

MEMORANDUM



Date:	12 September 2023
To:	Jo Miller, Chief Executive
Copy:	Mayor and Councillors
From:	Karl Chitham, Acting Director Neighbourhoods & Communities
Paper author:	Kelly Crandle, Head of Parks and Reserve
Subject:	PETONE GRANDSTAND DETAIL SEISMIC ASSESSMENT

Purpose (Executive Summary)

1. As part of an ongoing inspection regime Sawrey Consulting Engineers Ltd (SCEL) were engaged to undertake a Detailed Seismic Assessment (DSA) of the Petone Recreation Ground Grandstand (grandstand).
2. The results of this 2023 DSA indicate the building's earthquake rating to be 20%NBS (IL3) as assessed in accordance with the guideline with 11 elements that are less than 34% NBS (IL3). This building has been assessed as being seismic Grade D which represents a high risk to occupants and neighbours, and it is equivalent to 10 to 25 times the risk expected for a new building.
3. The HCC Building Compliance team has issued an Earthquake Prone Notice for the grandstand and require that that grandstand is no longer earthquake prone by 30 August 2038
4. In response to findings from the DSA several decisions are required and workstreams need to commence. Until the Next Steps are undertaken the Parks & Reserves team is not able to make a final recommendation on an action for the building. The decisions and proposed actions are summarised below.

Recommendation

That the Chief Executive agrees:

- a. that the grandstand seating and level 1, including the function space should remain closed as a result of the recent DSA findings.

Approve / Decline

- b. the ground floor changing room and toilet facilities remain operational to match ground bookings as per the [Seismic Performance of Council Buildings Guidelines](#). Booking requests are made once the organisation wanting to book the facility has been advised of the earthquake prone status.

Approve / Decline

- c. the Next Steps, as set out below, for the grandstand should commence, noting this work is not funded in this financial year and will include internal and subsequently external discussions.

Approve / Decline

- d. that short-term physical works be funded in the Draft LTP and undertaken with sufficient budget provided in 2024/25. The scope of the short-term work to be confirmed in discussion with the appropriate service providers, including SCEL, and confirmed with the Chief Executive. Although not funded, advice and design work will be prepared in 2023/24 to enable work to commence in early 2024/25.

Approve / Decline

Background

5. Hutt City Council engaged SCEL to undertake a Detailed Seismic Assessment (DSA) of the Petone Recreation Ground Grandstand (grandstand). The scope of the report was solely focussed on the existing building structure. The assessment of alternative opportunities to meet the current and future objectives of the facility was not included in the brief. To support SCEL in undertaking the report:
 - a. A geotechnical investigation and assessment report has been provided by Tetra Tech Coffey (NZ) Ltd (21 April 2023) providing advice on the ground conditions at the site of the grandstand.
 - b. Concrete Structure Investigations Limited have carried out destructive and non-destructive investigation at selected positions under the bleachers to assist in the estimation of strength loss, of steel and concrete.
6. The grandstand is 42.5m long, 13m wide, and 13.5m high. It was built circa 1939 with some structural improvement circa 1979 and some seismic strengthening circa 2014. The structure is made of heavy materials such as reinforced concrete and masonry, with some lightweight elements such as the roof and the level 1 clubrooms.

7. It is an irregular structure: i.e. it lacks symmetry both vertically and horizontally. The roof is corrugated iron, the bleachers are reinforced concrete, and the level 1 floor is predominately timber with some reinforced concrete slab. The walls are a combination of reinforced concrete, reinforced block, or un-reinforced masonry infill. The grandstand consists of 13 tiers of covered exterior seating between 2.5 and 7.5 metres above ground level. Covering the grandstand is a corrugated iron hip roof. The area under the grandstand has two levels. At ground level there are changing rooms and ablution facilities. Level 1 contains a social hall, kitchen, toilets, (collectively referred to as the clubroom(s)) and offices. The level 1 floor is half the width of the overall building width. There are external stairs at each end and internal stairs in the middle of the level 1 floor area.
8. The results of this DSA indicate the building's earthquake rating to be 20%NBS (IL3) as assessed in accordance with the guidelines. This earthquake rating is for an Importance Level 3 (IL3). The DSA has identified 11 elements that are less than 34% NBS (IL3).
9. This building has been assessed as being seismic Grade D which represent a high risk to occupants and neighbours, and it is equivalent to 10 to 25 times the risk expected for a new building.
10. Every building is categorised into one of four importance levels. The NZ Building Code requires a 30% increase of the design earthquake loading to be imposed on the model, compared with the design earthquake loading that is imposed on a similar IL2 building in which a crowd of fewer than 300 persons would be expected to congregate.
11. A change from IL3 to IL2 would automatically mean 20%NBS(IL3) structural members become (at least) 26%NBS(IL2). With the removal of live loading from the grandstand, the latter figure may improve marginally. The building would be less than 34%NBS(IL2) but interim securing would likely be less onerous to reach a selected lower bound seismic ultimate capacity. The work involved in retrofitting to Grade B or Grade A (i.e. 67% & 80% of earthquake ultimate loading) would be significant.
12. Managing the building to allow less than 300 people by closing the grandstand seating would change the importance level of the building and the imposed weight to closed off areas will be reduced, as will the associated inertial seismic load. This can be achieved by the continued closure of the grandstand seating.
13. The building is an irregular structure, vertically and horizontally. This means that its structure's earthquake response is relatively unpredictable. A complex dynamic analysis has been carried out on the building model but the level of reliability of the results should be considered lower than for the results of a simple analysis of a regular building. Engineering judgement is required (i) to estimate current material properties in areas of the building that have not been tested, (ii) to identify the assumptions for the creation of the structural model, (iii) to decide on the approach to its analysis, and (iv) to interpret the results. Therefore, while the results of this DSA are reported as an "earthquake score", the inexact nature of adopting a model and making assumptions should be considered with $\pm 5\text{-}10\%$ uncertainty.

14. The grandstand structure is complex relative to most other low rise building structures both in its form and because of its level of decay. Levels of seismic assessment can vary, as can the reliability of conclusions. This depends on the level of assessment, and the complexity of the building structure and its situation. The limited on-site investigation for this DSA provided a snapshot of levels of material decay in a few selected locations. Inferences have been made from the results. This type of testing with its inferences would not be required if the building was known to be in good condition. Further testing may be undertaken in the future if a greater knowledge is required.
15. Rust is visible on structural steel members and on reinforcing steel to concrete elements where concrete cover is absent. Insufficient concrete cover may have contributed to the development of corrosion. Assumptions on the corrosion of reinforcing steel have been made and accounted for by reducing the cross-sectional area of the external reinforcing steel. Generally, for a particular member, this DSA has assumed that all outer layer reinforcing steel has the same remaining area of steel as the bar with the worst corrosion. The exception is at gridline C above column 3, which has been considered an outlier; and in this case the bar with the worst visible corrosion had 3% remaining steel. No reduction in the reinforcing steel near the inside face of concrete structure has been made.
16. Based on an early draft of this report:
 - a. the grandstand seating and access to the level 1 clubroom was temporarily closed. While closing the seating does not change the overall rating of the grandstand, it does reduce the risk to the public and reduce the remedial works required to meet the threshold for an earthquake prone building.
 - i. The grandstand is not expected to be used in the short term and the limited requests for bookings have been advised that the status of the building is under review.
 - b. No decision has been sought from the Council regarding the building's earthquake prone status and the associated timeline for the building to be structurally improved.
17. There are a variety of options available to Council and these include, but not limited to:
 - a. open the grandstand seating and await the confirmation of the building status and remediation timeline.
 - b. the grandstand seating and level 1 clubrooms remain closed however the ground floor changing room and toilet facilities remain available for limited use.
 - c. Close all aspects of the building.
18. The report proposes that an overall strategy should be developed to identify and consider practicable long-term options for continued use as a grandstand and/or changing facilities and clubrooms.

19. Next Steps

Further work is required to enable the Parks and Reserves team to prepare a recommendation on the available options and associated costings for the grandstand. The further works will include, but not limited to:

- a. Scoping the work to meet a range of NBS and IL levels. At this stage the limits of the options will be NBS34%(IL2) up to NBS67%(IL3). The feasible and practical options will be confirmed in conjunction with SCEL.
 - b. Cost estimates for viable options will be developed including staging and any other ongoing costs likely to be incurred i.e. preventative maintenance etc.
 - c. An assessment of the impacts on the refurb/rebuild budget of \$6.5M included for 2030/31 will be made.
 - d. Additionally, other opportunities to meet the functional deliverables of the building will be made to ensure all cost-effective options are considered.
20. The report also proposes a range of short-term works, depending on the preference of the Pito-One Steering Group and the Long-Term Plan trade off conversation, which should be undertaken including:
- i. The structural improvement of the end walls above the bleachers; including removal or replacement of the glazing and timber framing, the urgent strengthening of the four steel posts at the building ends (two at each end), structural improvement of an internal transverse lintel and the rear wall structure.
 - ii. Ceilings, partitions etc are non-structural elements have not been specifically assessed. An assessment of non-structural elements should be undertaken.
 - iii. Maintenance at positions of spalled concrete, crumbling concrete, and exposed reinforcing steel at external concrete walls, beams and columns.
21. This memo has been prepared on the premise that Council has previously signalled an interest in renewing the grandstand in the current form for the purpose of including funding in Annual Plans and Long-Term Plans. In light of the current Assets Review, Draft Asset Principles and the recent DSA results, it is timely to now consider alternative futures for the Petone Recreation Ground Grandstand. There are options beyond renewing the existing grandstand.
22. Firstly, the community and Council need to consider whether a renewed grandstand, would offer the community sufficient value by providing right combination of spaces and services to meet current and future needs. The demand to provide a grandstand for large numbers of spectators, frequently, at sub-regional sportsgrounds has reduced significantly since the 1970s.
23. Another approach to consider is providing a new, smaller building that would provide the community with an asset and services that better meet the community's requirements in a contemporary and lower cost way. This could include changing rooms, exterior spectator seating, a function space, public toilets and a small grounds depot.
24. Alternatively, there may be a preference to remove the grandstand and not replace it.

Risks

25. The building does represent a risk. A seismic grading scheme has been developed that compares the life risk (due to earthquake damage) of this building to other buildings. The grading scheme provides a Life Safety risk from A+ (Low) to E (Very high). Note although the building has been graded D it is very close to being graded E.

Utilisation/Financial implications

26. There is no budget for any work included in the current financial year. Additional budget will be required to undertake any work, including further investigation, design and costings.
27. A refurb/rebuild budget of \$6.5M is included for 2030/31. The expected cost of achieving a Grade A or B would be significant.

Legal implications

28. The Building Act 2004 sets out a framework for earthquake implications on buildings. It is important to note a building with an earthquake rating of less than 34%NBS fulfils one of the requirements for the Territorial Authority to consider it to be an Earthquake-Prone Building (EPB) in terms of the Building Act 2004. Additionally, a building with a rating less than 67%NBS is considered as an Earthquake Risk Building (ERB) by the New Zealand Society for Earthquake Engineering. This DSA has found the rating to be less than 34%NBS(IL3). The Council Building Compliance team has determined that the grandstand is earthquake prone and the seismic risk must be remedied 30 August 2038.
29. Health and Safety at Work Act 2015 sets out the principles, duties and rights in relation to workplace health and safety and the obligations it places on the Council need to be considered.

Health, Safety and Security implications

30. The Parks & Reserve team recommend limited closure to reduce the risk of injury during an earthquake. No staff are based at the building. Grounds maintenance is based in a nearby building.

Communication and Engagement

31. The Mayor and elected members will be advised.
32. Key stakeholders are known and will be invited to discuss the report and findings. Sawrey Consulting Engineers Ltd are available to support any meetings/briefings required. Key stakeholders are:
 - a. Petone Rugby Club and Wellington Rugby Football Union
 - b. Petone Community Board
 - c. Cricket Wellington
 - d. Pito-One Steering Group

33. On site signage will be posted to communicate the earthquake status.
34. Information on the issue and Councils management of the building will be provided for the public via usual communication channels.

Attachments

35. There are three attachments to this paper:

Attachment 1: Petone Rec DSA Final Vol 1, Report

Attachment 2: Petone Rec DSA Final Vol 2, Appendices A to D

Attachment 3: Petone Rec DSA Final Vol 3, Appendices E to H.

Signed:



Karl Chitham
**Acting Director Neighbourhoods and
Communities**
Hutt City Council



Kelly Crandle
Head Parks and Reserves
Hutt City Council



Jo Miller
Chief Executive
Hutt City Council

