

Wynyard Crossing Bridge Remediation

Assessment of Temporary Bridge & Transport Options



Prepared for
Eke Panuku
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1. Executive Summary

This report has been compiled to provide a summary of the assessment of temporary pedestrian access options while the Wynyard Crossing Bridge undergoes maintenance. This report draws on previous studies (by others) and provides a consolidated summary of information where applicable.

The purpose of this report is to provide an objective summary of options to assist Eke Panuku in determining how it may improve accessibility and whether it is feasible and practicable to do so.

A summary of the existing alternatives, new alternative transport options and temporary bridge options is summarised within this Executive Summary, further supporting details are contained within the body of the report.

It has been found that the only option that provides considerable improvement to the accessibility in comparison to current state is the temporary bridge options, however these will take time to implement making this impractical. Notwithstanding the time to implement making this option impractical there are also Health and Safety (H&S) and compliance risks that will need to be resolved to ensure this option is feasible.

1.1. Normal State and Existing Alternatives

Under ordinary circumstances a journey utilising the Wynyard crossing bridge could be expected to take 9 minutes from North Wharf to the Viaduct and 12 minutes between North Wharf and the Ferry Terminal. If the bridge is closed to allow for marine traffic these times would be extended by a further 5 minutes.

By comparison, alternative walking routes provide journey times of approximately 18 minutes between North Wharf and the Viaduct and approximately 23 minutes between the Viaduct and the Ferry Terminal.

During normal operations, scheduled bus services (including walking at either end) provide journey times of approximately 16 minutes between North Wharf and the Viaduct and approximately 17 minutes between North Wharf and the Ferry Building.

These options are summarised below and provide a baseline to compare alternative options against.

Table 1 – Summary of Existing alternatives compared to normal conditions (bus times include walking time at either end).

	Walking		Bus	
	North Wharf to Viaduct	North Wharf to Ferry Building	North Wharf to Viaduct	North Wharf to Ferry Building
Normal Conditions	9 minutes (14 minutes if bridge operation occurs)	12 minutes (17 minutes if bridge operation occurs)	16 minutes (23 minutes including waiting time)	17 minutes (25 minutes including waiting time)
Wynyard Crossing Out of Service	18 minutes	23 minutes		

1.2. New Alternative Transport Options

Alternative transport options could be provided as summarised in Table 2. It should be noted that the journey times do not include walking time to destinations or time spent waiting for services. These journey times are no better than the current alternative but may provide a level of attraction value that has been lost through the Wynyard Crossing Bridge being out of service.

Table 2 - Summary of Alternative Transport Options

Option	Feasible	Journey Time	Comments
Temporary Small Ferry Service	Yes	15minutes ¹ each way excluding walking and waiting times ² .	Minimal benefit in reduction of journey time, limited capacity (60/boat, 1,200/day, significantly less than average pedestrian movements with are more than 6,000 people) ³ .
AT Ferry Additional Stop to existing services.	No	20 minutes each way excluding waiting and walking time	<p>Not possible due to impacts to wider public transport network, timetabling issues. Would create wide disruption to many Aucklanders.</p> <p>Would require additional infrastructure (hop cards, signage) time to implement.</p> <p>Does not improve journey time of people moving between North Wharf and the Viaduct.</p>

1.3. Temporary Bridge Options

Temporary bridge options are outlined in Table 3. It is important to highlight that any temporary bridge must be able to accommodate the passage of vessels which will impact the level of service.

Table 3 - Summary of Temporary Bridge Options

Option	Feasible	Time to Implement	Comments
Temp Bridge (Sliding)	Yes, conditional on stability issues of pontoons being resolved, acceptance/resolution of non-compliance issues	Approx. 6 months	<ul style="list-style-type: none"> Reasonable time to implement (6-7 months) Would require Resource Consent Would impede/limit navigable channel. H&S risks to be considered, non-compliant with Auckland Design Manual and building code.
Temp Bridge (Pivot)	Yes, conditional on stability issues of pontoons being resolved, acceptance/resolution of non-compliance issues	Approx. 6 months	<ul style="list-style-type: none"> Reasonable time required to implement (6-7 months) Would require Resource Consent H&S risks to be considered, non-compliant with Auckland Design Manual and Building Code.

¹ This is the current estimate from the Water Taxi Operator, actual travel time will be much shorter but needs to include time to secure the water taxi and load/unload all passengers. Journey time represents time from first passenger on to last passenger off.

² Wait time would be 30 minutes with a single ferry operating, this could be halved with a second ferry.

³ Capacity for a single ferry, capacity would be 2,400 with two ferries operational.

2. Introduction

2.1. Scope

Eke Panuku have engaged RCP to compile a summary of options to provide temporary pedestrian access whilst the refurbishment of the Wynyard Crossing bridge takes place over a period of approximately 6 months. The options being considered are outlined as follows:

- Existing Access arrangements (current)
- Temporary Bridge Options
 - Pivoting pontoon bridge
 - Sliding pontoon bridge
- Temporary Transport Options
 - Small ferry boat service (e.g. Red Boats)
 - AT Ferry Service (additional stop)

2.2. Background

2.3. Use of the Wynyard Bridge

We understand that statistics relating to the use of the bridge were last collected in 2022. These show that during typical weekdays there was an average of 6,574 pedestrian movements per day, and an average of 9,094 per day on the weekends.

The bridge lifts approximately 25 times per day, with each lift cycle taking approximately 5 minutes, which accounts for 2.5 hours of the bridge in the open position for vessels throughout any given day.

The walking path from a nominal centre point of North Wharf and the Viaduct is 680m as indicated in Figure 1. This journey would normally take 9 minutes⁴ unless delays due to the bridge being closed to pedestrians to allow for marine traffic in which case would add an additional 5 minutes to journey times. From the Ferry Terminal to North Wharf the walking distance is 900m, refer Figure 2, this journey could be expected to take 12 minutes. Journey times are summarised in Table 4 and establish a baseline to compare alternative solutions.

Table 4 - Journey times utilising the Wynyard Crossing Bridge

Scenario	Approx. Journey Duration
North Wharf to Viaduct	
Walk from North Wharf to Viaduct	9 minutes
Walk from North Wharf to Viaduct, with delay due to Wynyard Crossing Bridge being closed to pedestrians to allow for marine traffic	14 minutes
North Wharf to Ferry Terminal	
North Wharf to Ferry Terminal	12 minutes
North Wharf to Ferry Terminal, with delay due to Wynyard Crossing Bridge being closed to pedestrians to allow for marine traffic	17 minutes

⁴ Times are based on a walking speed of 1.25 metres/second which is identical to Google Maps (4.5km/hr).

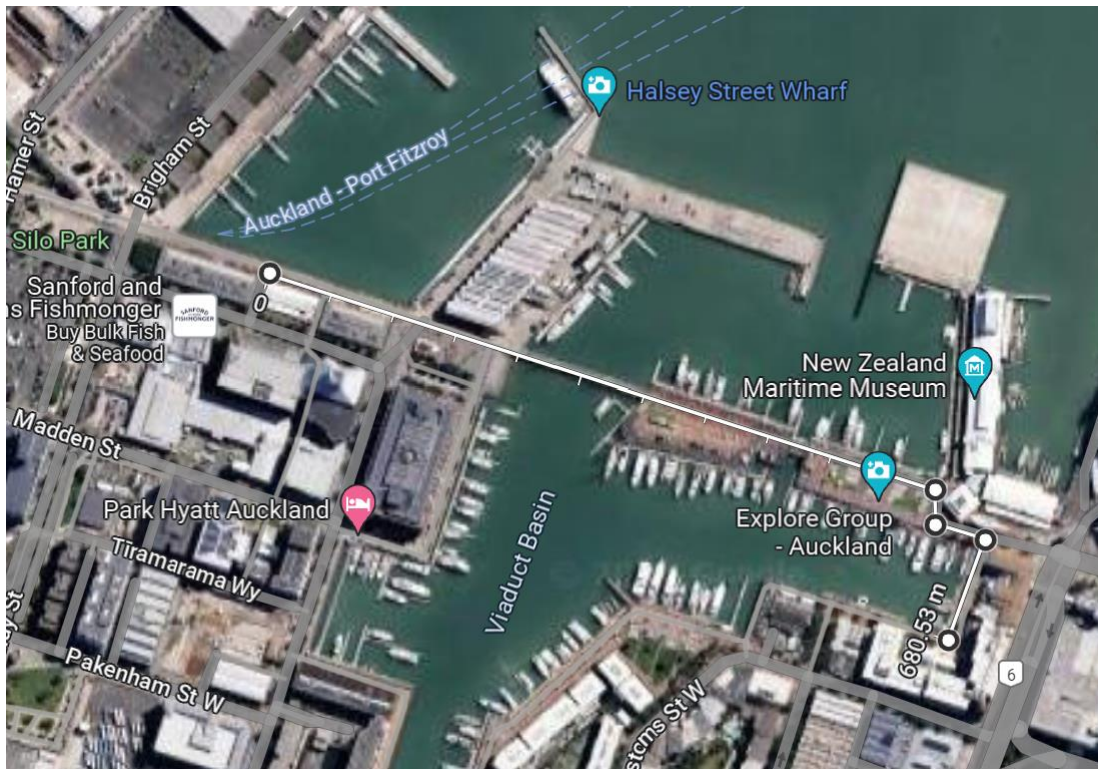


Figure 1 - Distance between North Wharf and Viaduct (normal circumstances)

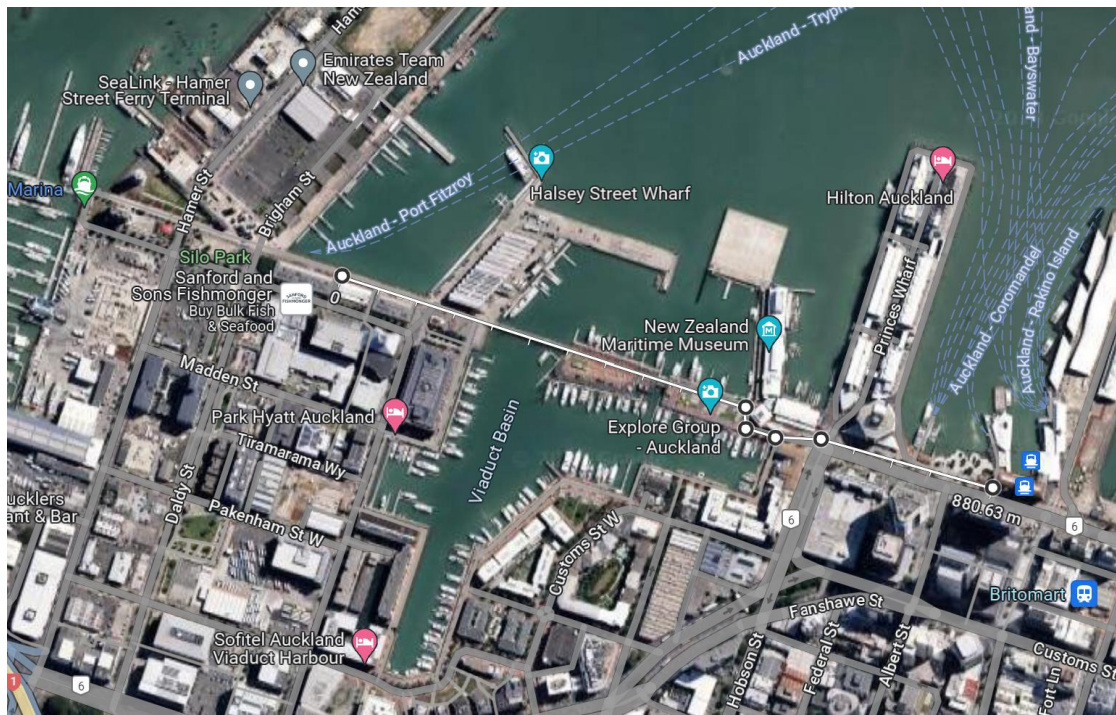


Figure 2 - Distance between North Wharf and Ferry Terminal (normal circumstances)

2.4. Existing Alternatives to the Wynyard Crossing Bridge

While the Wynyard Crossing bridge is out of service the following options are available:

- Alternative Walking Route (refer Figure 3 and Figure 4)
 - 1,300m to the Viaduct
 - 1,700m to the Ferry Terminal
- AT Bus Service – City Link (refer Figure 5 and Figure 6)

These are summarised in Table 5, these establish a second baseline to compare other new alternative solutions. The City Link bus runs every 8 minutes⁵.

Table 5 - Existing alternative options to Wynyard Crossing

Scenario	Approx. Journey Duration
North Wharf to Viaduct	
Walking	18 minutes
Bus (excluding waiting time)	16 minutes
Bus (including waiting time)	23 minutes
North Wharf to Ferry Terminal	
Walking	23 minutes
Bus (excluding waiting time)	17 minutes
Bus (including waiting time, every 8 minutes)	25 minutes

⁵ City Link bus runs every 8 minutes, 6am – midnight Monday to Friday and every 10 minutes 6:20am – midnight on weekends. Source: <https://at.govt.nz/bus-train-ferry/bus-services/link-bus-service>

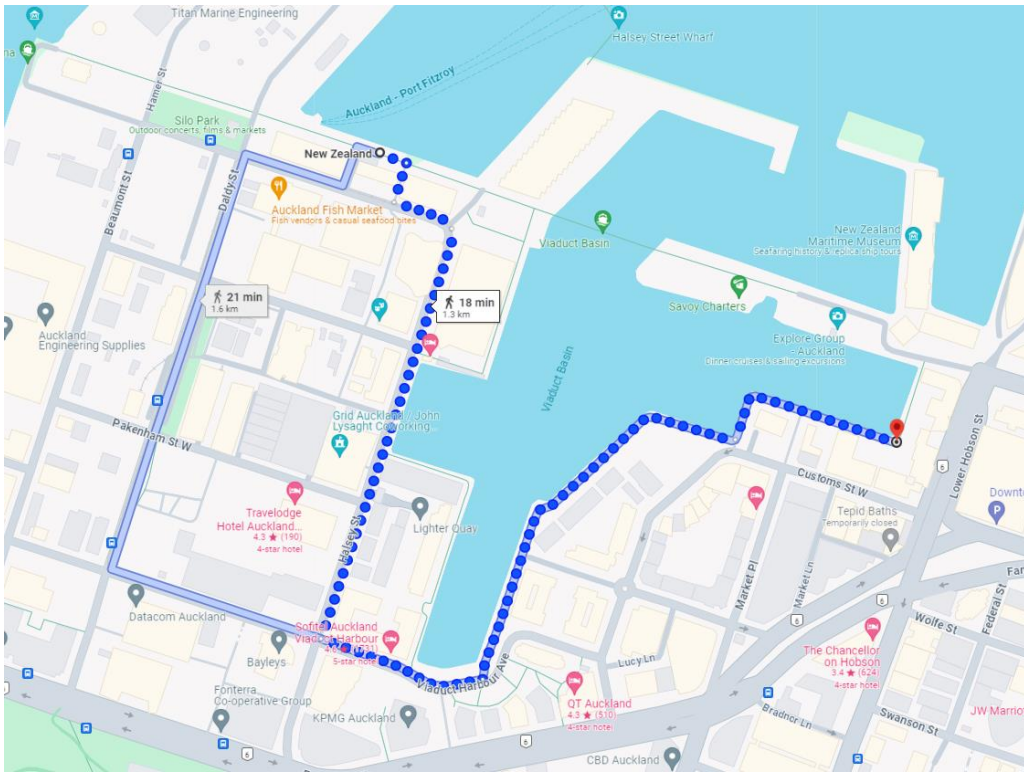


Figure 3 - Walking distance between North Wharf and the Viaduct (source: Google Maps)

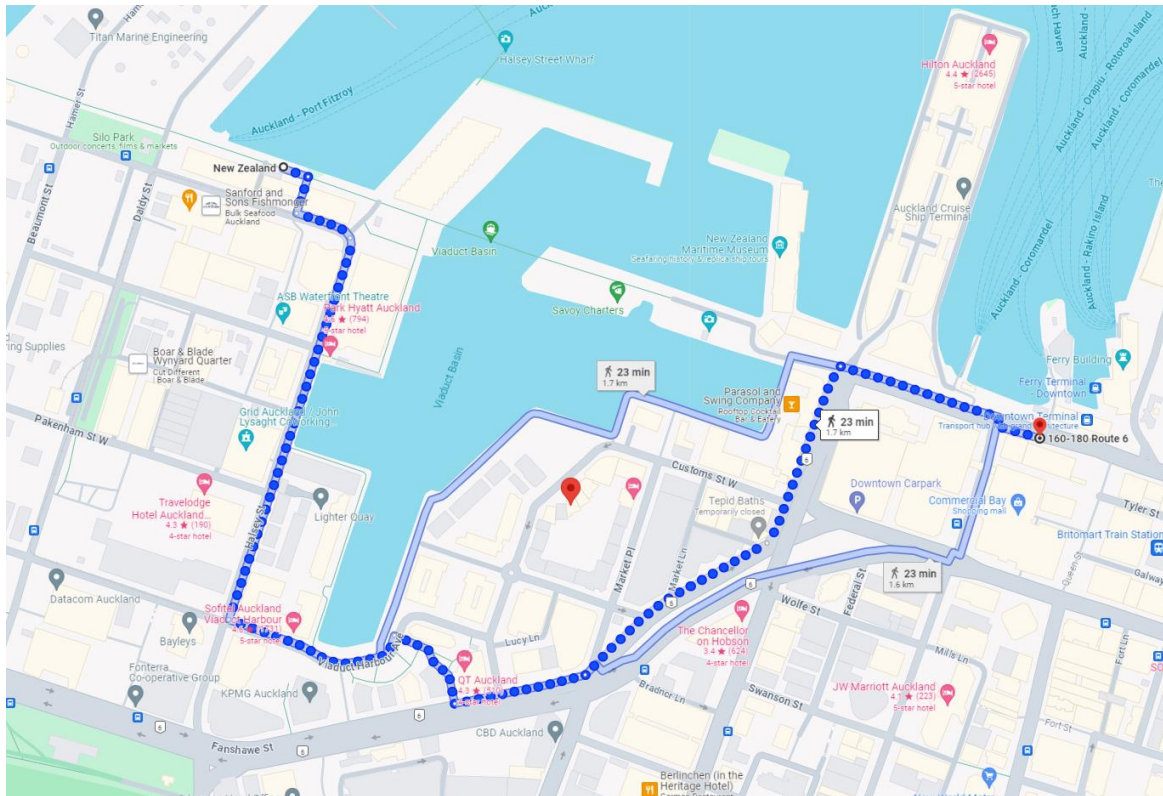


Figure 4 - Walking distance between North Wharf and the Ferry Terminal (source: Google Maps)

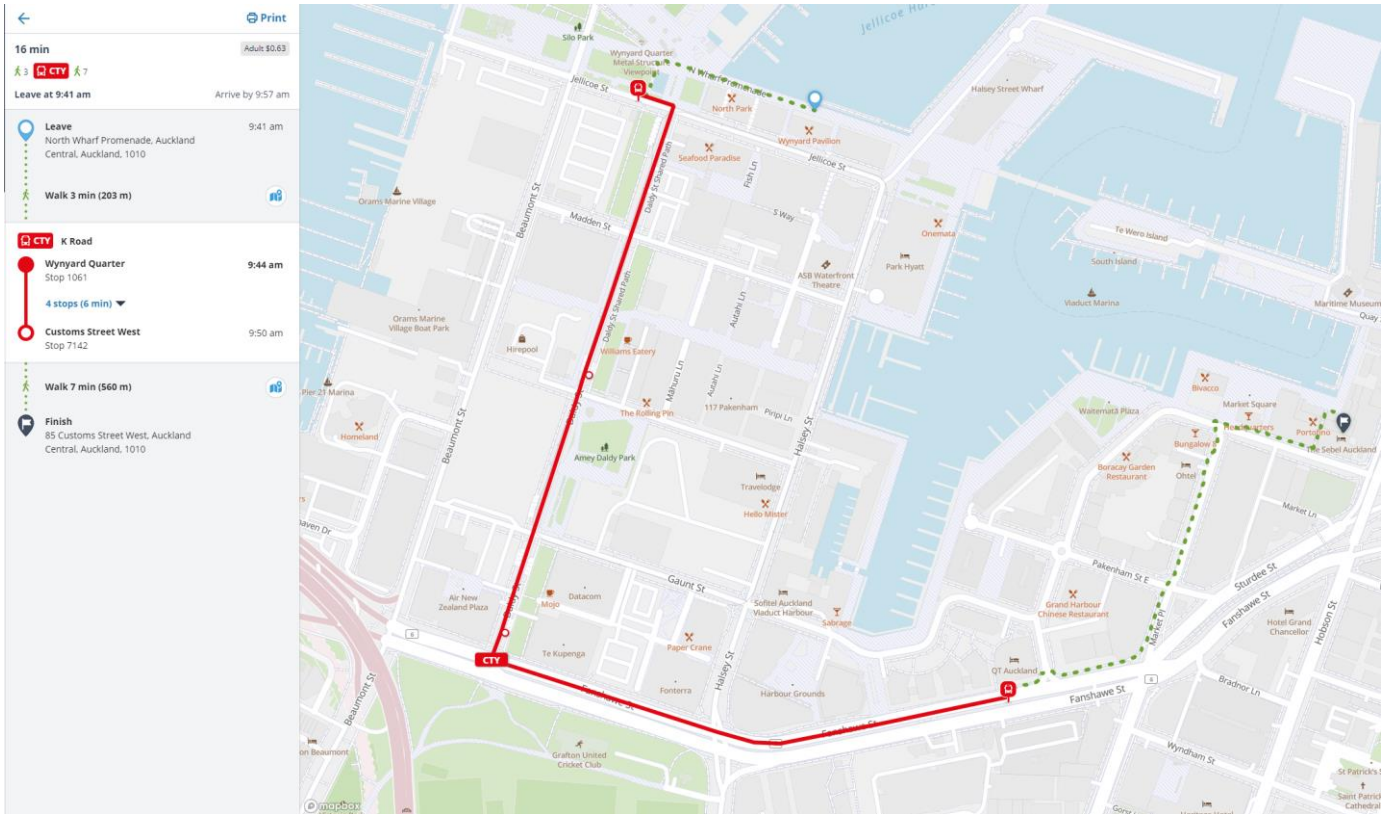


Figure 5 - Existing alternative options between North Wharf and the Viaduct (source AT Journey Planner <https://at.govt.nz/bus-train-ferry/journey-planner>)

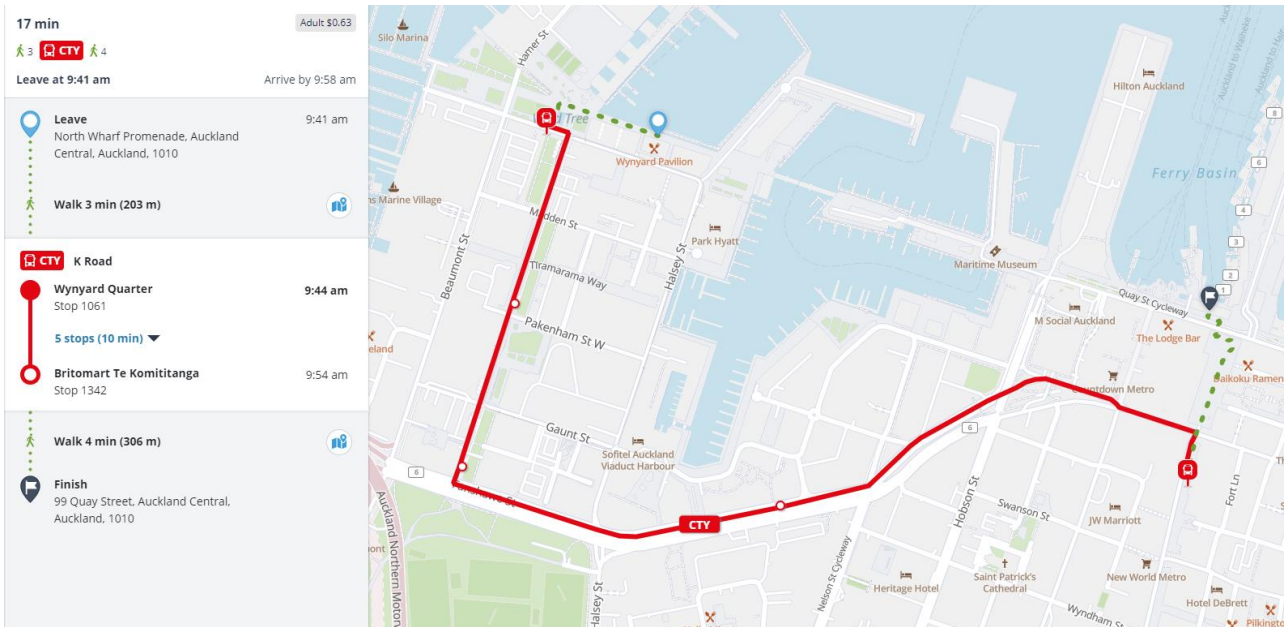


Figure 6 - Existing alternative options between North Wharf and Ferry Terminal (source AT Journey Planner <https://at.govt.nz/bus-train-ferry/journey-planner>)

3. Temporary Alternative Transport Options

3.1. AT Ferry Service (Additional Stop)

A meeting was held with Auckland Transport to determine the viability of using the existing ferry network to service an additional stop in the outer Viaduct Harbour. The outcome of the meeting was that it would not be practicable to add an additional stop to the existing ferry service due to the following reasons:

- Ferries are on a tight timetable which would need amending, communicated to the public and reprinted to cover adjustments over the period that the works will take place.
- The current services interconnect with bus services passing the terminals and it would not be possible to adjust all the bus services to align with the changes in the ferry timetables temporarily.

Despite the above barriers, the following items would need to be considered:

- Additional infrastructure to support ferry services, signage, HOP card facilities, way finding, queuing areas etc.
- The solution does not necessarily address the issue of people trying to navigate between North Wharf and the Viaduct and would result in longer journey times.
- Little to no benefit to journey time to those navigating between North Wharf and the Ferry Terminal (expected journey time of 20 minutes not including walking at either end or waiting times).

3.2. Temporary Small Ferry Service (Red Boats)

This service could be achieved through utilising a private company that is experienced at operating within Auckland Harbour and are already on the Council approved vendor list.

The ferry would travel between Te Wero Island and Karanga Plaza on the outward side of the marina (as indicated in Figure 7) to minimise interaction with marina users. At peak times, with a single boat, departures could occur every 30 minutes (15 minutes each way). The addition of a second boat would provide departures every 15 minutes.

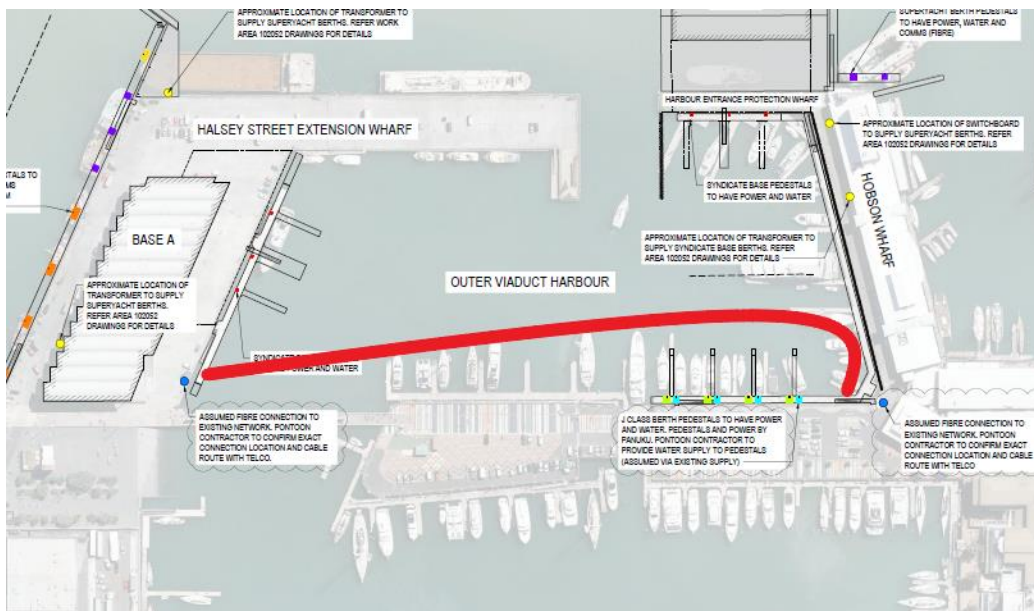


Figure 7 - Indicative route of temporary small ferry service.



Figure 8 - Proposed temporary small ferry service.

3.3. Strengths

We highlight the following positives associated with this option:

- ◆ Experienced operator running ferries within Auckland Harbour that has a good understanding of what is involved in operating a service such as that proposed.
- ◆ The vessel would require a skipper and deckhand for safety and crowd control onboard and they can also assist in boarding and disembarking of passengers to streamline the process.
- ◆ The vessels already comply with Maritime NZ safety standards with a qualified licence crew and risk registers exist for this type of operation.
- ◆ Could be up and running as soon as a contract is signed.
- ◆ Proposed vendor has a fleet of vessels that could be called upon should a breakdown occur, which would limit service disruptions.

3.4. Weaknesses

We highlight the following weaknesses relating to this option:

- ◆ It is estimated this option could only move 1,200 passengers per day with a single ferry. Each ferry has a capacity of 60 passengers. Capacity would be doubled with a second ferry, however it should be noted that this is only a fraction of normal users of the Wynyard Crossing Bridge.
- ◆ Departures would have to be delayed/held whilst vessels enter and exit the marina. Vessel movement from the marina would still take priority.
- ◆ Initially and for major events, it would be required to have an ambassador at each side of the crossing to explain the setup to people.
- ◆ Signage and a fenced off area would be required to inform people and allow for queuing. The fenced area would allow ambassadors and/or crew to restrict people entering the queue when passenger numbers are reached.

4. Temporary Bridge Options

4.1. Summary

Temporary bridges have not been deemed feasible as it is likely that implementation will take 6-7 months. This means that the temporary bridge would only be in operation for a brief period before the permanent bridge is returned to service, and therefore provided limited benefit. In addition, the solution would be non-compliant with minimum design standards for gangways and still has several technical issues to be resolved to ensure compliance and safe operation.

4.2. Temporary Bridge Location

Any temporary bridge would have to accommodate the movement of vessels. The proposed location for the temporary bridge is to the south of the existing bridge, adjacent to the tidal steps and within the inner marina. We understand that this location was proposed as it:

- is outside of the construction zone and is close to the existing access corridor,
- allows continued safe vessel passage, and
- uses existing marina assets and will minimise berth disruptions.

We understand that other locations within the Viaduct Basin are not viable as they would add to the journey times, near or equivalent to, the existing walk around option.

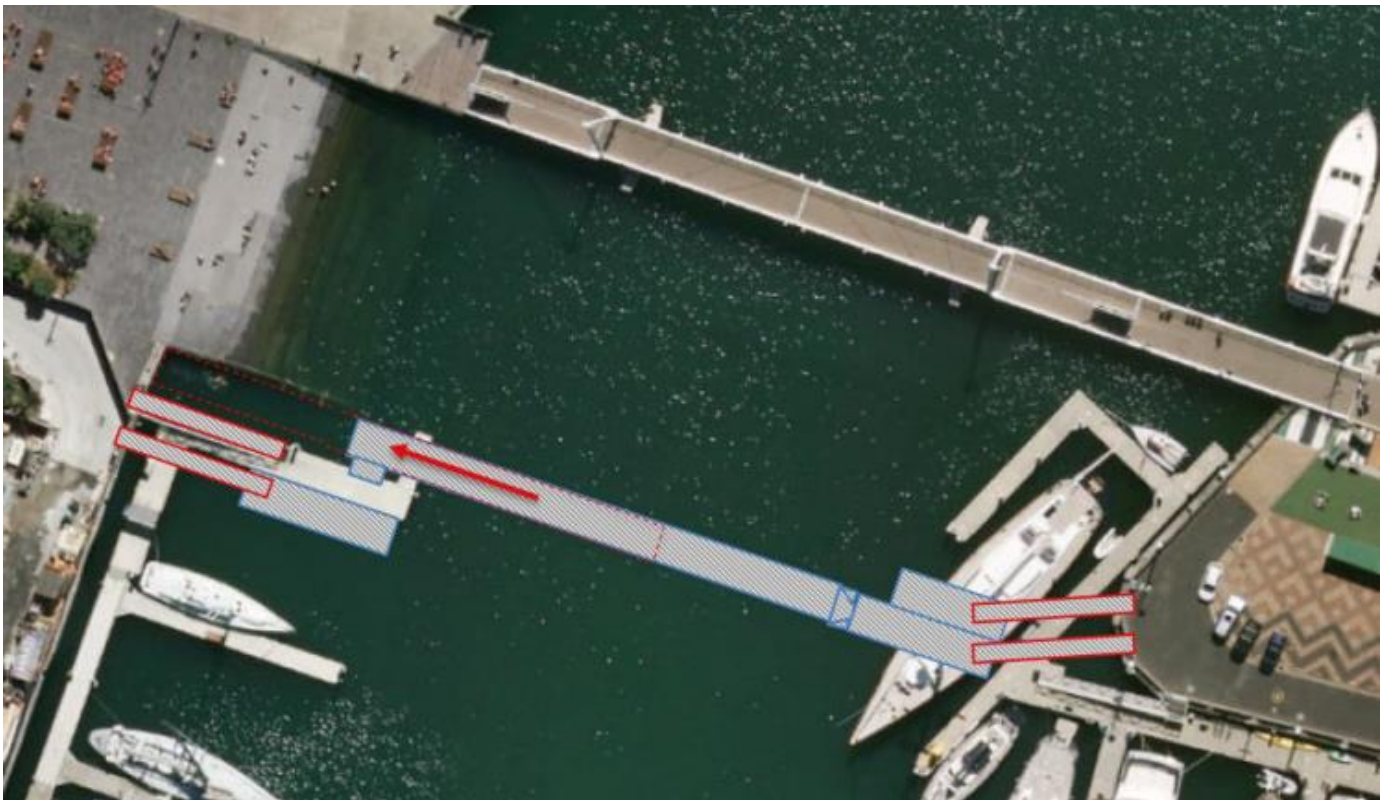


Figure 9 - Proposed Location of Temporary Crossing

4.3. Temporary Bridge Details

Various temporary bridge crossing locations were proposed when considering a longer-term outage of the bridge to facilitate its replacement, our understanding of this proposal is as follows:

- The proposed temporary bridge options utilise marine standard concrete pontoons and has two potential configurations.

- These concrete pontoons that have an approximate freeboard of 600mm and are used elsewhere within the Auckland marina asset base.
- Concrete pontoons will need to be checked to ensure compliance with the Auckland Design Manual (Ferry Terminal Design). Specific items that will need to be checked is pontoon freeboard (minimum 600mm when fully loaded) and loading capacity.
- The temporary bridge will require a resource consent as it would be in place for longer than 40 days. The pontoons would need to be leased by Eke Panuku from NZ Marine and the gangways will require design and fabrication.
- To ensure flow of pedestrians the concept proposes to add an additional gangway to either side.
- Proposed gangways will be non-compliant with the Building Code as required by the Auckland Design Manual for Ferry Terminals (most appropriate standard).
 - Gangways would have a maximum slope of 1:6 (slope will vary with tides), this is consistent with existing gangways in the area. The maximum allowable gradient under Building Code regulations is 1:12, this can be increased to 1:8 over short sections where no practicable alternative is available.
- Both temporary pontoon bridge configurations would require the installation of temporary piles to provide stability to the pontoons. For the sliding option this would require four piles to support the sliding section and four piles for the static section.
- A 100hp outboard motor would be fitted for the opening and closing of the pontoons. This is expected to need two operators to run the crossing during operational hours; one operative acting as 'driver' and the other as support person to help manage pedestrians. Gates will be installed at the top of both gangways to manually control pedestrians during operations.
- The crossing will be approximately 50m in length in the closed (to marine navigation) position.
- An 1100mm high handrail will need to be installed on the pontoons for pedestrian safety.
- Cyclists and scooter users will be expected to dismount before boarding the gangway and walk across.
- Lighting and other operational fittings will be installed once the pontoons are in position and testing of the operation has been completed. A temporary power supply will need to be installed and a suitable storage locker for spare fuel for the outboard motor.
- Lighting will be required for pedestrians and on the crossing and existing bridge piers for marine navigation. Communication with the marina users will be required to explain to them the temporary operational setup of exiting and entering the marina, signage will also be required on approach to the marina for any visiting vessels.
- From the Risk Assessment provided (refer to Appendix A) there are technical issues that remain unresolved in relation to the stability of the pontoons across the navigable channel. In the normal use case of pontoons these would be secured to piles but, in this case, this is not possible through the midsection of the bridge.

4.4. Temporary Bridge Operation

We understand the proposed temporary bridge will operate as follows:

- The temporary crossing will continue to function as the existing bridge did with priority given to marine traffic. The proposed operating hours are from 06:00 to 00:00 (6am to midnight) 7 days a week.
- The reduced width of navigational channel during the refurbishment works will mean only one vessel at a time can pass. Marine users will need to radio ahead to the Bridge Master to allow time for pedestrians to clear and the bridge to be opened.

The likely operation of the temporary bridge will be:

1. A vessel calls the Bridge Master Office requesting passage. This could be from inside the marina or from the outer marker buoy.
2. The Office will contact the temporary crossing operators advising them of the passage.
3. The operators will manually close the access gates to stop any new pedestrians entering the bridge and allow all others to continue crossing. They will communicate with those waiting to cross that the bridge is about to open.

4. Once the pontoon is clear, the operators will close the exit gates and advise the Office that the pontoon is clear.
5. The driver operative will start the motor, while the support operative lifts the connections ramps and ensures the pontoon is safe to move. The driver moves the pontoon into the open position.
6. The support operative alerts the Office the bridge is open so they can confirm with the vessel that passage is now clear and safe.
7. The Office confirms there are no more vessels to pass, and the driver closes the pontoon.
8. The support operator reinstates the connection ramps and secures the pontoon. The gates are reopened by operators to allow pedestrian access to continue.

4.5. Temp Bridge Configurations

4.6. Option 1 – Pivot Bridge

The pivoting pontoon bridge opening time is likely to be significant slower than the existing bridge. This is because the pontoons will encounter a large drag force due to the horizontal face of the pontoon within the water. We have been advised that it is not possible to avoid this issue as a reduction in the pontoon draft is likely to decrease the pontoons stability when in use.

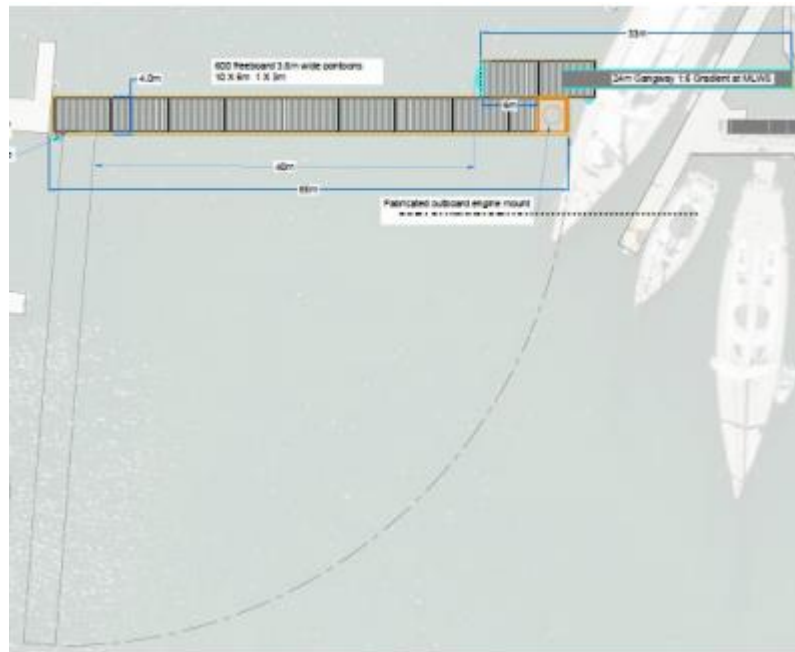


Figure 10: Swinging Pontoon Bridge Option

4.7. Option 2 - Sliding Bridge

From concept level information provided, the operation of the sliding bridge will be faster than the pivoting option but slower than the normal operation of the lifting bridge. This option requires a high number of piles being installed but the movement of the pontoons will have a lower drag force applied.

The option will also result in a reduced width (from 32m to approx. 24m) available for the navigable channel due to the constraints of the marina size and the area the pontoon can slide into. We understand that this option will require the relocation of some larger boats from the Viaduct Basin.

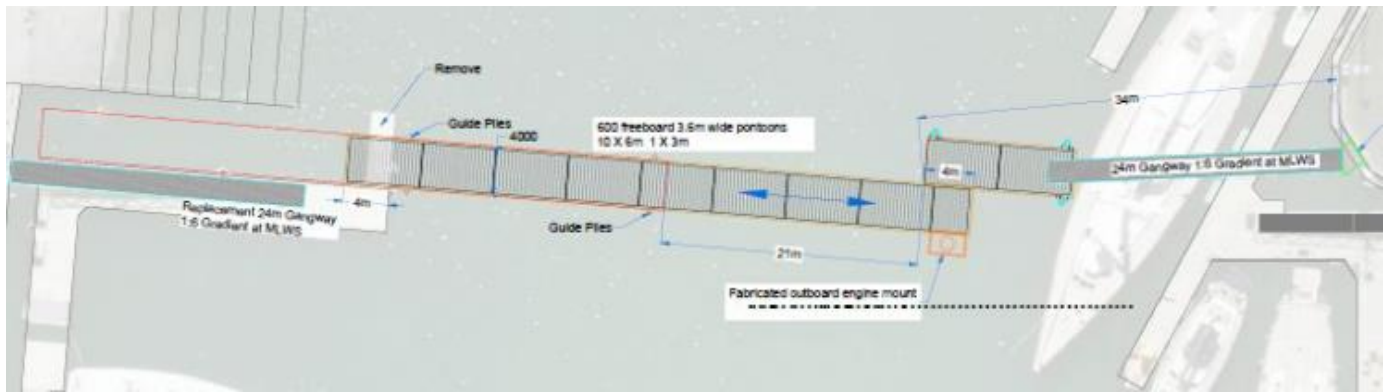


Figure 11: Sliding Pontoon Bridge Option

4.8. Timeline to Implement

We understand that only concept level designs of the temporary bridge options have been completed. To implement the solution, several tasks would need to be completed:

- Detailed Design – pile design, interconnecting pontoon supporting structures and gangways.
- Detailed Risk Assessments
- Construction Management Plan & Assessment of Environmental Effects (AEE) to support Resource Consent Application
- Resource Consent
- Procurement/Off Site Fabrication
- Construction
- Commissioning and Testing

Estimated durations are outlined in the programme detailed in Appendix B, timelines are likely to be similar for either configuration. This programme is provisional and contains several assumptions. From the preliminary programme, it is likely that implementation will take 6-7 months, meaning that the temporary bridge would only be in operation for a very short period before the permanent bridge is returned to service, and therefore provided limited benefit.

Schedule of Appendices

Schedule of Appendices

Appendix A Pontoon Bridge Risk Assessment

Appendix B Pontoon Bridge Preliminary Programme



Appendix A

Pontoon Bridge Risk Assessment

Note: Risk Assessment was not completed by RCP.

Risk	Description	Mitigation	Safety	Programme	Cost	Impact	
Pontoon condition	The pontoons have been in long term storage and would require servicing	Review condition of pontoons early to develop scope of servicing	2	2	2	2	2.00
Pontoon public use	The pontoons require hand railing installing to make safe for the public. They would need returning with the handrails removed	Pull together a scope for works required to bring the pontoons to a safe standard for pedestrians crossing	4	2	2	3	2.75
Procurement of access gangways	New access gangways are required. These will need to be designed, fabricated and installed.	Early engagement with gangway fabricator, scope to keep design as simple as possible. Is there an 'off the shelf' option available	2	4	3	1	2.50
Pontoon stability	The length of the crossing will require the pontoons to be at least 3m wide with piles installed to ensure stability. Pedestrians crossing, wind and wave loading could all cause the pontoons to become unstable.	Pontoons to be wide enough to mitigate expected stability issues. Pile guides installed to provide support, impossible to locate along the section required for vessels passing.	3	4	4	3	3.50
Speed of opening	The swing bridge will take longer due to the lower speed required to reduce drag. The sliding option is still expected to take 20 minutes per opening cycle	Appropriate powered outboard motor to be used however increased speeds are difficult due to the drag and instability this will cause on the pontoons	2	1	2	4	2.25
Public access	The gangways are unable to achieve the required slope for disabled access of 1:12 due to the space within the marina	Gangways to be made as shallow as possible with the changing tide and space within marina. Warning signs for disabled users of the steeper gradient. Potential to have personnel on site to offer assistance	2	1	1	3	1.75
Poor lighting	The pontoon bridge will be poorly light during part of the operating hours without additional lighting being required. Risk to security and safety	Install lighting along the length of the crossing. Ensure light levels sufficient to show changes in level due to connections of pontoons and gangways.	4	2	2	3	2.75
Operation	Safe operation of the crossing requires 2 personnel RYA 2 qualified. One to operate the outboard motor and the other to ensure it's safe to operate	Job advertised at an early date to ensure suitably qualified personnel are employed	2	2	3	2	2.25
Lack of signage	Signage will be required to inform pedestrians and marina users of the new operating procedure for the crossing. Risk of people not knowing the procedure and colliding with the pontoons	New signage installed at suitable locations, newsletter to local residence and marina users, social media posts with operational updates	2	2	2	3	2.25
Security	Access to the marina pontoons is possible from the pontoons/gangways. Security risk to the existing. Marina pontoons don't have handrails	Gangways to connect to the new pontoons and not onto marina pontoons. Security system in place to monitor marina and security guards employed if deemed necessary	4	2	3	3	3.00
Lease	Lease agreement required with NZ Marine	Talks with them to determine lease agreements and draft lease proposed and processed quickly	1	2	3	1	1.75
Consents	Resource consent required for pile installation without the piles the stability of pontoons will be compromised	Determine requirements for consent early and submit as soon as details required for consent are known	3	3	2	2	2.50



Appendix B

Pontoon Bridge Preliminary Programme

