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STRUCTURAL INVESTIGATION REPORT

PORT HEDLAND RETIREMENT VILLAGE

21-23 Stevens St, Port Hedland, Western Australia

Prepared for: **Town of Port Hedland**

Prepared by: [redacted]

[redacted] **13588**

Date: July 2018

1. Executive Summary

1.1. The buildings were thoroughly inspected internally and externally

1.2. Several of the buildings and other structures such as fences and paths are structurally unsound.

1.3. Significant maintenance is required in the short term to address safety and/or serviceability issues

1.4. The facilty as a whole is at or is approaching the end of its economic life

1.5. The fabric of the individual buildings and structures comprising the facility is approaching the end of its serviceable life or is already unserviceable, including concrete masonry walls, external structural steel, concealed structural roof tie downs, roof cladding, fencing and paving throughout.

1.6. If the buildings are retained the ongoing cost of repair and maintenance will increase exponentially.

1.7. Structural alterations that be required to meet operational and regulatory requirements are not readily accommodated by the design of the buildings.

1.8. Replacement of the buildings is likely to cost less than upgrade and maintenance when considered on a whole of life basis and is recommended.

2. Background

2.1. The facility was inspected on 8th May 2018

2.2. The purpose of the inspection was to investigate the structural elements of the buildings to provide structural information to assist long term decision making.

2.3. As constructed architectural and structural drawings were not available at the time of inspection.

2.4. Conclusions and opinions included in this report are based on non-destructive or invasive visual inspection of the buildings, and the experience and judgement of the report author.

2.5. Limited calculations or analysis has been performed on the existing structures, sufficient to form the opinions contained in this report.

2.6. All buildings and residential units were inspected internally and externally from ground level.

2.7. A selection of buildings was inspected from within the roof space, and externally from on top of the roof cladding.

3. General Observations and Recommendations

3.1. The concrete masonry brick work and other structural elements are approaching the end of their serviceable life.

3.2. Early to advanced signs of masonry reinforcing corrosion is apparent.

3.3. Corrosion of reinforcing steel is likely to become visible at more locations and progress at an increased rate.

3.4. There is severe corrosion to the concealed structural roof tie downs at both sides of the rear door to nearly all accommodation units.

3.5. Corroded steel elements is causing severe an ongoing cracking to the masonry of the residential units.

3.6. The reinforcing corrosion, concrete masonry cracking and spalling can be patch repaired, and steps taken to slow the progress, but the annual cost of repair and maintenance will increase exponentially.

3.7. Structural steel elements have widespread surface corrosion. Remedial protective coatings are required to prevent corrosion causing future structural deterioration and damage.

3.8. Roof claddings is approaching, and in some locations has exceeded, its expected serviceable life. If not replaced, roof leaks, if not already occurring, are likely to occur with increasing frequency.

3.9. Plumbing, electrical and mechanical services have been altered re-routed and repaired in an ad hoc manner.

3.10. Many services and fixtures are exposed, are not adequately protected, supported, or identified. This will make any necessary upgrades to services and equipment disproportionately expensive, with a risk of ongoing unreliability, and higher maintenance costs for the life of the building, even after upgrade.

3.11. The large proportion of bracing/load bearing elements significantly restricts options for reconfiguring the layout, without incurring very significant costs.

3.12. The floors are uneven, and/or at varying levels throughout the buildings.

3.13. It is not structurally viable to alter the floor levels. Any significant upgrade to the facilities would trigger a requirement to comply with current access requirements for people with disability. The varying floor levels and layout constraints imposed by load bearing elements would make access compliance with Australian Standard AS1428 “Design for access and mobility” very difficult and expensive and would likely result in an operationally compromised layout.

4. Detailed observations

4.1. Amenities/Common Room

4.1.1. Brick pier at rear encloses severely corroded steel column or tie down rod.

4.1.2. This pier is structurally unsound.

4.1.3. The pier is potentially unstable and should be considered a hazard.

4.1.4. The pier requires remedial action in the short term to ensure it does not collapse and provides adequate vertical support and tie down to the roof structure over.

4.1.5. The external brick work leaf has corrosion to the bed course reinforcing steel.

4.1.6. Flat lean-to extension at barbeque area (the “patio extension”) is corroded at outer end due to low roof pitch preventing self-cleaning of sheets.

4.1.7. Repair of the Patio Extension is considered uneconomical.

4.1.8. Patio should be removed and replaced if it is required for ongoing serviceability and amenity.

4.2. Residential Units

4.2.1. Cracking at rear door

4.2.2. Steel columns below ground should be inspected by excavating surrounding soil if they are to be retained.

4.2.3. It is recommended that soil surrounding the external steel columns be excavated to enable inspection of any exposed steel that may be present below existing ground level, to determine if any corrosion is present. Any corrosion should be treated prior to application of a corrosion resistant protective coating if required.

4.2.4. “Trimdek” profile steel roof sheeting remains serviceable but is approaching the end of its economic service life.

4.2.5. External paving cracked, uneven, and unserviceable for residential use, especially aged care.

4.2.6. Columns to rear fences all corroded, ranging from surface rust to fully corroded and physically disconnected from footings. Structurally unsound, and potentially unstable.

4.2.7. Corrosion to bed course reinforcing. Will get progressively worse at an accelerating rate. Difficult and expensive, and uneconomical to repair.

4.2.8. Bed course flashing at bottom course partially or totally corroded

4.2.9. Termite damage to some roof trusses internally. Thorough inspection would require removal of all ceiling insulation.

4.2.10. Signs of ongoing water leaks indicated by staining to ceilings, likely due to damaged and/or missing cowlings to exhaust fans.

4.3. Free standing Carport

4.3.1. Roof cladding unserviceable and unsound.

4.3.2. Roof cladding requires replacement.

4.3.3. Purlins corroded and unsound at some locations. Partial replacement required.

4.3.4. Structural beams and columns have surface corrosion. Complete repainting required.

4.3.5. Repair considered only marginally economical as compared to removal and replacement.

4.4. Storage rooms (free standing external)

4.4.1. Significant cracking to single skin masonry.

4.4.2. Doors severely weather damaged and no longer serviceable for weather protection or security

4.4.3. Enclosures remain structurally sound, but unserviceable, due cracks allowing water ingress.

4.4.4. Internal structural steel has surface corrosion.

4.4.5. Structural steel framing remains sound, but full repaint required to limit further corrosion, particularly at tie down rod anchorage points.

4.5. Access paths - external

4.5.1. Access paths connecting buildings are cracked, uneven and unserviceable.

4.5.2. In many places the paths include significant trip hazards.

4.5.3. The external paths are considered extremely hazardous given the buildings use as aged persons accommodation.

4.5.4. Grinding and patching will reduce hazards in the short term, but complete removal and replacement is required to ensure acceptable levels of safety and amenity.

4.6. Access paths – internal (rear yards)

4.6.1. Access paths at the rear yards of the units are cracked, uneven and unserviceable.

4.6.2. In some units the paths are loose pavers, and uneven with significant gaps.

4.6.3. The step heights between paving and the rear door of units are variable, uneven, and in many cases hazardous.

4.6.4. In many places the paths include significant trip hazards.

4.6.5. Many of the internal paths are considered extremely hazardous given the buildings use as aged persons accommodation.

4.6.6. Grinding and patching will reduce hazards in the short term, but complete removal and replacement is required to ensure acceptable levels of safety and amenity.

5. Conclusions

5.1. Several elements of the buildings are unsound, including:

5.1.1. load bearing column to the amenities building,

5.1.2. structural tie downs of the roof at the rear doors of the accommodation units

5.1.3. the free-standing carport,

5.1.4. nearly all of the fences at the rear of the accommodation units.

5.2. Much of the fabric of the buildings is either already unserviceable, or is approaching the end of its economic life, including:

5.2.1. external face brick walls generally (bed course reinforcing corrosion),

5.2.2. roof cladding generally,

5.2.3. flashings generally

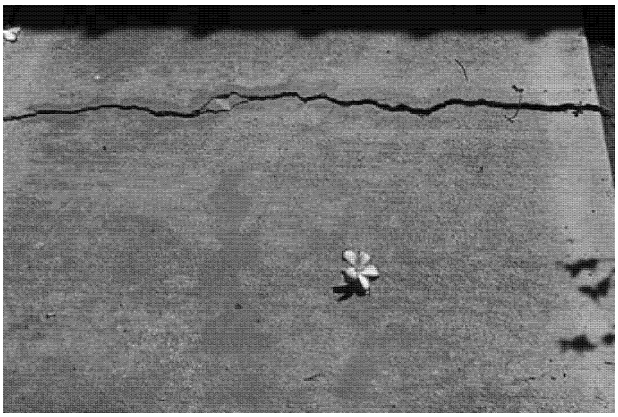
5.3. External structural steel elements require repainting in the short to medium term to prevent existing light corrosion progressing to structural damage.

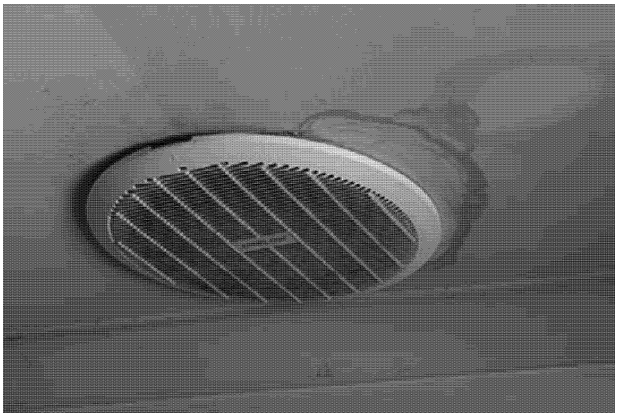
5.4. With exceptions noted above, the buildings are substantially structurally sound, but are approaching the end of their economic life

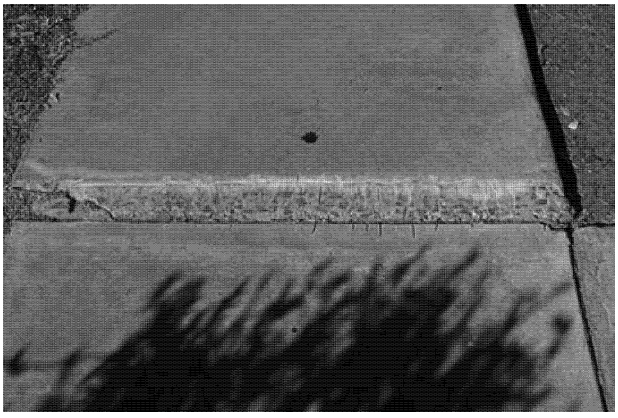
5.5. The whole of life cost of structural and other upgrades to meet current and future stake holder and regulatory requirements for safety, durability, accessibility and functionality, together with required upgrades to services and equipment, fit-out and finishes, and ever-increasing maintenance and repair costs, is likely to equal or exceed the cost of replacing with new purpose designed buildings.

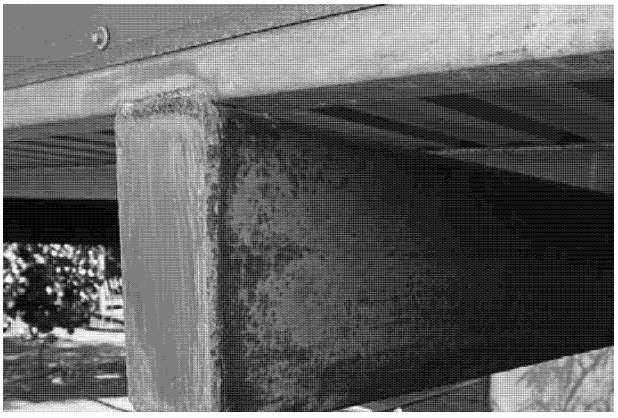
6. Recommendation

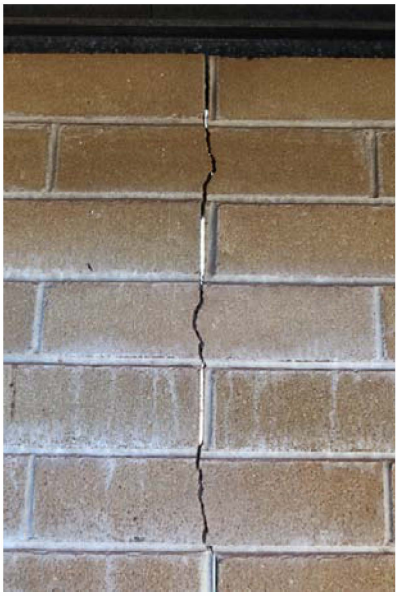
6.1. Replacement of the whole facility including all buildings is recommended.

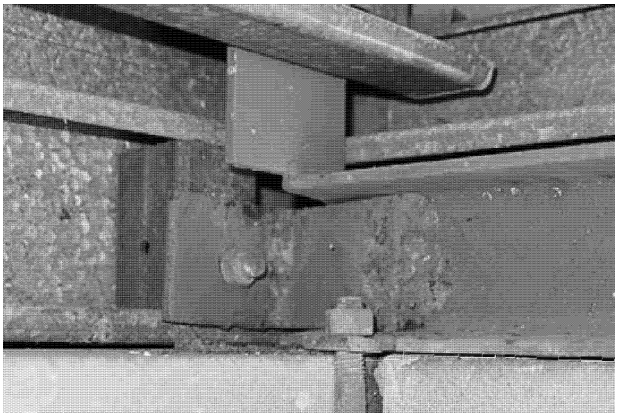












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Approved for Issue:

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