



Quoin

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Michael Doig
Citadel Property Limited
on behalf of Cambridge 137 Limited
Level 1
236 High Street
Christchurch 8011

By Email: michael@citadel.nz

Dear Michael

Harley Chambers, Cambridge Terrace, Christchurch

As requested, Quoin Structural Consultants (Quoin) inspected the Harley Chambers Building on 13 June 2023 to assess its current condition and provide comment on the public safety of the Building. The inspection was completed by Brett Gilmore (CPEng).

The most recent previous inspection of the building completed by Quoin (Brett Gilmore) was on 13 December 2016. This inspection and review was summarised in the Quoin letter dated 21 December 2016.

This letter provides an update to the 2016 Letter (included here in black text), with new observations and comments include in 'green' text. Where possible, Quoin has compared recent photos with photos taken in 2016.

We confirm that Brett Gilmore, Chartered Engineer from Quoin Structural Consultants (Quoin), inspected the property known as Harley Chambers on 13 December 2016, and makes the following observations and comments.

1. The building has suffered some additional damage since my last inspection of the building on 13 December 2016. It is apparent that the building is degrading further over time.
2. The additional damage we observed includes but is not limited to the following:
 - (a) Significant extension and widening of horizontal crack near the base of the north-east column, directly adjacent to the footpath. We know that this column had previously settled and had a crack, but the crack is much wider now and extends all of the way through the column.

Crack appears to be similar to previous 2016 inspection. Quoin notes that the reinforcing of the column section includes widely spaced stirrup reinforcing.

Such horizontal cracks when located between stirrups, which is likely, are considered dangerous and could result in a more sudden-type failure of the column under moderate lateral earthquake loading.

If a **moderate**-large earthquake were to occur in Christchurch (estimate magnitude 6.0 or greater) then this column could fail and cause partial collapse of this corner of the building.

The building itself will not fall over as a whole, but debris could fall out onto the footpath. The suspended floors are well reinforced and perimeter beams tie into the column at each floor level, but the uncertain nature of earthquakes means that we have to expect that some significant damage could occur.

At the very least, this column and corner needs to be propped and braced.

Further to our discussion on 18 December 2016, Quoin recommends installation of a barricade on the footpath at least 1m from building and extend it 5m away from the corner. This might link up with barricade at the entry. See (b) below.

A barricade fence was installed adjacent to this section and is currently in place. However, it is noted that the barricade is located hard up against the building and does not have the suggested 1m minimum gap (see photo below).

It appears that it is not possible to ensure that the barricade is maintained at the recommended safe distance from the building.



- (b) The joint between the north and south sections of the building appears to have widened by approximately 5mm.

At the top of the joint at parapet level, facing Cambridge Terrace, it appears that there could be some loose concrete. It is difficult to tell without being able to get closer to inspect. This section was cleaned out after a previous earthquake, but given its location and proximity to the footpath then this should be checked again.

We also observed widening of cracks in the front concrete canopy apron over the entry off Cambridge Terrace, which is adjacent to the gap noted above. We do not know exactly how this is constructed so we have to proceed with

caution. The extent of cracking to this section appears to be significantly worse than when inspected in December 2016, which has possibly been caused by ingress of water and the effects of thermal variations over time on the previous cracks. The cracks occur at the mitred corners, so the apron slab may be susceptible to severe damage and possible collapse in a moderate earthquake, depending on the condition of the reinforcing.

Quoin recommends providing temporary fences/barricade approximately 1m away from building to provide safety from any falling debris. The apron is not too high above footpath so 1m should be adequate. Further investigation can be undertaken in due course if required.

A barricade fence was installed adjacent to this section and is currently in place. However, it is noted that the barricade is located hard up against the building and does not have the suggested 1m minimum gap (see photo below). It appears that it is not possible to ensure that the barricade is maintained at the recommended safe distance from the building, likely because the location of such barricade impacts greatly on the width of the public footpath.

This means that if any part of the canopy apron were to spall, or collapse under a moderate earthquake, then the barricade may not prevent serious injury to the passing public.

Quoin recommends immediate reinstatement of the barricade fence at 1m distance from the front face, or demolition of the apron canopy, or installation of temporary propping beneath the canopy.



- (c) The cracks at the base of the parapet are more visible than they used to be. The parapets that face onto Cambridge Terrace and Worcester Boulevard comprise of reinforced concrete. It is our opinion that they are safe.
- (d) There appears to be a number of new cracks in the front facade to Cambridge Terrace and Worcester Boulevard (plaster over concrete structure), or maybe older cracks that have widened and/or extended. Since our last inspection, these are worsening such that ongoing degradation from wind and rain could cause spalling of the plaster/concrete. We note that this is directly adjacent to the footpath and worst along Cambridge Terrace.

The very wide cracks in the east facade beneath the northern-most lowest window, adjacent to the north-east column noted in (a) above, appear to have

widened slightly since 2016. This suggests possible ongoing settlement of the corner column. It is noted that the basement at this same corner of the building remains full of water.

With the basement being full of stagnant water for long periods of time, and having been through numerous attempts to dewater, plus the settlement that has occurred and that appears to be ongoing, there is likely to be added degradation to the structure that includes but may not be limited to:

- i. More extensive contamination of the concrete to the basement walls and base slab.
- ii. Added degradation of the reinforcing, typically at the crack locations.
- iii. Added stresses in the corner column and adjacent beams, over the height of the building, as caused by the settlement. Such cumulative added stresses reduce the residual strength of the affected column and adjacent beams.



A barricade may be required at some stage. As noted above, a barricade is in place, albeit hard up against the building and not 1m away from the building as is the suggested minimum distance should small debris fall from the building.

Quoin recommends a closer inspection be completed to assess if any material is loose and this should include the close inspection noted in (b) above.

- (e) A fire occurred in the south-west corner of the north section of the building at ground level.

The ceiling has been burnt out and it appears that the soffit of the concrete floor above was exposed to the fire.

Also, extensive spalling occurred to the plaster finishes of the internal breeze block wall.

This has likely resulted in a reduction in loadbearing capacity of the floor in this localised area.



- (f) Temporary timber infill to a north side window appears to have fallen out towards the adjacent building at 141 Cambridge Terrace.



3. As you are aware, we have inspected the building numerous times, and Quoin have completed a detailed structural assessment of the building. The building was previously assessed to be:
 - North section assessed as 15-40% x NBS in its damaged state and 25-55% x NBS in its undamaged state.
 - South section assessed as 34% x NBS in its damaged state and 37% x NBS in its undamaged state. The building in its current condition has degraded further and will continue to go so.

It is noted that the building was originally constructed in two sections. The gap seen from the Cambridge Terrace is the joint between the two sections.

The building, as a whole, is Earthquake Prone.

From our inspection on 13 December 2016, the condition of the north-east corner column is very poor and this would reduce the assessed current condition of the north section to less than 15% x NBS.

4. We note that Quoin was involved in the scoping the repairs required to the building, and this included strengthening back to 34% x NBS. The cost estimates confirmed that it was not economic to repair the building, with the cost of repair being more than the cost of a rebuild.
5. When the adjacent new building was recently constructed, we had to get the north parapet and brick infill to the north wall removed to ensure safety on the adjacent site. These emergency works were approved by CERA under Section 38 of the Building Act and the works completed. At this time, Quoin (previously Structex Metro Ltd) recommended that the north section of the building be deconstructed due to the poor structural condition of the building and its very low assessed % x NBS. This recommendation preceded our knowledge of the cost of repairs.

The deconstruction did not proceed.

Quoin's opinion remains the same, that the north section of the building is not economic to repair, and when combined with the south section, the building as a whole is not economic to repair.



6. It is Quoin's professional opinion that the building as a whole should be deconstructed. The main reasons include:

- (a) The north-east corner could partially collapse, in its current condition under moderate earthquake shaking.
- (b) The concrete canopy apron directly adjacent to the east side footpath is significantly cracked and could partially collapse under moderate earthquake shaking.
- (c) The building in the long term is unlikely to be repaired because it is not economic to do so. Hence it will continue to degrade.

Several parties, including Quoin and other Professionals between 2011-2017, and other independent Professionals (not including Quoin) between 2017-2023, have looked at options to strengthen, repair, and refurbish the building. It appears that it is not economic to do so.

- (d) It was evident during our inspection that the building was being occupied by unauthorised people. This is a great concern given the structural condition of the building, and also that the internal environment is a health hazard.

There are other risks in the building that include falling debris (ceilings, plaster, damaged breeze blocks, etc), plus brick parapets to the rear sides of the building, plus asbestos in some materials, plus the basement remains part filled with water.

We note also that the previous owner's representative (Valour Properties) have been one of the most responsible building owners throughout all of the earthquakes with ensuring that safety to occupants and the public. But even with this clear focus, it has been impossible to prevent some unauthorised people entering the building.

This creates a high level of stress for the new Building owners, Cambridge 137 Limited and myself as the Structural Engineer responsible for providing advice, structural condition and safety, as we know the building is dangerous but cannot fully control it.

Little has changed since Quoin's last inspection in 2016. The building should not be entered without full PPE, of which the new building Owner sensibly insists on for any authorised access.

Further, unauthorised persons have caused a fire to the interior of the building resulting in some weakening of the structure. Any such occurrence in the future could result in far more severe damage and injury to people.

- (e) The poor condition of the brick parapets to the rear sides of the building mean that there is a safety risk to the fire egress path of the adjacent building when this adjacent building on Worcester Boulevard is occupied. There is further risk to damage to this private property that has not been purchase by Cambridge 137 Limited.



7. Given the obvious damage to the building, any further detailed assessment of the external facades directly adjacent to the footpaths that could be undertaken to survey the extent of any areas of loose plaster and/or debris would be regarded as commercially wasteful. There are several areas which pose a potential fall risk to the footpath and action should be taken immediately to reinstate the 1m barrier. It is evident that the heritage features of the façade are now extensively damaged.

This follows the apparent ongoing degradation of the building exterior as ongoing differential thermal effects and weathering appear to degrade the exterior plaster/concrete at the crack and joint locations.

We understand the new owners share our view that the building should be deconstructed. We strongly recommend that such action proceed with urgency to mitigate the risk that this building poses to stakeholders and the public.

I am available to meet with any parties if this helps them understand the safety issues and what it would take to repair Harley Chambers.

If you have any queries then please let me know.

Yours sincerely
Quoin Structural Consultants Ltd

Brett Gilmore CPEng #139988
Director & Senior Structural Engineer
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