

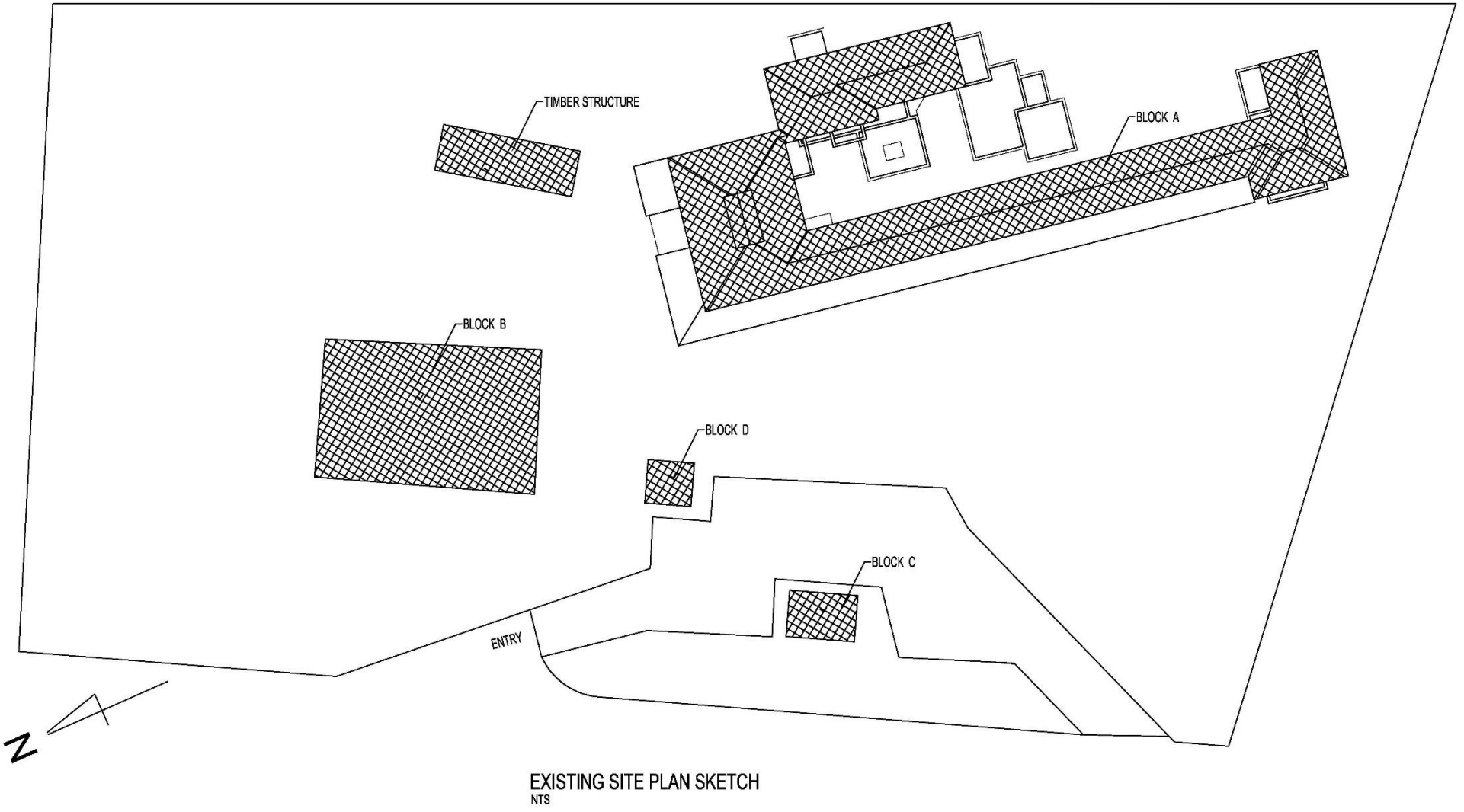
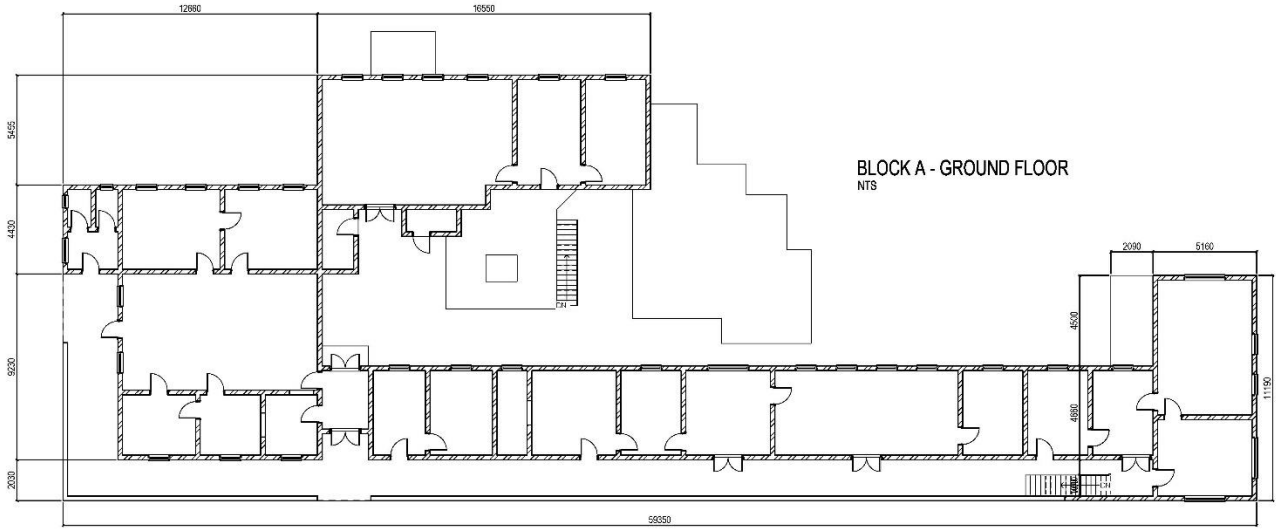
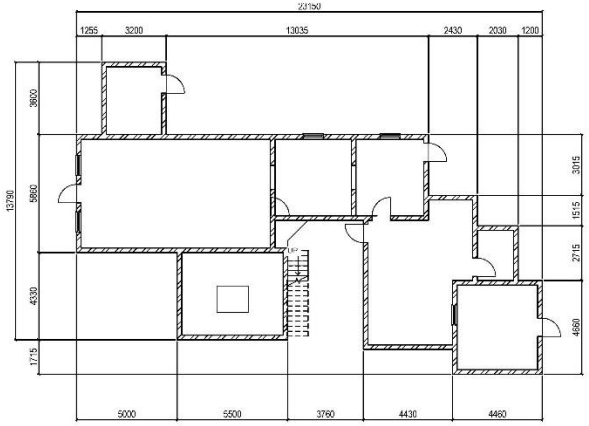


Fig 11: Existing Site Plan Sketch



BLOCK A - GROUND FLOOR
NTS



BLOCK A - BASEMENTS
NTS

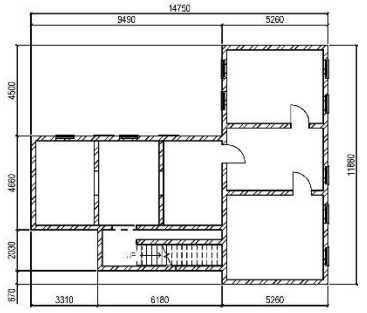


Fig 12: General Layout of Block A

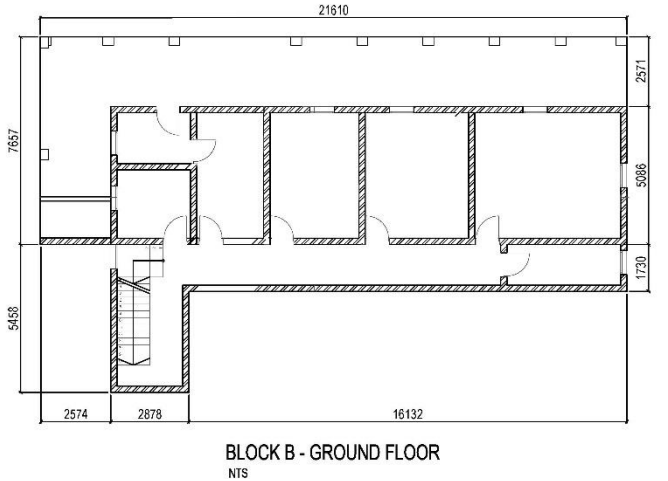
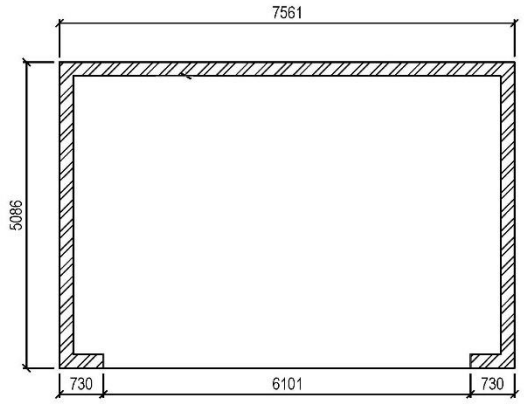
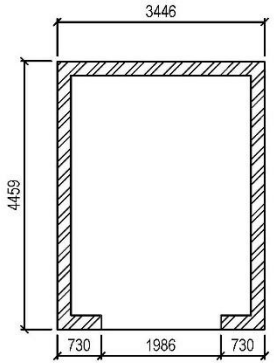


Fig 13: General Layout of Block B



BLOCK C
NTS



BLOCK D
NTS

Fig 14: General Layout of Block C & D

ANNEXURE B: PHOTO REPORT

BLOCK A (MAIN OFFICE BUILDING)

Photo 1: Collapsing Roof Structure

Photo 2: Missing Walkway Roof Corner Timber Column

Photo 3: Completely Collapsed Roof Structure

Photo 4: Collapsed Roof Structure Debris

Photo 5: Spalling of Concrete – Basement Roof Slab

Photo 6: Spalling of Concrete and Rusting Rebar – Basement Roof Beam

Photo 7: Spalling Concrete and Failure of Beam / Column Connection

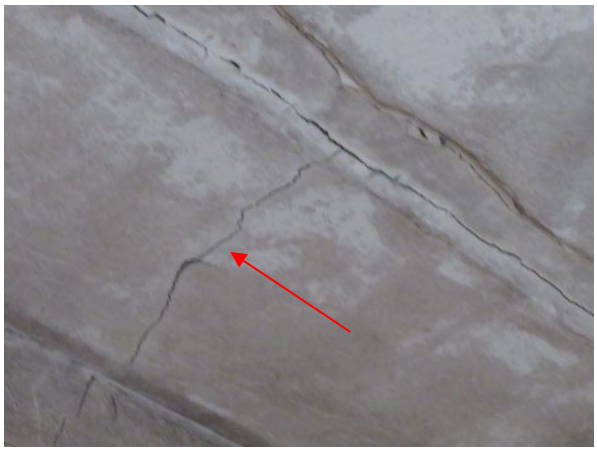


Photo 8: Cracked Roof RC Beam

Photo 9: Collapsed RC Element

Photo 10: Signs of Water Ingress through RC Slab and Beams

Photo 11: Very Poor Condition of RC Slab Soffit Signs of Water Ingress through RC Slab

Photo 12: Very Poor Condition of RC Slab Soffit & Rusting Steel Elements

Photo 13: Water damage to basement walls

Photo 14: Water damage to walls

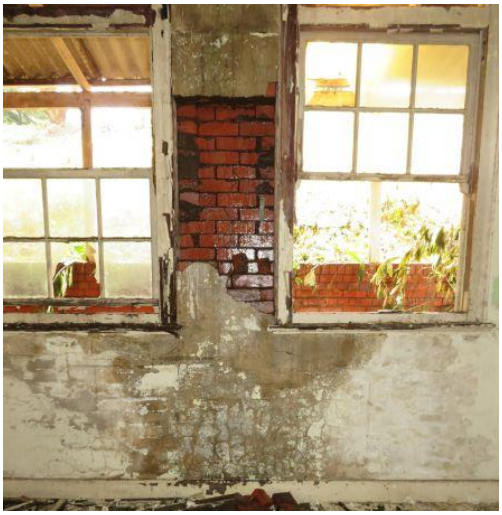


Photo 15: Damaged Internal Walls

Photo 16: Water damage to walls (noted green mold on walls)

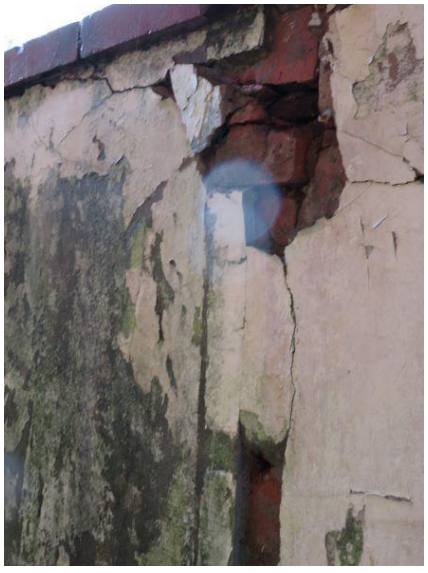


Photo 17: Major Cracks on Walls; Green mold on walls

Photo 18: Major Cracks on Walls; Rising damp on walls

Photo 19: Major Crack on the Surface Bed

Photo 20: Collapsed Timber Floor

Photo 21: Horizontal Cracks on Brick Retaining Wall

Photo 22: Stairs to Basement

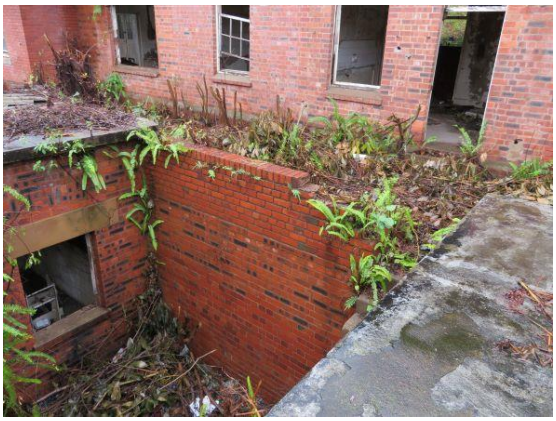


Photo 23: Roof slab showing poor condition (Debris and vegetation on top of slab)

Photo 24: Roof slab showing poor condition (Cracks on slab)

BLOCK B (OFFICE BUILDING)

Photo 25: Bare roof structure without roof sheeting

Photo 26: Collapsing Roof Structure

Photo 27: Collapsing Roof and Ceiling Structure

Photo 28: Collapsing Roof Structure Debris

Photo 29: Rusting Composite Slab Steel Deck

Photo 30: Spalling Concrete & Rusting Composite Slab Steel Deck

Photo 31: Cracking Beam / Column Connection

Photo 32: Cracking Beam / Column Connection

Photo 33: Very Poor Condition of RC Slab Soffit Signs of Cracks and Water Ingress through Slab

Photo 34: Very Poor Condition of RC Slab Soffit Signs of Cracks and Water Ingress through Slab

Photo 35: Typical External Wall – Disintegrating Walls and Rising Damp Signs

Photo 36: Disintegrating Brick Walls

Photo 37: Major Cracks on Gable Wall

Photo 38: Major Cracks on Internal Wall

Photo 39: Unsupported Sections of Walls Due to Collapsed / Vandalised Support System

Photo 40: Collapsed walkway slab & Failing lintel system

Photo 41: Stairs to 1st Floor Level

Photo 42: Collapsing Stair Steps (Note poor condition of external wall)

BLOCK C (COVERED CARPARK/ GARAGE)

Photo 43: Timber beam showing signs of rotting (Note asbestos roof sheeting)

Photo 44: Timber beam showing signs of rotting

Photo 45: Timber showing signs of rotting

Photo 46: Timber showing signs of rotting

Photo 47: Major cracks on side wall

Photo 48: Major cracks on back wall

Photo 49: Major cracks on retaining (back) wall(bulging)

Photo 50: Signs of rising damp on back wall

BLOCK D

Photo 51: Typical Brick Wall Condition (fairly good)

Photo 52: Typical Brick Wall Condition

Photo 53: Signs of Lintel Deflection (Plaster delaminating)

Photo 54: Signs of water ingress on RC roof slab

TIMBER STRUCTURE

Photo 55: Side View of Building

Photo 56: Front View of Building

Photo 57: Front View of Building (Note no retaining wall provided)

Photo 58: Poor Interior Condition of the Structure

Photo 59: Poor Interior Condition of the Structure

Photo 60: Poor Interior Condition of the Structure

EXTERNAL WORKS

Photo 61: View of Driveway from the Main Gate

Photo 62: View of Driveway from Gate 2

Photo 63: Typical Driveway Condition

Photo 64: Typical Driveway Surfacing Condition

Photo 65: Retaining wall by Main Gate (Note exposed foundations)

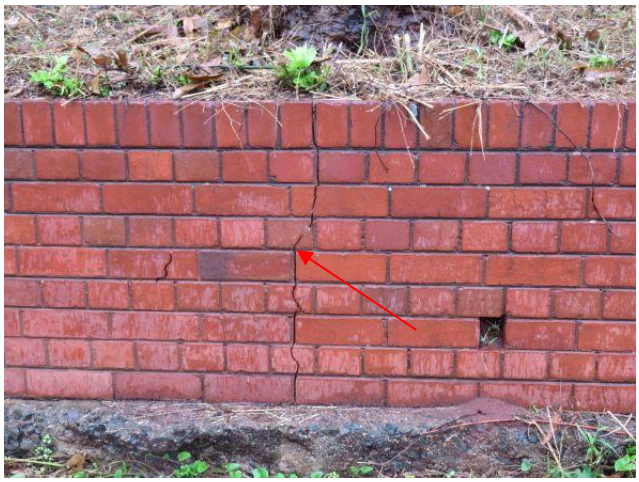


Photo 66: Crack on brick retaining wall

Photo 67: View of main steps to Block A from parking

Photo 68: View of main steps to Block A

Photo 69: Retaining wall at the lower boundary of the site

Photo 70: Typical View of site from the North Eastern Side