

9 December 2022

Shelly Bay Taikuru Ltd
C/- Earl Hope Pearson
The Wellington Company
Todd Building
93 Customhouse Quay
Wellington

Shelly Bay Redevelopment - Security of the existing wharf and adjacent seawall and structures

Dear Earl

You have requested confirmation of Holmes' position on the wharfs, seawalls and building structures at Shelly Bay, Wellington. This letter is intended to assist you in discussions with Wellington City Council, with whom we are comfortable that you share this correspondence.

Background – recent work together

Your request has been issued further to the recent collaboration that we have undertaken with you and Brian Perry Civil (BPC). That work related to Shelly Bay Wharf and the adjacent seawall, as summarised in our memo “Shelly Bay Redevelopment – Wharf Options”, dated 29 September 2022.

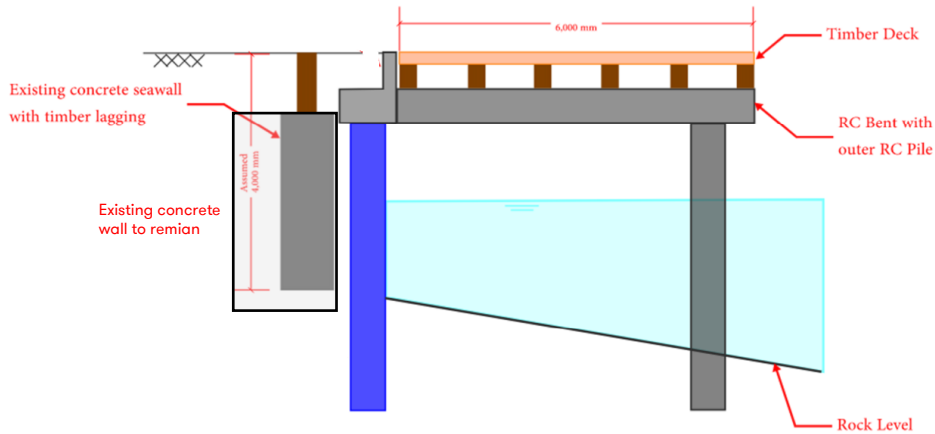
We discussed the progression of wharf works with you, your team, and BPC representatives in meetings at Holmes' offices on 17 November and 30 November 2022. These discussions developed the ideas presented in our 29 September memo and allowed collective identification of constraints, threats and opportunities around different solutions, construction, and deconstruction work.

One particular constraint that was discussed is the presence and condition of the buildings adjacent to the wharf. Following the meeting on 17 November, you shared some records with us, as a factual basis upon which we could assess the impacts of the proposed ideas on the adjacent structures. These records were Tonkin and Taylor (T+T) inspection reports of 19/8/16 and 22/6/20, T+T memo “Shelly Bay Shed 8 July 2020 Update” of 27 July 2020, two EQ Prone Building notices and an unbranded ‘risks’ document which documents some specific building-related hazards at the site.

Next steps – redevelopment planning

We understand that Shelly Bay Taikuru Ltd's (SBTL) preferred outcome for this area of Shelly Bay is a rejuvenated precinct of buildings with a resilient, durable seawall and slim wharf structure running in a strip along their western, sea-facing edge.

Our collective preferred solution (Holmes, SBTL, BPC) for achieving this with the marine structures is generally as outlined in the sketch below. This is taken from Holmes' 29 September memo. It involves a new seawall structure which is framed into a cap beam and outer pile. The cap beam supports the new timber wharf deck. The existing concrete seawall would remain behind the new seawall structure, any timber on top of the seawall would be removed and backfilled with engineered fill.



Methodology matters

Building the proposed seawall and wharf will require heavy machinery. The simplest way to access the site would be from the land. This would allow heavy machinery to crane wharf piles and other segments into place over the water from the land. In this particular case, the existing buildings would preclude this. We understand there appears to be an appetite for constructing the new wharf and seawall before a decision on the future of these buildings is reached. The following considers how construction may occur with the existing buildings in place.

It is possible to access one end of the wharf/seawall from the land at the northern end of the site with the existing buildings in place and work toward the other end along newly constructed segments of the wharf/seawall. Equally, it is possible to access the site from the water using a barge.

These possibilities could be progressed with the existing buildings in place. Working right against the buildings would constrain seawall design options and construction access paths, requiring specific measures to ensure the plant doesn't impact the existing structures. This adds cost and time over and above a 'clear-site' approach.

Constructing the new piles will require heavy machinery that will drive, cut, or drill down into the bedrock. This piling technique is common practice in the marine environment for structures such as this in Wellington. It is expected that this activity will produce some amount of vibration during installation. This will be due to the interface of advancing the pile toe into the seabed and bedrock and the dynamic effects of the piling rig itself.

Given the proximity of Shed 8 and the Shipwrights Building to the piling work, it is our opinion that the effects of construction vibration on these structures must be assessed. This is because construction activity such as that proposed could cause damage to one or both of these buildings. It would be reasonable for anyone planning this type of work to consider the impact on adjacent properties – because of the potential for loss of amenity and/or the risk of inducing an instability hazard.

Considering risk

While we have not been engaged to undertake a detailed assessment of the preferred solution, some judgement can be applied to present initial context around its effects. A logical sequence follows to describe this:

- The wharf and seawall is currently in poor condition. Some level of structural upgrade is required to protect land behind it and to facilitate building upgrade/replacement work. A review of options has been completed, and the preferred solution – given the required outcomes – is as outlined above.
- Given that piles need to be constructed for the preferred solution as indicated, and their proximity to nearby buildings, we believe it is likely that there will be some level of disturbance caused to the foundations of the adjacent buildings.
- On the basis of supplied documentation, Shed 8 and the Shipwrights Buildings are not expected to have the ability to reliably withstand a moderate earthquake. This means that construction-phase vibration – while not necessarily the same as earthquake shaking – will be a significant case to consider in terms of damage likelihood and severity.
- On the basis of supplied documentation, Shed 8 in particular, has a heavily deteriorated and compromised foundation system. Temporary remedial works were commissioned by WCC in December 2015. T+T (2020) recommended for subsequent remedial works to be in place within one year of installing the emergency works, i.e. by December 2016. This date has now elapsed by six years. This means that the primary structural support system for the building is essentially unquantifiable by desktop study alone. Regardless, the undermining of foundations and stability of temporary props would likely be made worse by piling work, and so foundation stability would likely degrade further as the work proceeds.
- Given that the construction-induced effects may be significant, and the ability of the buildings to resist these effects cannot be verified with the current data understood to be available, the risk of building damage would require mitigation or proactive intervention before starting the works.
- Mitigation by keeping distant is not an option as the wharf location is set. To build the wharf and seawall a distance from the buildings would mean creation of a reclamation or construction of much more wharf structure than is envisaged. In our understanding of SBTL's view, these are not viable approaches.
- Vibration effects could be resisted safely by a system external to the building. This could be bracing to other restraints – such as back into the footprint of the building if it could be proven that support exists. This system would need to be designed and constructed prior to any vibration from piling work. However; to verify how the bracing would work, and to install the bracing, the stability of the building would need to be considered.
- The foundations of Shed 8 are compromised and would need to be repaired or infilled to support any bracing work required from the bullet point above. The viability of safely completing these repairs is not clear. T&T noted in their 2020 memo that to facilitate temporary access, partial wharf demolition or specialist remote camera inspection would be needed. The foundation degradation could then be further assessed. Only after this could risk around the temporary access process be considered.

So, to achieve seawall and wharf rebuild with buildings remaining in place, the following would need to occur:

- Risk assessment on the process of doing building inspections
- Remove deteriorated wharf section to provide safe access to observe foundations of building
- Complete assessment of the foundations
- Risk assessment on the process of doing physical works to secure the building
- Design securing for the building and/or design repairs to foundations
- Remove asbestos from the building so that vibration doesn't cause friable particles to shake loose

- Build securing works and/or foundation repairs with appropriate safety controls in place
- Complete inspection of building at commencement of seawall and wharf construction as a benchmark for monitoring of any damage or movement
- Monitor buildings daily during wharf construction for any indication of loss of stability
- Repair any damage which does occur – expected or otherwise

Alternatively, if the buildings were removed, the above process could be avoided. The seawall and wharf repair would consequentially be safer, faster and cheaper. There could also be benefits from considering how the seawall design could be made more efficient if access to the landside area were available.

Conclusion

We have stated a view above for how work on Shelly Bay wharf and seawall will impact, and will be affected by adjacent building structures. It appears possible to renew the seawall and wharf whilst retaining the buildings in place. This approach, however, will lead to

- a high risk profile
- significant hazard exposure for personnel
- a longer construction period than could otherwise be achieved
- a more costly construction project than could otherwise be achieved
- a need for targeted discrete repairs in staged fashion to secure, brace, supplement, improve, replace and/or rebuild part or all of the existing buildings

An alternative approach could be to review the value of retaining the buildings against the negative outcomes listed above. In particular, it is not clear to the undersigned that the hazard exposure to personnel is necessary in the face of what appears a reasonably practicable alternative. This would mean the approach is not aligned with the requirements of the Health and Safety at Work Act, and so is deserving of thorough consideration before pursuing.

Yours sincerely

A handwritten signature in blue ink, appearing to read "Wayne Juno".

Wayne Juno
MANAGER INFRASTRUCTURE CENTRAL
Holmes NZ LP

Copies to: Sunil Hira, Egmont Dixon; Lee Griffiths, Brian Perry Civil

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