CORE Project Consulting Pty Ltd
trading as CORE Consulting Engineers
5/45-55 Epsom Rd Rosebery NSW 2018
ABN 73 054 959 036
02 8961 3250
customerservices@core.engineering

2 May 2023 Revision: 1

Owners of Strata Plan 7795
c/ - Mason and Brophy Strata Management
Suite 2/16 Rodborough Rd,
Frenchs Forest NSW 2086

Attn: Melanie Yandell

RE: SP7795 80-82 PACIFIC PARADE, DEE WHY NSW 2099 – RETAINING WALL STRUCTURAL ASSESSMENT

INTRODUCTION

Core Consulting Engineers have been engaged by Mason and Brophy Strata Management on behalf of the Owners of SP7795, to inspect and provide structural advice on the retaining wall of the Unit 21 and 22 garage at 80-82 Pacific Pde, Dee Why NSW. The Owners are concerned that the structural adequacy of the wall has been compromised. The Owners had previously received an engineering report on the location, produced by Northern Beaches Consulting Engineers dated 6th of March 2020. The purpose of this report is to list site observations, discuss any structural issues and provide advice for remediation.

A practicing structural engineer from Core Consulting Engineers carried out a visual inspection on Monday 5th of April 2023. The inspected areas included the internal confines of the Unit 21 garage and the surrounding area. At the time of the inspection the Unit 22 garage was locked, and the internal confines could not be inspected The inspection included visual and non-destructive methods of assessment. The inspection was limited to areas visually accessible and safe at the time of the inspection.

The property consists of a multi-storey residential apartment building constructed of reinforced concrete slabs supported by load bearing masonry walls and a pitched tiles roof.

The subject structure is an independent two-tenancy garage constructed of masonry walls on a reinforced concrete infill slab with a timber pitched roof. The garages are divided by a masonry partition wall.

No structural drawings of the base building have been provided for review.

OBSERVATIONS & DISCUSSION

The wall in question is located on the north-east of the property and forms the north wall of the two-tenancy garage (Photograph 1).

Upon initial inspection of the Unit 21 garage, it was observed that the rear north wall has separated from the partition wall approximately 55 mm at the damp proof course level (Photographs 2 & 3).

An inspection was then conducted of the external face of the wall in question from the neighbouring property. It was observed that the masonry wall is a retaining wall and is approximately retaining 1000 mm of soil. (Photograph 4). Furthermore, the lower portion of the wall was rendered, so it's unclear on the exact construction of this section of wall, however based on the moisture markings it appears that this is some sort of concrete masonry block construction.

Stepped cracking was observed to the wall in addition to a vertical crack and horizontal crack. This would suggest that the lower section of wall, despite likely being a concrete block, is unreinforced masonry. (Photographs 5, 6 & 7).

Furthermore, the masonry below damp proof course level was observed to be displaced approximately 50 mm from the remainder of the wall, indicating the wall has rotated outwards. (Photograph 8).

The rotation and observed displacement of the wall appears to have caused the observed cracking to the wall.

As the wall is retaining soil, it is supporting lateral earth pressure which is the horizontal pressure applied to the wall. As there is a car storage unit above, the wall is subject to an additional vehicular surcharge load which is acting laterally against the wall. This lateral pressure from the combination of the retained soil and car storage unit above, has induced a tensile stress in the masonry likely causing the wall to rotate and crack due to overstress.

Due to the lateral pressure, the footing needs to resist the overturning force. It is possible that the footing is under-designed as extensive rotation and displacement was observed to the wall the footing size and construction is unknown as it could not be inspected on site without destructive works. It is also possible that the soil underneath the footing may be poorly compacted or fill.

In addition, it was observed that the roof downpipe was connected to a partially embedded clay pipe that serves as part of the stormwater system on site (Photograph 9). Clay pipes, as opposed to PVC, have a weak tensile strength and more suspectable to cracking when imposed to ground movement. Clay pipes do not fit perfectly together and are often susceptible to tree roots entering through the section joints and causing damage.

It is therefore possible that water is leaking into the ground system from the pipe, resulting in soil erosion around the footing system, and playing a role in the observed movement and rotation.

Large trees were observed within the vicinity of the garage (Photograph 10). It is possible that the tree roots have infiltrated the area and damaged the retaining wall footing system. As stated previously, the roots may have damaged the existing clay pipe in the area causing water to leak.

CONCLUSION

Based on the observations and discussion, the retaining wall is deemed to be in a poor state. The existing masonry wall construction is not structurally adequate and at risk of localised collapse.

The defective retaining wall should be removed and replaced with a compliant retaining wall.

Given how the garage is a standalone structure, and the timber roof is showing early signs of deterioration it is recommended that a complete demolition and rebuild of the garage structure is carried out. During these works the tree roots and clay pipe should be investigated by a plumber to ensure there are no leaks and that the roots have not caused damage to clay pipes in the area.

These works should be designed and specified by a qualified structural engineer. Core Consulting Engineers recommend that these works be conducted within the next 6-12 months.

This document does not relieve other parties of their responsibilities.

Should you have any queries on this inspection report, please do not hesitate to contact the undersigned.

Yours faithfully,

Reece Yeo
BEng(Hons)
Structural Engineer

Reviewed by,

Anthony Longhitano
BEng(Civil)
Senior Structural Engineer

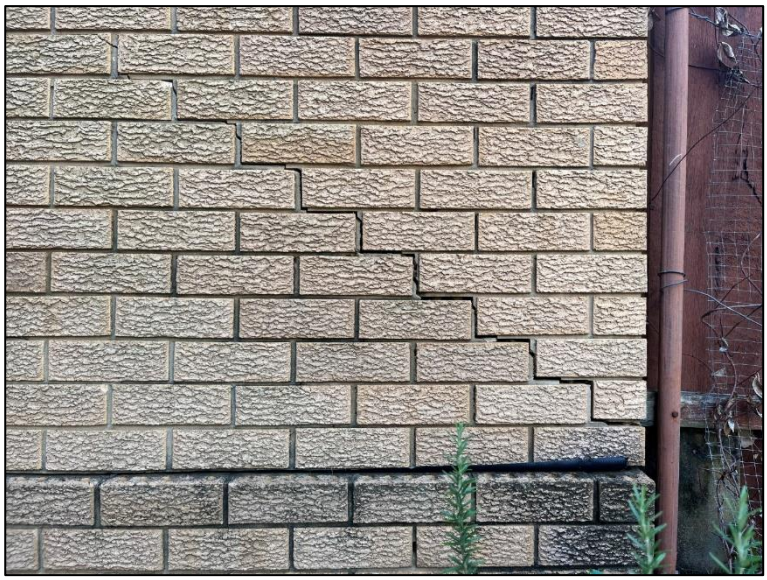
PHOTOGRAPHS

Photograph 1 – Overview of two-tenancy garage

Photograph 2 – Overview of rear garage wall and partition wall

Photograph 3 – Separation between rear garage wall and partition wall

Photograph 4 – Overview of retaining wall



Photograph 5 – Step cracking

Photograph 6 – Step cracking

Photograph 7 – Vertical and horizontal cracking

Photograph 8 – Displacement and rotation of masonry along damp proof course level

Photograph 9 – Overview of clay pipe and water system

Photograph 10 – Overview of large trees in the vicinity on the north-east boundary

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4. The inspection/s undertaken to complete this Report included only those safely accessible areas and areas that were within the CORE Consulting Engineers Pty Ltd Engineer's line of sight and were close enough to enable reasonable appraisal.
5. Note the following in relation to the preparation of this Report:
    a. destructive testing was not undertaken
    b. insitu materials, vegetation, fixtures or other building elements were not removed or disturbed
    c. furniture and other chattels were not moved
    d. enquiries to planning or other authorities were not undertaken
    e. minor faults are not highlighted in this Report unless when taken together they constitute an area of concern to be addressed.
6. This report does not consider the possible locations, affects, risks or otherwise general reporting of the presence of asbestos within the property.
7. Waterproofing of buildings is a challenging task. Typically water will penetrate the external envelope of every type of building. When water or the effects of water can be observed inside a structure it is likely that penetration has been occurring for some time often by multiple ingress mechanisms. To address all possible mechanisms is generally unnecessary and often requires destructive investigation and remediation works that is not cost-effective. It is our approach to provide practical, cost-effective solutions to waterproofing defects by identifying and addressing primary ingress mechanisms, and to then monitor the outcome of these solutions. It is possible that after a primary ingress mechanism has been rectified a secondary or tertiary mechanism is seen to be also contributing to a waterproofing defect, and may need to be addressed in the future.
8. Efflorescence is a normal bi-product of certain building materials. It is difficult to avoid efflorescence where moisture can interact with cementitious products including locations at stairs, at balcony edges and finished surfaces. Minor efflorescence from within tile adhesive, grout and the face of masonry walls may appear and are considered maintenance issues.