PRELIMINARY STRUCTURAL CONDITION ASSESSMENT REPORT FOR FISH JETTY BUILDING AT WILSON'S WHARF

Project Name	:Preliminary Condition Assessment (Fish-Jetty Building)
Project Number	: TBA
Author	: Asanda Dube
Owner	: Transnet National Ports Authority
Client/User	: Transnet National Ports Authority
Project Engineer	: Asanda Dube
Revision Number	: 00

Release Date:

Print Date: 23/05/2023

1 Table of Contents

List of Figures

Signatories:

Prepared by: _____ 07 June 2023

Asanda Dube
Civil Engineer
Date

Reviewed by: _____ 07 June 2023

Siphiwe Sibiya
Chief Engineering Technician
Date

Approved by: _____

Dumisani Mkhize
Deputy-Port Engineer
Date

2 EXECUTIVE SUMMARY

2.1 General Description

The Point Precinct in the Port of Durban consists of mainly automotive terminals and container terminals, other additional facilities include public restaurants along the Wilson's Wharf area. It is customary for Transnet National Ports Authority to periodically assess the condition of the infrastructure to ascertain the general condition of the infrastructure. These condition assessments are even more critical for building structures which are leased to private enterprises. This report will cover the results from a preliminary structural condition assessment which was conducted for the Fish Jetty building which is located within the Wilson's Wharf area.

Structural Condition Assessments are performed to ensure that structures meet all applicable building codes related to structural integrity. Conditions assessments look for signs of potential structural issues or problems with building maintenance that could lead to structural failures. The condition assessment is conducted to establish the structural integrity of the building.

Structural integrity is the fundamental part of engineering in the construction of a building. It ensures that the structure is fit to support and withstand the purpose it was built for, its structural load (including its own weight) without any deformation, breaking, brittle fractures, or collapsing due to human abuse and environmental factors, throughout its predicted lifespan. To assure this, it requires periodic inspection and maintenance such as painting, waterproofing and plumbing. Avoiding or delaying of which can result in catastrophic failure causing monetary loss, loss of life or severe injuries.

2.2 Physical Condition of the sites

The Fish Jetty building is located within the Point precinct in the Port of Durban. The surrounding area consists of mainly public facilities such as restaurants, and fishing companies. The building is currently being earmarked for accommodating the TNPA security department. Figure 1 shows the aerial view of the site.

Figure 1: Locality

Property Details:

Name:	(former) **FISH JETTY BUILDING**
	ERF ### - DURBAN
Address:	Canal Road, Durban, 4001
Purpose:	Fish Storage facilities and Office Accommodation
Size:	579.71m^2

3 INTRODUCTION

3.1 Purpose

The purpose of this condition assessment report is to present the findings following a condition assessment conducted at the former Fish Jetty building (Point Precinct) on the 9th of May 2023. The execution of the assessment was to ascertain the physical condition of the existing infrastructure. The condition assessment was only limited to a visual inspection of the structural members of the building.

The results from this report are intended to provide guidance to the Transnet (NPA) Property Department with regards to the future plans for the property e.g., demolish the building, upgrade the building, or repurpose the building.

3.2 Scope of Work

The scope of the assessment was mainly focused on the structural members of the building to the exclusion of electrical elements. The engineering team had to establish the condition of the structure and whether it is structurally sound to accommodate employees.

The main structural elements inspected consist of the following:

- Walls
- Timber Truss Rood
- Concrete Slab Roof
- Foundation

The team was also looking for any visible sign of defects caused by natural and unnatural events such as:

- Natural disasters like lightning, hail and storm, flood, and volcanic eruption.
- Vandalism
- Fire

4 CONDITION ASSESSMENT FINDINGS

This section comprises of the findings from visual inspection conducted on the 9th of May 2023. It gives the structural description of the building, assessment of excessive loading attributable to the misuse of the building structure, detailed assessment of defects and deterioration, and the survey of exposure to aggressive environment. The conclusion and recommendations provided include engineering views, assessment, and judgement. Of which such conclusions and recommendations could be different, depending on the professional engineer assigned to undertake the inspections at that time.

4.1 Structural Layout of the Building

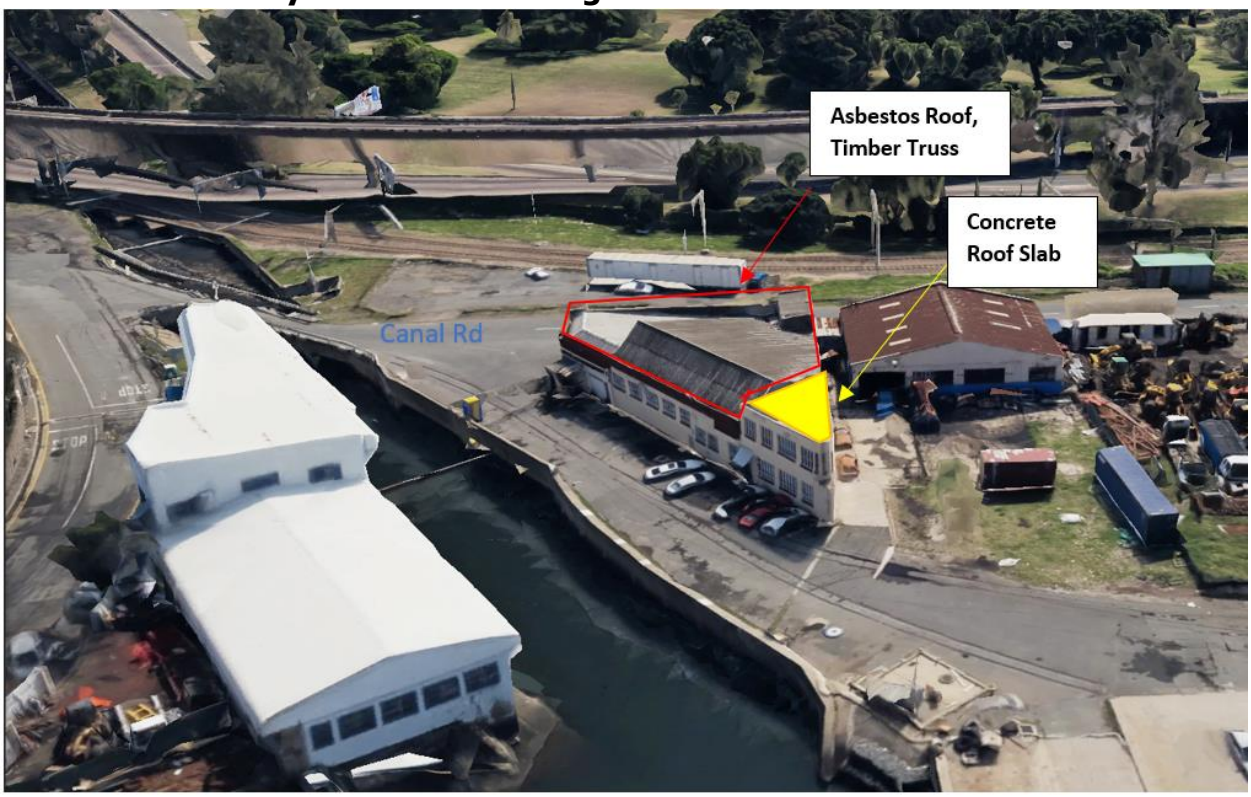

Figure 2: Fish Jetty Building Layout Plan

The building is comprised of two sections; east wing which comprises of office space, and west wing which comprises of a workshop and storage space as shown on Figure 2. Both sections have ablution facilities. The workshop section has a steel rollup door.

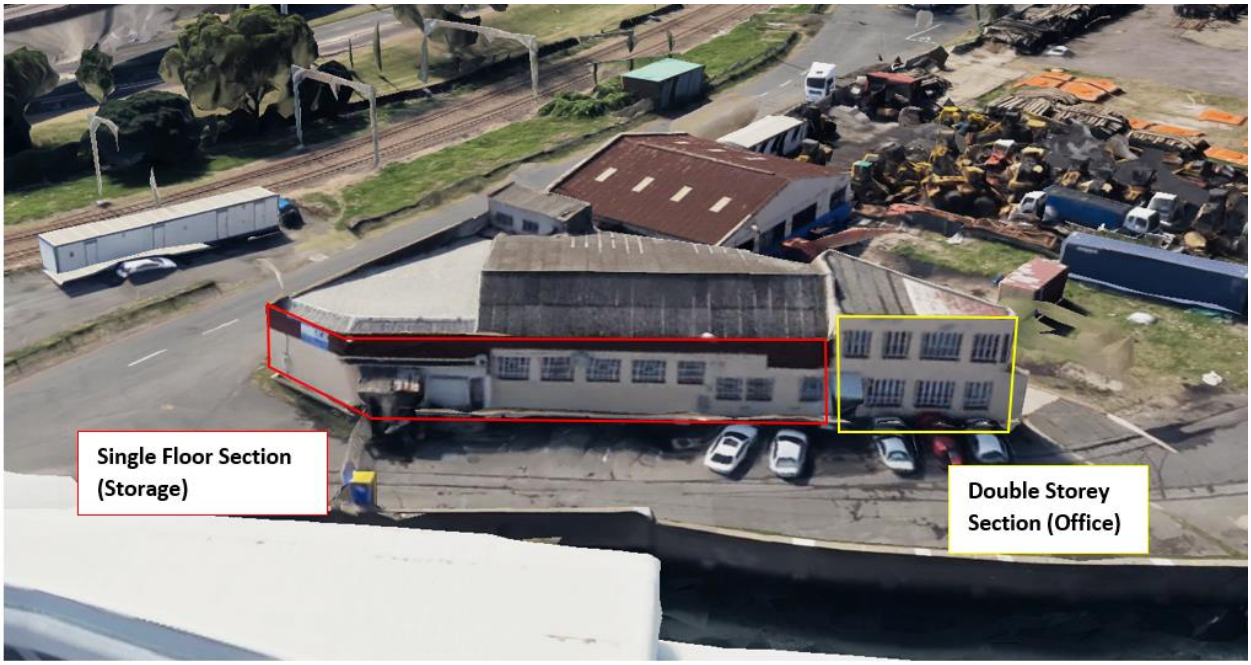

Figure 3: North Elevation of Building

The eastern section consists of two floors of office space, which is partitioned with drywall. Ablution facilities are located on both the ground floor and the first floor. The western section consists of a single-story layout with compartments used as "cold rooms" for frozen fish storage.

4.2 Interior and Exterior Walls

4.2.1 Interior Walls

Figure 4 below displays interior wall and the identified imperfections.

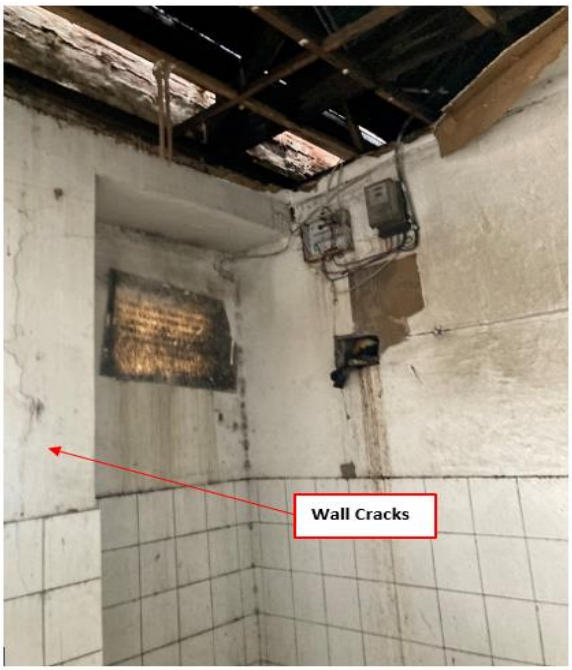

Figure 4: Interior Walls on the Western Section

For the interior walls, especially at the western section (formally used for frozen food storage), significant cracks can be seen. There were no loading testing excises done but with engineering judgement from the visual inspection; the cracks are taken as indication of minor settlement of the structure. The other sections consist of ceramic tiled walls. Significant cracks are also observable along the window lintels as shown on Figure 5. Structural dampness can also be observed on the walls of the building (Figure 6), this could be either the result of intrusion from outside or condensation from within the structure. A high proportion of damp problems in buildings are caused by ambient climate dependent factors of condensation and rain penetration.

Figure 5: Wall Cracks Close to Windows

Figure 6: Wall Dampness

The observation from the Eastern wing also indicates similar level of damages, with most significant cracks found around the window lintel. Figures 7 & 8 show the identified damages.

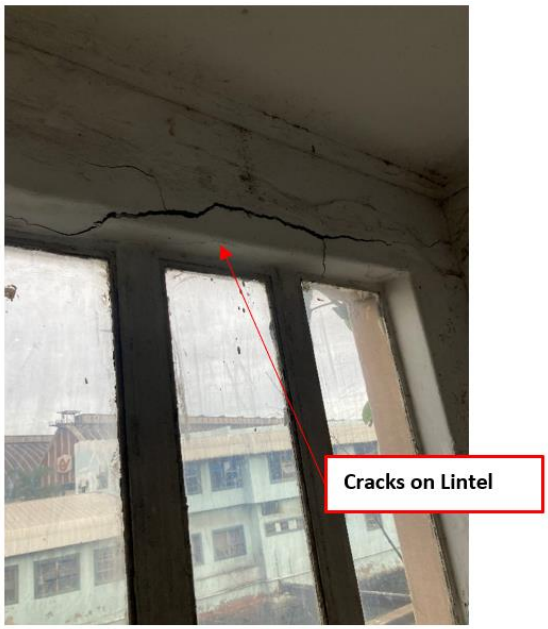

Figure 7: Eastern Section Cracks on Concrete Lintel

Note:

- The observed cracks require further investigation to establish the root cause. It is typical for vertical cracks to form on building walls when there is minimal settlement on the structure's foundation.
- The Wall dampness combined with cracks on the concrete lintel above the window could also compromise the strength of the wall.

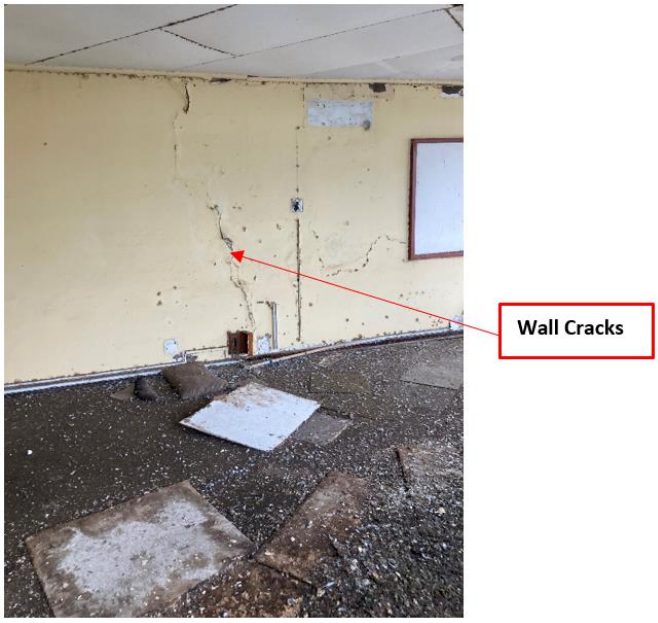

Figure 8: Walls Cracks on Eastern Section

4.2.2 Exterior Walls

The external walls are constructed from brick and mortar.

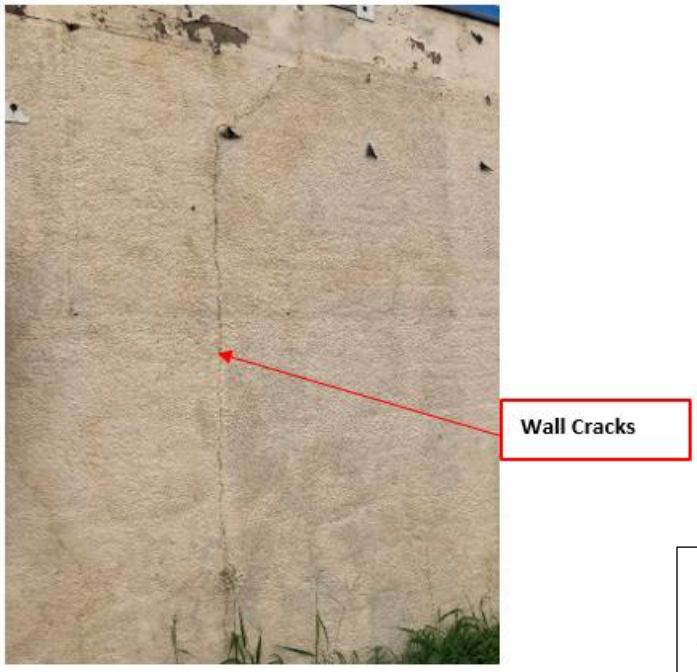

Figure 9: Exterior Cracks

Note:

A thorough structural examination is advised due to the discovery of small fractures primarily concentrated on the western portion of the exterior walls.

Figure 10: Exterior Wall Cracks on Western section

Figure 11: Exterior Wall (Eastern Section)

4.3 Roof and Ceiling

Findings from the building inspection reveal spalling on the soffit of the roof slab, specifically in the eastern section. In the western section, the roof is composed of asbestos sheets supported by timber trusses. The asbestos sheeting has sustained damage, and the trusses have been exposed to prolonged rain, leading to evident harm to the ceiling and carpets. Figures 12 & 13 show the extent of damage.

Figure 12: Concrete Spalling

Note:

During the condition assessment the top of the roof could not be accessed for visual inspection.

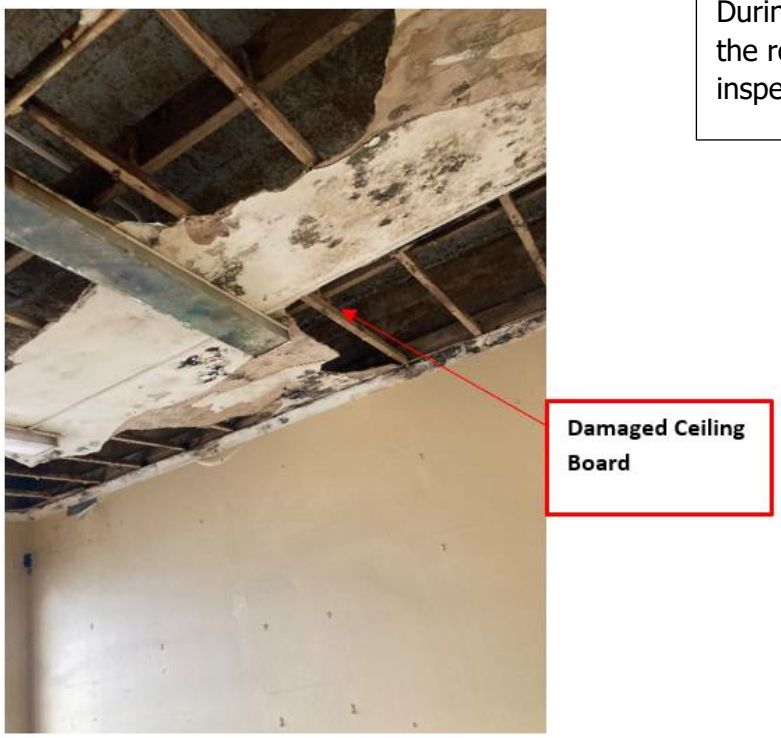

Figure 13: Damaged Ceiling

4.4 Floors

The building consists of sections with floated concrete floors and carpeted floors for workshops and offices respectively. The findings from a visual inspection did not show significant structural damages on the floors. However due to damages on the roof the carpets have been exposed to rainfall. Figure 14 shows the condition of the carpets.

Figure 14: Damage on Carpets

4.5 Survey of Loading on the Building Structure

The structure was initially employed by a fishing company, with certain rooms inside serving as storage for frozen fish. The original architectural plans for the building were not obtainable during the preparation of this report, thus making it unfeasible to determine the original layout of the building and the specific capacities it was intended to accommodate.

4.6 Uninspected Parts of the Building

As indicated on the list below; during the inspections, certain elements were not examined due to limitations in access.

a) Roof top,
b) Foundations, and
c) Floor slab for the office section of the building.

4.7 Survey of Exposure to Aggressive Environment

Some spalling was identified on the underside (soffit) of the roof slab. However, there were no major concrete refurbishment required.

The roof timber frame indicates signs of prolonged exposure to rain and the elements, this can compromise the original strength of the members.

5 Limitations

This was solely a visual inspection of a building structure, no load calculations or design verifications conducted. The constraints experienced include tall heights for roof inspection, lack of As-built drawings to assess the original design of the building.

Table 2 below depicts the summary of the condition of all the structural elements that were inspected. The building was evaluated and rated using the *TNPA ASSET MAINTENANCE PRINCIPLES AND PROCEDURES (AMPP) (shown in Table 1).*

Table 1: Rating

Condition				
Poor	<40%	Not safe for use	Major upgrades required	Decision required on future of asset
Satisfactory	40-59%	Safe	Some urgent work required	Use of current and planned budget
Good	60-79%	Safe	Moderate ongoing maintenance require	Plan for next cycle
Very good	80-89%	Safe	Minor maintenance required	Plan for next cycle
Excellent	90-100%	Safe	No maintenance required	No budget needed

Table 2: Summary of Condition Assessment

Structural Element	Condition Score		Comments
Masonry Walls	30-40%	Unsafe	General condition is structurally poor, further investigation of the foundation and geotechnical condition is highly recommended.
Foundations	30-40%	Unsafe	Further Assessment is required.
Timber Roof Truss	30-40%	Unsafe	Major Maintenance required
Concrete Rood Slab	90%	Safe	Drainage must be assessed.

6 Conclusion and Recommendations

The current state of the building renders it unsuitable for occupancy, as there is a significant quantity of cracks present in the load-bearing walls, indicating structural settling. Consequently, a comprehensive evaluation is required to assess the stability of the building's foundation and the surrounding soil conditions.

Additionally, the timber components of the roof trusses have incurred minor damage and show signs of prolonged exposure to the elements. It is imperative to evaluate the remaining strength of these timber members. A professional engineer should conduct a thorough assessment of the key structural elements, including the walls, roof, and foundation. The future usability of the building hinges upon the implementation of the following recommendations:

a) Replacement of the asbestos roof.
b) Further evaluation of the timber roof frame to determine the residual strength of its members.
c) Arrangement of necessary equipment, such as scaffolding, to inspect the roof drainage system.
d) Restoration of the interior drywall, floors, doors, and windows.
e) Cleaning of the floor surface followed by a visual inspection.
f) Engagement of a Professional Service Provider to perform a structural assessment of the building's foundation.