Before an Independent Hearings Panel
Appointed by Christchurch City Council

under: the Resource Management Act 1991

in the matter of: proposed Plan Change 14 to the Christchurch District Plan

and: **Daresbury Limited**
(Submitter 874)

Summary Statement of Brett Andrew Gilmore for Daresbury Limited (Structural Engineering)

Dated: 17 April 2024

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SUMMARY STATEMENT OF BRETT GILMORE FOR DARESBURY LIMITED

INTRODUCTION

1 My full name is Brett Andrew Gilmore. I am the Joint Managing Director and a Senior Structural Engineer with Quoin Structural Consultants (Quoin), and formerly known as Structex Metro Ltd (*Structex*). I have held this position since 2006.

2 I prepared evidence in relation to the submission made by Daresbury Limited (*Daresbury*) on Plan Change 14 to the Christchurch District Plan (*PC14*) dated 20 September 2023 (*EiC*). My qualifications, experience and confirmation I will comply with the Code of Conduct for Expert Witnesses (Part 9, Environment Court Practice Note 2023) are set out in my EiC and I do not repeat those here.

3 My EiC provided a structural engineering assessment in respect of Daresbury Limited's submission seeking Daresbury House be removed from Appendix 9.3.7.2 Schedule of Significant Historic Heritage of the Christchurch District Plan.

4 In this summary statement, I have briefly summarised the key points from my EiC and provided comments on the Rebuttal evidence of Mr Stephen Hogg where some items of disagreement are noted with my evidence.

SUMMARY OF EVIDENCE

5 Daresbury House has suffered significant damage as a result of the Canterbury Earthquake Sequence.

6 The building will require extensive repair works to reinstate the building back to its pre-earthquake condition and to a safe minimum earthquake strength of 67% x NBS.

7 I have recommended a repair strategy that focuses on reinstating the appearance of the building's aesthetics and features, but that needs to be widely intrusive across the footprint of the building, at all levels, to achieve this and meet a minimum level of earthquake strength.

8 The damage caused to the building is significant and widespread across the footprint. While aiming to be sensitive to the heritage nature of the building when considering the structural repairs and strengthening of the building to a safe level, it is unavoidable, in my opinion, that such repairs are intrusive across a significant portion of the building's structure and features, that includes the walls, floors, roofs, chimneys and foundations.

9 The Structural Technical Advice provided by Mr Hogg concurs with all of the major structural issues and is in general agreement with myself on the repair and strengthening works required.

10 For the alternative repair options noted by Mr Hogg I agree that these are structurally feasible, but I have provided comments noting where these might affect the internal spaces and how these may compare with and affect my proposed repair methodology. Refer to further comments below regarding Mr Hogg's rebuttal evidence.

RESPONSE TO THE REBUTTAL EVIDENCE OF MR HOGG

11 I agree with Mr Hogg that the 100mm concrete skin can encroach into the 75mm timber framing where this strapping exists. From investigations, the thickness of the strapping varies from 75mm to 0mm. This includes:

(a) No timber strapping to the brick walls in the Dining Hall, Library, and Hall 3.

(b) 20mm timber strapping to the south brick wall of Office 1.

(c) 50mm timber strapping to the brick walls in Office 2.

12 The 100mm skin walls will have a larger effect on the space requirements for those rooms per (a-c) above.

13 I note that in these areas where there is a lesser thickness of timber strapping per (a-c) above, then Mr Hogg's option might consider removing the internal brick skin and replacing this with the 100mm thick shotcrete skin. This would reduce the effects on the overall thickness of the wall but would result in additional work for the part removal of the inner brick skin.

14 Mr Hogg notes that the option for a shotcrete layer applied to the inside face of the exterior walls assumes that the double and triple brick walls do not need to be demolished. I note that there are some severely damage walls that will require demolition, but also that there are brick walls that are less damaged and that would be suitable for such shotcrete repairs.

15 The most severely damaged walls requiring demolition at Ground level include walls to the Lounge (west end of south wall, all of west wall, parts of north wall), and parts of the west wall to the Dining Hall.

16 The shotcrete option will result in a heavier building and require more seismic bracing than currently assumed in my repair option. The shotcrete option may require some additional steel frames at

the upper levels, to supplement the current light weight sheet bracing walls.

17 For the sections of the external brick walls where large gaps have opened between the bricks and the windows, such as to the west wall of the Dining Hall, then my methodology mitigates this issue via reconstruction. Mr Hogg's methodology might require part demolition of the wall, at least of the exterior skins, and/or alternative methods to appropriately fill the gaps and/or replace the windows.

18 I agree that the shotcrete option is achievable to those walls that are not severely damaged but note that the extent of the effects of this option on the lateral seismic bracing and foundations, and space requirements, and on repair methodology to repair larger gaps at some windows, needs to be developed further in order to make suitable comparisons of the cost effectiveness between the options.

19 With regards to the use of a fibre overlay as an alternative to the shotcrete option, my comments above at paragraphs 14 to 18 similarly apply.

20 I note also that such overlays are normally much thinner than the shotcrete, so the effects on space are not likely to be an issue.

21 On projects where Quoin have used such overlay materials, the overlay has been used to strengthen brick walls for in-plane shear strength and added resilience, but we found them not to be as effective for improving flexural and overturning resistance of such walls, or improving a wall's out-of-plane strength. In such strengthening, we have preferred to use concrete skin wall type options, albeit with having to accommodate the effects on space and/or the breaking out of inner brick skins.

Brett Andrew Gilmore

17 April 2024