





AKAROA WHARF RENEWAL OPTIONS

PREPARED FOR CHRISTCHURCH CITY COUNCIL (CCC)

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- Appendix C - 1887 Construction Drawings
- Appendix D - Current Wharf Configuration
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1 EXECUTIVE SUMMARY

The Akaroa Wharf is a 155 m long timber wharf originally constructed in 1887. The public space on the wharf is owned and maintained by Christchurch City Council (CCC). The condition of the wharf is such that in order for it to remain safe for public use, significant investment would be required. To keep the wharf operating until a new wharf is constructed, repair works have been completed and further works may be required to allow for the continued use of the structure.

The purpose of this report is to document location and material options for the wharf upgrade for public consultation and Council decision-making and to outline the development of a preferred location, the rebuild back of the wharf in its current location but with an increase in height based on projected sea level rise.

The scope of repairs and maintenance anticipated over the next 10 - 20 years in order to keep the wharf functioning would be close to a full rebuild and completing this work piecemeal would be disruptive and ultimately more expensive than rebuilding the wharf.

A number of options were identified during a public consultation process between 28th May and 26th June 2019. In order to shortlist the options, a workshop was held on 4th October 2019, attended by engineers from Calibre Consulting Ltd, planners, quantity surveyor, CCC heritage experts, urban planner, the Harbour Master, CCC Parks staff and CCC officers. Feedback from the public via written submissions was discussed and a series of options were developed based on the viability of each option as well as public support.

This report provides an overview of the location and material options. Conceptual drawings for the each of the options were prepared by Calibre, refer to Appendix A

- Baseline Option 0 / Restore existing wharf in its current location, no change to structural form.

The preliminary location options assessed are shown in figure 1 and described below:

- Option A: Construct a new wharf in the same location as the existing wharf.
- Option B: Construct a new wharf along the north side of the existing wharf.
- Option C: Construct a new wharf off Church Street and on the site of the original town wharf.
- Option D: Construct a new wharf from Akaroa Recreation Field / Children's Bay.



Figure 1: Location Options

The preliminary construction material options assessed include:

- Option 1: New wharf structure with like-for-like hardwood timber.
- Option 2: New wharf structure with mixture of concrete and hardwood timber, visible members would be hardwood
- Option 3: New wharf structure made from concrete

The options were further analysed in December 2019 / January 2020 through a Multiple Criteria Analysis (MCA). The MCA was facilitated by BECA with input from Calibre, planners, quantity surveyor, CCC heritage experts, Ōnuku Rūnanga, urban planner, the Harbour Master, CCC Parks staff, CCC officers and the Akaroa community board.

The options do not consider the size, height, alignment of the wharf, these items will be part of a developed design based on the preferred location option. In particular, the connection to the land and how this has an impact on the heritage of the existing wharf abutment and other heritage items nearby. Similarly, a mixture of traditional and modern construction is being discussed with the intention to balance the function and longevity of the structure with keeping with the aesthetic of the Akaroa Historic Waterfront.

The final wharf design will be developed based on location Option A and material Option 2.

Option 0, restoration of the wharf like for like was considered in the MCA. This option was not favoured as it limits the opportunity to increase the amenity of the new wharf and does not address sea level rise.

Options A & B are for rebuilding the wharf in the current location and alongside to the north respectively, these both scored similarly but Option A scored highest and is being developed.

Rebuilding the wharf using like for like hardwood timber would require materials to be imported. This presents a procurement risk as the global supply chain has been disrupted by the pandemic. Much of the structural timbers are hidden from view and the cost difference between using modern and traditional materials is minor. The discrete use of modern materials is to be considered as Options 1 & 2 score similarly in the MCA. Re-using traditional materials from existing wharves is also being investigated.

This report does not include cost estimates but the Options are ranked in order of cost and the costs were considered in the MCA ranking process.

2 INTRODUCTION

2.1 Background

The Akaroa Wharf was built in 1887 and served as the main economic gateway for both passengers and goods until the mid-twentieth century. Christchurch City Council (CCC) is responsible for the maintenance and operation of the public area of the wharf. There are two privately-owned buildings that are structurally connected to the Council-owned wharf.

The wharf is of significant recreational, heritage and commercial importance to Akaroa and the wider Canterbury region. It is widely recognised as a focal point for the town. Additionally, Akaroa Wharf serves as a community and recreational hub for the harbour with the wharf regularly used by visitors, local residents, commercial fishing and tourism operations.

In recent years and following the 2010 / 2011 Canterbury earthquakes with the need to redirect cruise ships from the damaged Lyttelton cruise ship terminal, Akaroa has become a popular cruise and regional tourism destination. There have been concerns about overcrowding on and around the wharf during the summer season. Cruise tourism numbers are uncertain at present due to COVID-19, however it is anticipated that cruise ship tourism will return in the future in some form and once the pandemic settles globally. The completion of the new Lyttelton cruise berth is anticipated to reduce pressure on the Akaroa Wharf once cruise ships resume.

Regular structural inspections of the wharf are undertaken to identify the condition of the wharf and to recommend any short or longer term maintenance repairs. Inspections of the wharf have been completed in 2015, 2018 and most recently in June 2021. The 2018 and 2021 reports by Calibre assessed the condition of the wharf to be moderate to poor. The wharf is over 130 years old and a large amount of the original material has been replaced, but these new materials are now also deteriorating.

CCC completed repairs on the wharf in 2019 - 2020 which included new stringer beams and replacement bracing as well as upgrades to 16 piles. These repairs will provide the necessary improvements to allow the wharf to operate for 3 to 5 years in conjunction with continued inspections and maintenance. Additional repairs were identified in the 2021 condition assessment which CCC are arranging to be completed.

Calibre completed a 'Preliminary Options Report' (May 2019) which set out structural approaches for the repair or replacement of the wharf and provided options for construction materials and location (new and existing) of the structure. The options were developed as a starting point for discussion between CCC, the project team and the community. CCC released the report to the public on 28 May 2019 and held two public drop-in sessions and a 'Have your say' process. Consultation was completed in mid-2019 through which 95 submissions were received for consideration by the project team.

This consultation process provided new ideas and gave valuable insight into the priorities for the community, and these were considered in a further workshop held in October 2019 where the options were chosen to be included in a multi criteria analysis (MCA) assessment.

This report refers to various structural members that form wharf structures, an annotated diagram is provided in Appendix B for guidance.

2.2 Scope of this Report

The scope and purpose of this report is to provide an overview into the development of a preferred option for the wharf to be used for public consultation and Council decision-making. This report is based on the input and advice of project engineers, heritage consultants, quantity surveyors, Rūnanga, urban designer, planners and ECAN harbourmaster's office as well as review and input from CCC staff.

2.3 Description of Current Wharf

Akaroa Wharf is a linear wharf, 155 m long in addition to a 30 m long solid abutment. The area of the wharf deck is approximately 1,125 m² excluding the area of the privately owned buildings which have a footprint of around 460 m². There are also two floating pontoons, further described below. The wharf in its current configuration is shown in Appendix D.

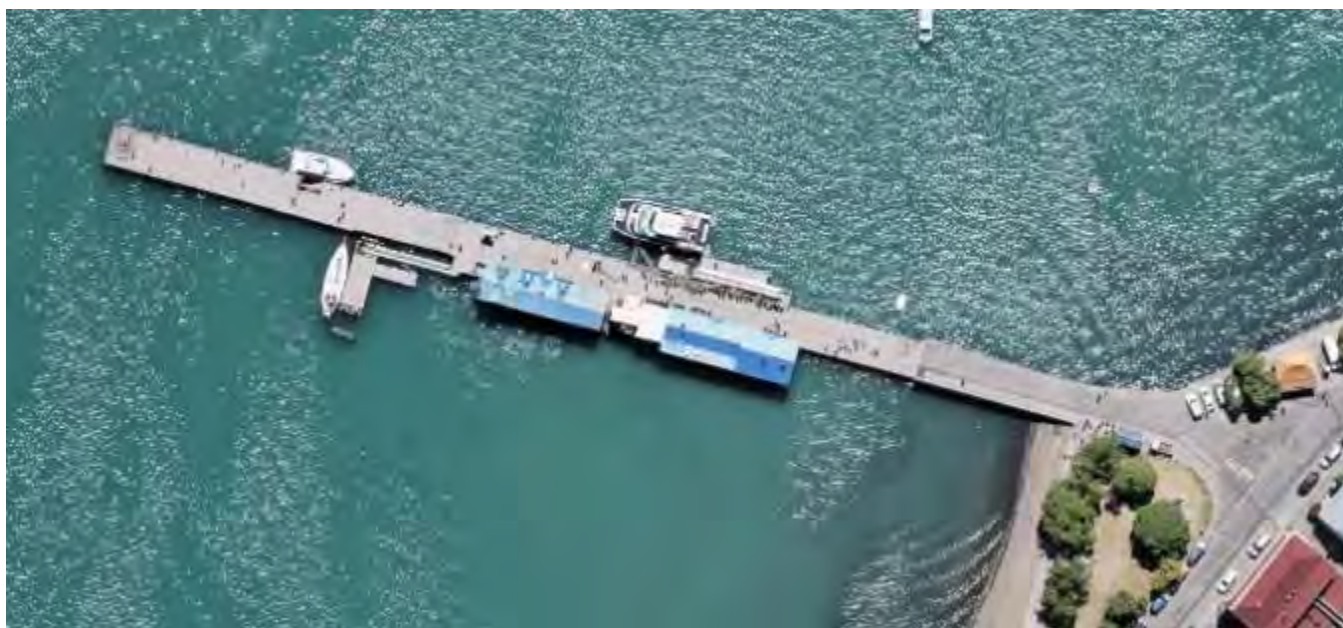


Figure 2: Aerial image of Akaroa Wharf Layout circa 2017 (Source: LINZ Data Service)

Appendix C. The drawings indicate that some of the original form and fabric of the structure remains, generally the original stringers and piles remain, but a large amount of decking, bracing and walers have been replaced. Numerous piles and stringers have been installed over the years, typically alongside the deteriorated original timbers.

The wharf is approximately 25 m longer than shown on the archival construction drawings. Photographs taken shortly after the wharf was completed are consistent with the drawings, other than additional bents added near the shore. Several buildings have been added in the last 60 years to replace the original goods shed. The wharf width is 7.3 m (24'), excluding pontoons and buildings.

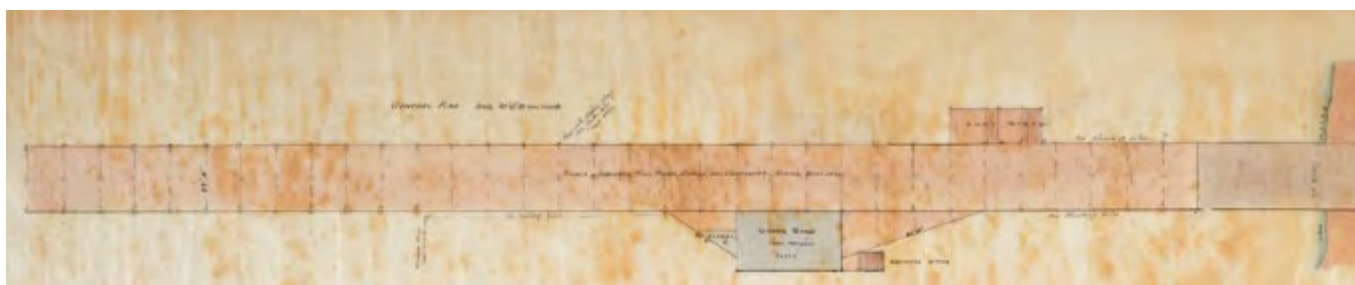


Figure 3: Comparison of 1878 construction drawings and photograph from 1905.

Two pontoon structures, one on either side of the main wharf were constructed around 2008. The pontoons are floating structures anchored in place by steel piles driven into the seabed. The pontoon on the south side of the wharf is 68 m² and orientated perpendicular to the main wharf. The northern pontoon is 68 m² and orientated parallel to the main wharf.

Infrastructure for the delivery of diesel fuel is located on Akaroa wharf. The fuel pump is situated around 80m from the wharf entrance on the northern side of the wharf. The fuel tank is located in front of the wharfinger’s office near the wharf entrance with the fuel line suspended below the wharf deck.

A crane is located around 60 m from the wharf entrance. The crane is at least 40 years old and was originally used for unloading seafood from commercial vessels.

In early 2021 CCC commissioned Enviser Ltd to prepare a User Requirements document to identify the key requirements of the current wharf users with a focus on marine operations for wharf renewal works and to identify future infrastructure requirements.

The wharf is a key component of the Akaroa historic waterfront area and further detail on the potential impact of the wharf upgrade can be found in the Draft Akaroa Main Wharf Conservation Plan dated May 2019 by Origin Consultants.

The wharf and its setting is scheduled as a Significant Heritage item in the Christchurch District Plan, along with the Wharfinger’s Office, the ‘Britomart’ cannon and The Fisherman’s Rest Shelter which all sit within the setting of the wharf. The land adjacent to the current wharf is also located within the Akaroa Heritage Area.

2.4 Condition of Wharf

An Opus condition report (2015) for the wharf identified several piles and stringers that required repair and noted that the useful remaining life of the wharf was 10 years, provided remedial works were carried out on an ongoing basis.

The structure was inspected by Calibre in 2018 and 2021 and found to be in a moderate to poor condition with numerous elements nearing the end of their life. Many of the original structural elements have been made redundant by the addition of new piles, steel bracing and steel and concrete beams. Repairs completed in the last 10-15 years include the addition of galvanised steel beams where the original timber beams had deteriorated and stainless-steel bracing replacing the original timber bracing where it had failed.



Figure 4: Deteriorated timber beam with new galvanised steel installed alongside



Figure 5: Steel tension bracing replacing missing hardwood timber bracing.

A large proportion of the galvanised and stainless-steel tension bracing installed around 10 years ago is in poor condition and much of the steel bracing was replaced in early 2020. The new bracing can be expected to last another 5-10 years before needing replacement again. Repairs have recently been completed to several piles, stringers and capping beam connections, intended to keep the structure in use for five years. It is expected that the structure will be replaced within this time frame.

Many of the original piles remain but have been repaired or made redundant by the addition of approximately 20 piles. A dive inspection in August 2018 and June 2021 indicated widespread teredo worm damage. The extent of degradation is highly variable but is typically confined to the intertidal zone. Once marine borer are in the piles there is little that can be done to mitigate the deterioration except to replace the piles and to install a barrier covering the intertidal zone to prevent future infestation.

During the Canterbury Earthquake Sequence (2010-2011), the 30m concrete abutment reportedly suffered damage from liquefaction with visible severe cracking in the walls. The abutment could suffer further damage due to liquefaction should a significant seismic event occur in the future.

The two pontoons which were added to the structure around 2008 are in good condition.

The original wharf piles appear to be still in place as fixings consistent with the 1878 construction drawings can still be identified. However these piles and fixings are now in poor condition.



Figure 6: Corrosion to fixing at top of pile. Fixing consistent with original 1878 detailing.



Figure 7: Pile with necking and concrete encasement repair.

2.5 On-going maintenance of current wharf

Several submissions received during the consultation were in favour of completing the ‘minimum’ repairs required to keep the wharf in its current form. The condition of the wharf has been assessed by two independent engineering consultants, both of which have indicated that even with regular maintenance, the remaining life of the structure is considered to be less than 10 years.

A large amount of repair work is needed to keep the wharf operational and the volume, cost of repairs and level of disruption can be expected to continue increasing. Doing ‘minimum’ repairs periodically would be less efficient and more expensive than completing a rebuild of the structure which is considered in the Baseline / Option 0. The prioritisation of piecemeal repairs is difficult as much of the deterioration is hidden and a rebuild removes the increasing risk of wharf failure due to unseen defects in the ageing structure. Examples of hidden defects include marine borer eating the piles from the inside and the rotting of timber stringers from the top down.

3 OPTIONEERING PROCESS

Christchurch City Council has recognised the need to investigate the options for replacing or repairing the Akaroa Wharf and has included budget in the 2021 to 2031 LTP to support this work. The budget does not include any upgrading to areas adjacent to the wharf (Britomart Reserve and Akaroa waterfront areas) or for any buildings on or attached to the wharf structure.

The process for the development of a preferred option for the repair/replacement of the Akaroa wharf followed the key phases described below.

3.1 Preliminary Engineering and Conservation Plans

Following the structural condition assessment undertaken by Calibre in August 2018, an options report was prepared by Calibre in May 2019 which discussed initial options for the wharf renewal / replacement with particular attention paid to the form, materials and location of the wharf. Indicative concept drawings were prepared for some of the options.

A Conservation Plan was developed, by Origin Consultants in May 2019 to discuss the heritage and cultural aspects of the wharf and Akaroa waterfront and to inform the next phase of the design process.

3.2 Public Engagement

In May 2019, background information including the Calibre Options Report and the Origin Conservation Plan was made available on the CCC website and publicised within the Akaroa community and to affected stakeholders for discussion.

CCC held public consultation meetings at the Akaroa Bowling Club on 12th and 13th June 2019, with approximately 20 members of the public attending. Consultation closed on 26th June 2019 with 95 submissions received. A more in-depth summary of the feedback is given in Section 5, with some of the key themes identified from the feedback being:

- The wharf forms a critical part of the Akaroa landscape.
- The wharf should be shared by all users (public, commercial operators, recreational fishing etc.) and there should be sufficient space to allow all of these activities to occur simultaneously.
- Traffic congestion is an issue in Akaroa, and this is exacerbated by coaches for cruise ship visitors.

3.3 Development of options

After the public consultation, the project team met to develop several options to take through into the next phase of consultation with the Council, Community Board, wharf stakeholders and wider public. A workshop was held on 4 October 2019 to discuss the consultation feedback, the approach to the wharf redevelopment process and the design inputs for the renewal.

The workshop was attended by the following parties who have or will contribute to the specialist advice required for assessing the options under engagements with CCC:

- Kristine Bouw. Project Manager, CCC
- Sylvia Doherty. Senior Project Coordinator, CCC
- Ian Fox. Harbourmaster, ECAN
- Paul Devlin. Head Ranger, Port Hills & Banks Peninsula, CCC
- Tom Arthur, William Southby and Deborah Curd. Structural Engineers, Calibre
- Luke Donnelly. Quantity Surveyor, WT Partnership
- Matt Bonis and Livi Whyte. Consultant Planners, Planz Consultants
- Boyd Barber, Urban Designer, CCC

Some of the key outputs/ discussions from the workshop included:

- Further discussion is required around the proposed 100-year design life and what that means for the design, including sea level rise, and potential future users. This is important as it is necessary to understand how the wharf will function as part of the Akaroa natural, economic and cultural environment for the next 100 years, rather than just considering the wharf as a stand-alone structure.

- Consideration should be given to all the marine structures in Akaroa Harbour as a network, not just the Akaroa Wharf in isolation. This includes which structures may be used as temporary loading facilities during construction as the Akaroa waterfront does not have sufficient space for construction set down.
- If the decision is made to move the wharf to a new location, this location will be limited by water depth and coastal profile, and investigations into the context of the size of ships that the wharf will be designed for will be needed. This will be determined as a result of public consultation and discussion between CCC and ECAN.
- New wharf in different location versus staged rebuild option to be further investigated. Due to the location of the wharf and the businesses operating out of the wharf buildings, this will be a crucial input into the decisions regarding the form and location of the new wharf (should this option be chosen).

Alongside the workshop, a number of reports have been prepared for CCC to provide inputs into the development of the options. These are listed in the in section 9.

4 DESIGN CONSIDERATIONS

4.1 Wharf usage

4.1.1 Current Use of the Wharf

The wharf was originally constructed for coastal shipping and was the primary means of access for both goods and people. A report outlining the current and future Wharf User Requirements (Akaroa Wharf User Requirements Needs Assessment) March 2021 has been prepared by Enviser Ltd.

The main use of Akaroa Wharf is tourism, recreational fishing and recreational use. There are two privately-owned commercial buildings built directly adjacent to the wharf. There is also a caravan on the wharf which sells fresh fish. The wharf is known to get very busy during the summer season including up to 4,000 cruise ship passengers arriving via tenders from cruise ships on a single day.

In the past, fishing boats used the wharf when seeking shelter of the inner harbour during inclement weather in the fishing grounds beyond the Akaroa Heads. This is no longer permitted given the current condition of the wharf. Feedback during the June 2019 public consultation indicated that both recreational and commercial fishing are seen as an important use of the wharf.

Further consultation with the commercial operators is required in order to better understand the amenity and operational requirements of the new wharf, and to balance these requirements with cost and the needs of other user groups.

4.1.2 Future Use of the Wharf

In recent years and following the 2010 / 2011 Canterbury earthquakes, with the need to redirect cruise ships from the damaged Lyttelton cruise ship terminal, Akaroa has become a popular cruise ship and regional tourism destination. There have been concerns about overcrowding on and around the wharf during the summer season. Cruise tourism numbers are uncertain at present due to COVID-19; although it is anticipated that cruise ship tourism will return in the future in some form. The completion of the new Lyttelton cruise ship berth is anticipated to reduce pressure on Akaroa Wharf once cruise ship visits resume.

The consultation in mid-2019 asked a few questions about the wharf to gain a sense of the key aspects to consider in the future design of the wharf.

Those consulted suggested that the future wharf should include:

- Improved access for local fishing and tourism operators as well as recreational boaters
- Make it larger – wider and more capacity and with better water and land access for all
- Heritage structure and character of Akaroa is important to new wharf
- More commercial – restaurant / café
- More amenities - seating, shelter
- Working wharf is important
- Important to be able to buy fresh fish from the wharf
- Fuelling options – petrol, diesel

This feedback has been included in the development of the User Requirements Document by Enviser Ltd which further identified a list of required and desirable infrastructure requirements.

4.2 Dimensions of the Wharf

The existing Akaroa Wharf is 7.3m wide. During the consultation process a number of submissions stated that based on current operation of the wharf, the existing width of the deck was not adequate. It should be noted that there are multiple locations on the existing wharf where parts of the wharf have been narrowed as the function of the wharf has evolved, in some places closer to 4 metres (Figure 8: Akaroa Wharf -Usable and Non-navigable areas (Source: LINZ Data Service) Usable and non-navigable areas analysis below).

Moving forward, further analysis will be required to confirm an appropriate width which fits within the project budget. One method of deciding the width could be to design to potentially accommodate a crowd with sufficient space for a light goods vehicle (3.5t) to safely use the wharf (possibly including safety barriers).

Ultimately the width of the wharf will be determined as a part of the layout of the user functions of the wharf and including the location and position of pontoon structure, wharf utilities and access and ensuring that any future buildings connected to the wharf do not reduce the usable space of the wharf.



Figure 8: Akaroa Wharf -Usable and Non-navigable areas (Source: LINZ Data Service)

Further discussion will need to be had during the detailed design phase with wharf users regarding vehicle access for maintenance, and with the fishing industry regarding the size of vehicles that would be used for unloading fishing/ mussel boats.

The length of the wharf will depend on the location of the new wharf and the layout of pontoon structures and user access. In some locations, a longer wharf may be required to reach a suitable water depth.

4.3 Wharf Deck Height

Sea level rise due to climate change is predicted to inundate the current wharf deck height and much of the surrounding area. A report has been completed by Jacobs (2020, 2021) on the projected sea level rise in Akaroa over the next 100 years which estimates sea level rise based on a combination of mean high-water spring tides and an additional storm surge.

Jacobs estimated future sea level rise based on internationally recognised IPCC climate scenarios; referred to as Representative greenhouse gas Concentration Pathways (RCPs). The RCP 8.5+ scenario predicts a sea level rise of 0.58m in 2070, the wharf height is proposed to be around 0.65m higher than the existing structure. The height was recommended as a compromise between allowance for future sea level rise and functionality in the short term including how the wharf connects to the waterfront.

With the higher deck level, more pontoons will be considered to give access to smaller vessels. The deck height will also have an impact on the connection to existing buildings and will be a part of ongoing discussions with building owners.

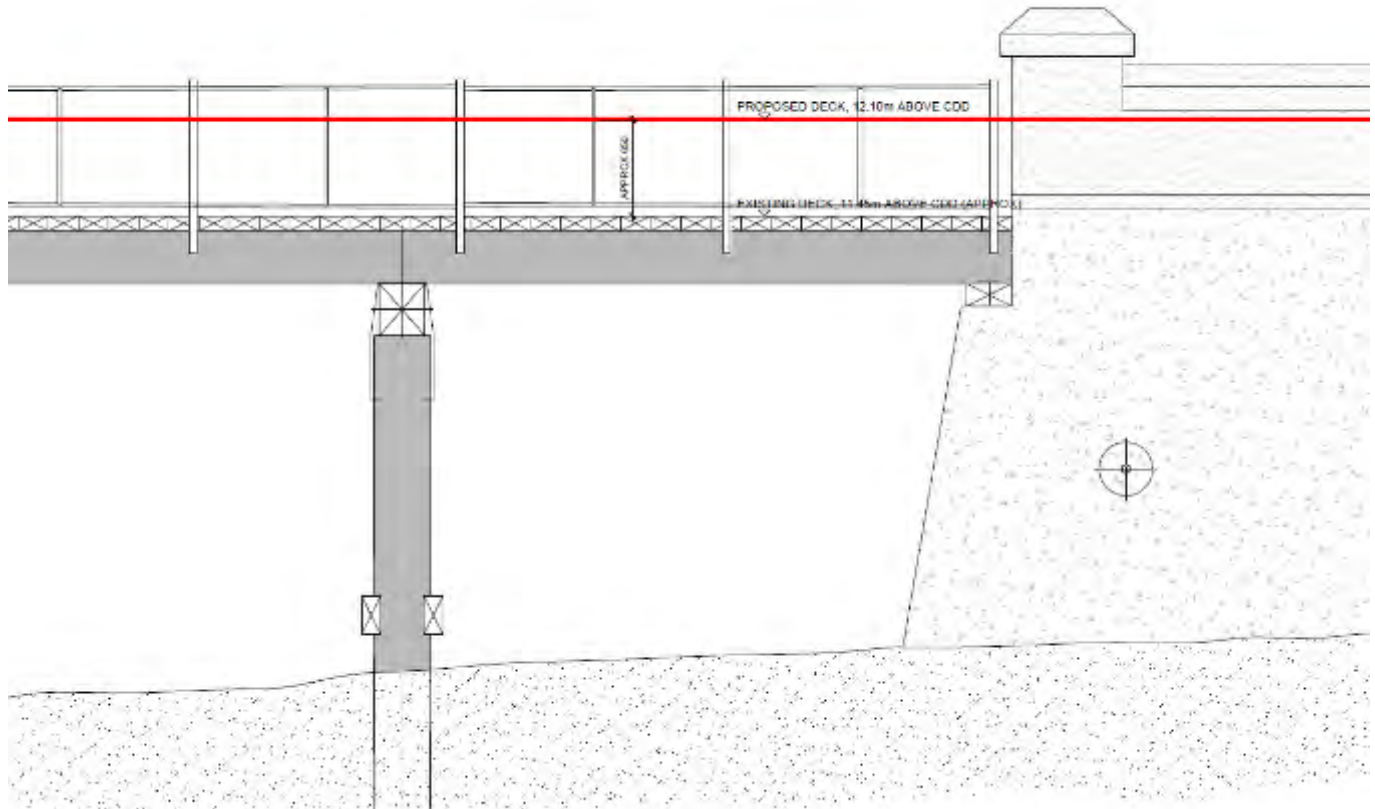


Figure 9: Proposed deck height vs existing wharf

4.4 Connection of Wharf to the Shore

The construction of a new wharf will require a new connection to be constructed from the land. The rebuilt wharf is expected to be 0.65 m above the current deck height with the difference to be made up at the start of the wharf with a ramp. The commercial and recreational uses of the wharf also require areas for loading and unloading of materials as currently exist next to the Britomart reserve. The location of the new wharf in the same location supports these important transport connections to the town and beyond.

The retention of the existing abutment was considered as an option for the rebuild of the wharf either in the same location or adjacent to the existing wharf. The retention of the wharf represented a good heritage outcome for the renewal project, however a number of issues with the retention of the 134 year old structure were identified including;

- The condition of the abutment is moderate to poor. There is cracking throughout the abutment walls and the condition of the inner structure is unknown.
- The abutment was damaged in the Canterbury earthquake sequence. For the structure to be retained, CCC would need to accept the risk of damage from moderate earthquakes in the future.
- The proposed wharf deck is 500mm higher than the existing abutment, a sloping section would need to be created over the abutment or at the start of the main wharf. Modification of the abutment will be needed in the medium term
- The condition of the existing abutment is such that strengthening / modifying the structure would present programme and cost risk
- Based on the above, piling works required for the new wharf structure would have an uncertain impact on the abutment structure and it is uncertain whether the structure would remain intact during the construction works.

Two high level options for the retention of the abutment were considered and include the following;

1. Concrete abutment
2. Seawall abutment option

4.4.1 Concrete Abutment

A solid approach, similar to that used on the current wharf could be designed such that the inner lower end of the ramp could be raised to make a horizontal access should the waterfront be raised in the future. The solid approach could also be designed to accommodate the addition of a stronger and higher parapet in the future.

4.4.2 Wharf connects directly to sea wall

This option would include an elevated and open structure and would be a less costly option than a solid / concrete option.

The existing solid abutment acts as a groyne, altering the beach either side of the wharf. It is likely the removal of the solid abutment would alter the shoreline locally.

4.5 Construction Materials

Australian hardwoods were used for the construction of most 19th century New Zealand wharves. The timber sections used for the original (late 1880's) part of the wharf were large with the stringers being typically 350mm deep x 150mm wide x 7900mm long.

Procuring hardwood timber in the volume needed for this project represents a significant programme risk. The timber is most readily available from South America and has a lead time of around six months. The global pandemic has resulted in volatility in the global supply chain affecting both costs and delivery times.

The selective harvesting of timber from South American sources contributes to rainforest deforestation. A careful balance must be found between minimising the environmental impact of sourcing hardwood timber and minimising the heritage impact of using modern materials.

There are Australian suppliers who confident they can supply sustainably managed hardwood timber similar to that used for the original wharf. The ability to provide hardwood timber in the sizes and volumes required is a programme risk.

Treated softwood timber is significantly weaker and cannot be substituted like for like with the hardwoods that the existing wharf is built from. Engineered timbers are not suitable for an aggressive marine environment.

Due to the poor condition of the timber on the current wharf, reusing these timbers for the new wharves is not recommended for load bearing elements.

Concrete can be designed to provide a design life of up to 100 years by providing sufficient cover to the reinforcement and specifying an appropriate concrete mix design.

Careful selection of construction materials can protect timber elements. For example the use of an impermeable concrete will prevent freshwater ingress. A concrete deck would however make maintenance more difficult as the structural members below are more difficult to access.

We are investigating options for using recycled timber from wharves. This would reduce the environmental impact of replacing the wharf.



Figure 10: Stringer deterioration from freshwater ingress, typical for traditional hardwood structures

Hardwood timber is prone to marine borer such as Toredos which can reduce the life of the structure. The existing main wharf in Akaroa has widespread Toredos damage to the piles. The risk of deterioration from marine borer can be partially mitigated by the use of timber treatments. Providing barriers around the piles such as fibre-reinforced plastic (FRP) jackets or Denso wrap is effective at reducing worm damage. Although visually intrusive these treatments can be hidden behind timber fenders.



Figure 11: Marine borer damage to hardwood pile

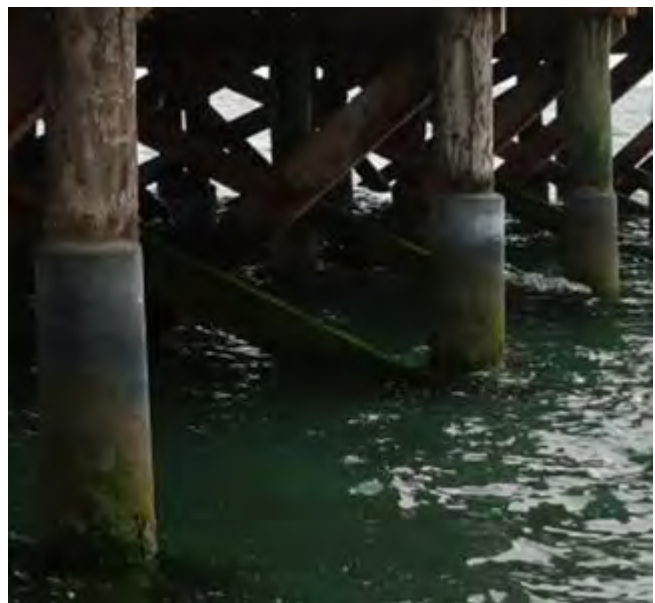


Figure 12: Timber piles with FRP jackets

4.6 Provision of Buildings on / next to wharf

Retaining the current alignment of the wharf will allow the current buildings to remain alongside the new wharf. Further detail around the future of the existing buildings connecting to the wharf is an important part of the consultation process and will include discussions with building owners on the proposed options moving forward.

Suggestions from the consultation process have included recommendations for additional commercial buildings including tour booking offices and a restaurant as occupants. Council has advised that the proposed budget included in the 2021 – 2031 Long Term Plan does not allow for the inclusion of any buildings.

4.7 Bathymetry Survey

A bathymetric survey has been completed for the seabed at each of the proposed option sites which has aided in the development of options for the wharf and the review of the preferred location and sub options. The survey will be used for locating berthing and pontoons to ensure there is sufficient draft for the vessels that are planned to use these facilities.

4.8 Heritage

The Akaroa Wharf has significant heritage value for Akaroa and the wider harbour. A draft Conservation Plan has been prepared for the Akaroa Wharf which considers both the heritage and cultural values of the wharf and options for the future of the wharf. The Conservation Plan is not a static document and is developed to be regularly revised and kept up to date (consistent with ICOMOS New Zealand Charter 2010). The project team is currently working in partnership with Ōnuku Rūnanga on updating the Conservation Plan and any policies and recommendations for the wharf.

The Akaroa Wharf is classified as a Group 2 – Significant item in the CCC Schedule of Significant Historic Heritage but is not included in the Heritage New Zealand Pouhere Taonga (HNZPT) list.

The Draft Conservation Plan identified the Akaroa wharf as one of the most significant heritage structures in the town and noted that the cultural heritage is highly significant to the town and wider district. The draft Conservation Plan made the following assessment of the wharf as having:

- High historical and social value
- High cultural and spiritual value
- Moderate architectural and aesthetic value
- Moderate technological and craftsmanship value
- High contextual value
- Moderate archaeological and scientific significance value

Despite the heritage significance of the wharf, the existing structure is in poor condition with many elements nearing the end of life. Many of the original hardwood elements have been replaced and major repairs are now required to a majority of the structure.

While the main structural elements of the existing wharf will be removed, the existing heritage abutment is an element that could be retained as part of an option for the rebuild of the wharf in parallel to the existing wharf. As described above a new elevated structure that connects the land to the main wharf structure could be built which does not replicate the abutment but rather draws attention to the heritage structure and allows for interpretation and future uses.

Moving forward a plan is required that recognises the heritage of the wharf but that also looks to the construction of a new wharf structure that will create a new heritage for the community including selected design elements of the existing wharf (character, form, bracing details) and which could include elements of the current wharf in furniture and urban design features on and around the wharf structure. The interpretation and story of the previous wharves (1850 and 1887) also represents an opportunity for development in future stages.

4.9 Cultural

Council staff have been working in partnership with and receiving input from Ōnuku Rūnanga on the cultural opportunities the new wharf brings. Three overarching concepts for cultural integration – mana motuhake, whakapapa and mahinga kai – have been developed.

While the wharf structure as an isolated element is more closely associated with the Pākeha history of Akaroa, it is located within a landscape of high significance to two hapū, Ngāi Tārewa and Ngāti Irakehu. These hapu are the tangata whenua of the takiwā which covers the Akaroa Harbour, surrounding coastal environment and hills as defined by the Ngāi Tahu Claims Settlement Act 1998.

The wharf is a prominent form within a cultural landscape embedded with whakapapa. It extends into the heart of Ngāi Tārewa and Ngāti Irakehu identity and way of life which was centred around mahinga kai.

The abutment to Akaroa Main Wharf also interfaces with Britomart Reserve, an area which for Ngāi Tahu holds special significance. This was the place where approximately 500 Ngāi Tahu gathered in 1848 to discuss the sale of land which would later be known as Kemp's Deed. This event also marked the beginning of land alienation and a multi-generational battle to have the principles of Kemp's Deed honoured.

The integration of both heritage and cultural elements in the design of the new wharf is a key consideration that will be explored in subsequent design phases.

5 MULTIPLE CRITERIA ANALYSIS (MCA) 2019 CONCEPT OPTIONS

The following options were identified during the workshop held on 4th October 2019 in Christchurch as most likely to meet the form, function, cost and environmental requirements for the wharf renewal. These were prepared for consideration in the MCA and the descriptions and inputs described in this section were as advised in December 2019 / January 2020.

All the options will require the Council to work closely with current wharf building owners and tenants on construction timing and approaches.

5.1 Baseline Option 0: Restore existing wharf in its current location, no change to structural form.

This option is for the staged demolition and replacement of the wharf in its existing location and form and at its existing height. Where possible existing timber members would be used, however a large proportion would be expected to require replacement due to their current condition. The majority of the material that could be retained is unlikely to be from the original 1887 construction due to the extent to which the structure has been repaired and updated over time.

This option would satisfy feedback received favouring repairs only, whilst also maintaining the structural integrity of the wharf for many years to come. This option would require either a complete shutdown of the wharf or a staged construction to allow for the ongoing use of the wharf. Staging would likely include the demolition and reconstruction of the outer end of the wharf first. The landward side and the abutment of the wharf would then be demolished with a temporary access provided to the new outer section.

With this option, the existing privately-owned commercial buildings could remain with structural improvements required. The construction process would be complicated by the need to ensure adequate support to the buildings at all stages of the rebuild, and by the need to manage the risk of damaging the buildings. Building within the existing footprint of the wharf limits the ability to improve use of the wharf space due to the presence of building access ramps.

Building the new wharf in the current location would be the most disruptive option during construction, as it is assumed the current wharf will need to continue to function during this period.

The heritage and economic benefit of replacing the wharf in its current form and location would need to be balanced against the need for modifications to allow the wharf to best meet the future needs of all wharf users. One way to do this may be to allow for the installation of some additional pontoons to provide extra capacity for recreational users and commercial fishing, however the location of these will need to be carefully considered to ensure that larger vessels could still berth against the wharf. Potential future locations for additional pontoons will be investigated during the detailed design stage and once a preferred option has been confirmed.

The Heritage New Zealand Pouhere Taonga (HNZPT) submission on the wharf rebuild states that HNZPT would not consider this to be a true refurbishment as many of the existing structural members are to be replaced with new hardwood timbers, losing the fabric of the original wharf. The ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value (ICOMOS New Zealand Charter 2010) defines the process of restoration as typically involving reassembly and reinstatement and is based on using the existing fabric. The level of maintenance required would be more in line with the definition of reconstruction in the Charter, which is distinguishable from restoration by the introduction of new materials.

Option 0, or the baseline option, would retain the current deck height. The current Mean High-Water Spring plus storm surge level is already at the underside of the deck so it is expected that the wharf would become increasingly prone to flooding.



Figure 13: Baseline Option, Option 0, Restore existing wharf in its current location

5.2 Concept Location Options

The following options cover the location of a new wharf. The locations were refined based on input from the public consultation, and the four location options are shown in context below. It should be noted the wharf alignments are indicative only.

The relative costs of each option is listed below ranked from lowest to highest cost.

OPTION	DESCRIPTION	MCA RANKING	COST RANKING
Option A	Current Location	1	lowest cost (tied)
Option B	North of Existing	2	lowest cost (tied)
Option C	Church Street	3	median cost
Option D	Children's Bay	4	highest cost

Table 1: Location Option cost hierarchy



Figure 14: Preliminary location options

5.2.1 Option A: Construct a new wharf in the same location as the existing wharf. Increase in deck height and investigate increase in width



Figure 15: Option A: Wharf in location of existing wharf

With this option the original abutment would be completely removed and a new abutment constructed that is fit for purpose. Additionally, the deck height would be increased to allow for sea level rise.

This option is for the staged demolition and replacement of the wharf in its existing location with an increase in deck height.

The original abutment would need to be rebuilt to accommodate a likely increase in width and raised deck height.

There would be similar disruption during construction to the baseline option as the current wharf will need to continue to function during this period. The cost for this option is estimated between greater than Option 0 and similar to Option B depending on the materials chosen.

Maintaining the privately owned buildings without modification is seen as challenging for this option. The new deck level will likely be higher than the existing, and the buildings rely on the wharf piles for vertical support. In addition, the piles connected to the building would need to be upgraded as a part of the overall wharf rebuild.

Planz Consultants noted in their 2019 report on the planning considerations that this option was anticipated to have the least restrictive consenting requirements under the Christchurch District Plan, Canterbury Regional Coastal Plan and the New Zealand Coastal Policy Statement.

5.2.2 Option B: Construct a new wharf along the north side of the existing wharf using the existing abutment

This option is based on the complete removal of the original abutment and a new abutment constructed that is fit for purpose. Further discussion with the project team on the heritage significance of the original abutment has led to a potential alternate approach to Option B where the original abutment could be retained, and a new elevated abutment (not solid) could be constructed. This Option would further emphasise the heritage significance of the existing abutment structure.



Figure 16: Option B: Construct a new wharf along the north side of the existing wharf

This option consists of a new wharf built either directly parallel to the existing wharf or on an angle off of the existing alignment. The abutment location would need to be investigated through further discussion with building owners, stakeholders and the community. The alignment of the wharf would be confirmed as part of the detailed design phase. Further investigation would also be needed into:

- Location of new connection to the land
- Heritage and cultural impact
- Construction and staging issues (current uses on north side of the wharf relocated during construction of new wharf)
- Impacts on commercial and recreational use of the wharf during construction

There would be some disruption during construction for this option as the current wharf will need to continue to function during this period. The cost for this option is estimated between greater than Option 0 and similar to Option A depending on the materials chosen.

5.2.3 Option C: Construct a new wharf off Church Street on the site of the original wharf

This option would alleviate some of the construction challenges present with Option A depending on the final alignment and position (e.g. locating the wharf directly parallel to the wharf would result in more construction impact than positioning the new wharf on an angle). This would allow the existing wharf to keep some level of service while the new wharf is being built. The demolition of the existing wharf can be staged around the new wharf construction.



Figure 17: Option C: Construct a new wharf off Church Street and on the site of the original town wharf

Option C includes building a new wharf out from the end of Church Street which is the location of the original 1850s jetty so this location would have some heritage weighting. A location plan from 1887 for the construction of the current wharf is included in Appendix C on drawing MD1333 which shows the position and alignment of this earlier jetty.

With this option the abutment to the original wharf would be retained.

An advantage of this option is that it will allow for the current wharf to operate while the new wharf is constructed and further would allow for the retention of the existing heritage abutment.

This option would create a significant change of the function and character of the historic waterfront area with the construction of a new abutment within the heritage setting in Akaroa. In addition, this option will create disruption to the transport system along Beach Road during the abutment construction period and beyond as there is less space available in and around Church Road and its existing commercial environment for car and bus circulation as well as the loading and unloading of fishing vessels.

Option C is estimated to have higher costs than Options A & B.

5.2.4 Option D: Construct a new wharf from Akaroa Recreation Field/ Children's Bay.

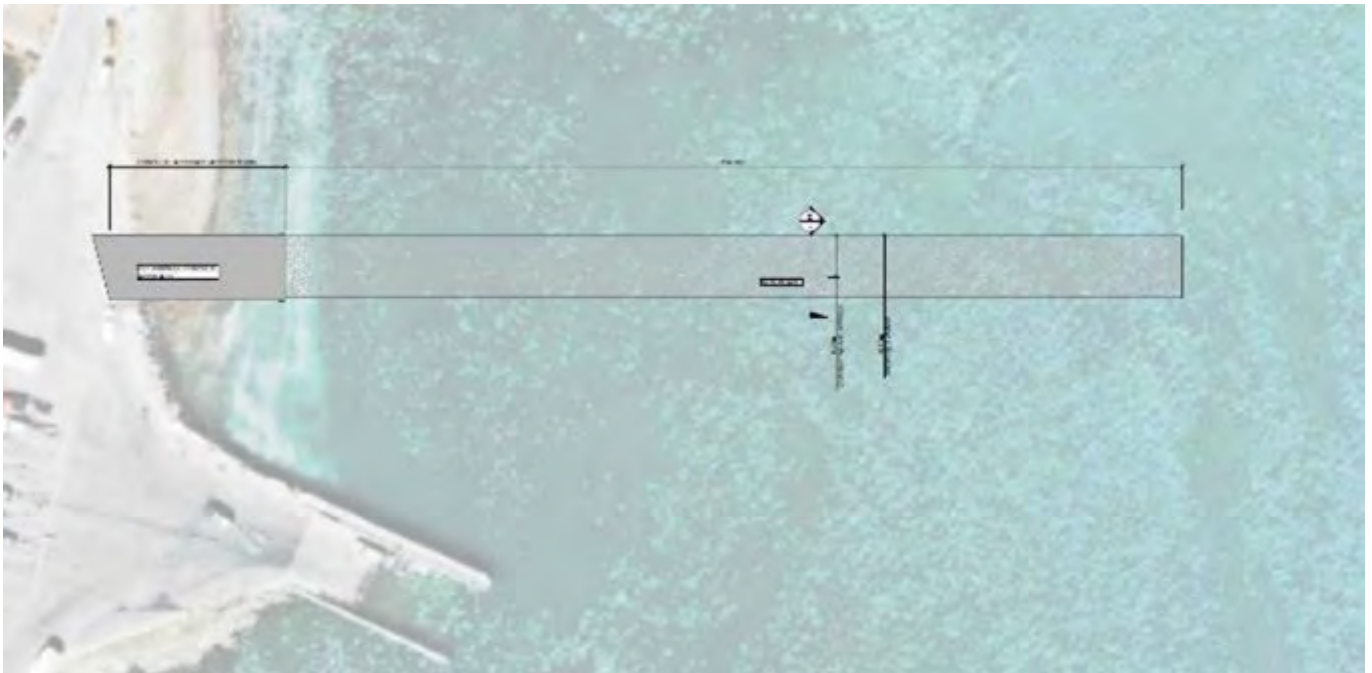


Figure 18: Option D Construct a new wharf from Akaroa Recreation Field/ Children's Bay

This option was proposed in multiple public submissions during the consultation process as a part of a solution for the high tourist and visitor volumes on and around the existing wharf. Some submissions suggested that in consideration of cruise ship tourism the Council look to consider two wharves, a new one to serve cruise ship needs and a refurbished wharf in the existing location.

With this option the abutment to the original wharf would be retained.

The relocation of the wharf to the other side of Akaroa is likely to have a significant impact on the heritage of the waterfront. Building the new wharf far away from the existing wharf would minimise the disruption to the current wharf users during construction. However the limited existing commercial presence around location Option D is seen to be a negative factor.

One of the main issues with the construction of a new wharf in this location is the depth of the water in Childrens Bay. While the area is dredged annually to maintain use of the slipway which is currently located there, the relocation of the wharf in this area would require the structure to extend significantly into the harbour and a significant dredging programme will be required to ensure suitable water depth is available for all vessels at all tides.

It is expected that the environmental impact and the relevant Resource Consent requirements would be more significant at this site than the other location options.

Building a new wharf in Childrens Bay would mean construction would be occurring in a Coastal Marine Environment not currently modified by human use to the same extent. The New Zealand Coastal Policy Statement imposes prescriptive impediments on structures within the Coastal Marine Environment that means this option would require a much higher degree of assessment and mitigation controls on the surrounding areas.

The report on Coastal Hazards shows the area around Childrens Bay is vulnerable to both sea level rise and inundation and it is likely that significant flood protection work would be required to the surrounding area.

Option D has the highest estimated cost and due to anticipated dredging. Flood protection works for the surrounding area are excluded from the cost estimate.

5.3 Concept Structural (Material) Options

The options analysis considered the construction materials for the structural 'form' of the wharf and include traditional, modern and a combination of both types of materials. The use of traditional hardwoods for wharf construction is discussed in Section 4.5.



Figure 19: 3D scanner image of existing wharf, showing concrete abutment and hardwood wharf beyond

It is expected that a new solid abutment would be built using concrete projecting from the seawall which would be consistent with the materials used for the existing structure. The detail of this construction would be developed during the concept design phase. The level of the new wharf is proposed to be higher than the adjacent shore so an incline will be necessary near the wharf entrance. The connection between the wharf and shore is a key design feature with implications on the heritage areas around the wharf entrance.

The materials options below refer to the construction materials and form of the wharf beyond the abutment.

5.3.1 Option 1: New Wharf Structure with like-for-like hardwood timber

This option is for a new wharf comprising similar materials and structural form to the existing main wharf but designed for future usage.

A traditional hardwood wharf would utilise timber piles, bracing, capping beams, stringers and decking. The shape and function of the wharf would not be significantly restricted by the use of hardwood timber.

Traditional wharf construction using hardwood is a niche market which may limit the number of contractors who have experience building this type of structure. More significantly, the availability and cost of timber materials in the volume that would be required for Akaroa require careful consideration. Another challenge is the use of timber decking. While timber decking allows relatively easy access to the structure below, it also allows fresh water to pass through and greatly accelerate the deterioration of the timber structure below.

5.3.2 Option 2: New wharf structure with a mix of concrete and hardwood timber. Visible members would be hardwood

This option would provide a mixture of materials based primarily on material durability, performance in maritime conditions and maintenance costs. For example, timber members would be recommended where they are prominent and concrete in discreet places.

With this option, the structure could be designed to pay homage to the original wharf's form, though all structural members would be constructed out of concrete for example. Original timbers taken from the wharf during demolition could be used as trimming members to hide modern construction materials and give the wharf an older feel. Refer to Appendix A

It is proposed that diagonal bracing be installed to provide the distinctive wharf 'silhouette' which gives the structure some of its character.

The piles can be concrete or hardwood timber and the appearance of the wharf structure from a distance would be similar. Timber fendering and decking could reduce the visual impact of concrete and help maintain the appearance and character of a traditional hardwood wharf.



Figure 20: Rona Bay Wharf, timber piles and bracing with concrete edge beam and deck

5.3.3 Option 3: New wharf structure made from concrete.

This option is for a modern concrete structure using concrete for all the structural elements. This concept is less defined than the others as the design is less constrained by the form of the existing structure. A modern concrete wharf would typically consist of piles and capping beams but without diagonal bracing which gives traditional timber wharves some of their distinctive character.

Concrete elements can span further than hardwood so fewer piles would be required. A 10m wide wharf, may require three piles per bent at 10m centres. Where vessels are berthing at the wharf, fender piles would be driven outside the main piles with intermediate fender piles between bents. Depending on the size of the vessels berthing on the outer end of the wharf additional piles may be required to provide resistance to the lateral loads exerted on the structure by larger vessels

Steel pile casings could be driven into the seabed and then filled with concrete. The capping beam could be formed with a precast shell beam or it could be cast in situ. The deck could be formed using pre-cast 'double T' sections which would form a safe working platform for the topping to be poured in situ.



Figure 21: UCSD Nimitz Wharf. Example of reinforced concrete wharf



Figure 22: Rangitoto Island Wharf, Auckland. Example of reinforced concrete wharf

5.4 Consideration of Options

6 MULTI-CRITERIA ANALYSIS (MCA) RESULTS

To compare and score the options, a MCA was completed in December 2019 / January 2020 over two workshops.

The MCA was undertaken to guide decision-making regarding suitable location and high-level structural design options. The MCA was facilitated by BECA with input from Planz Consultants, Calibre Group, WT Partnership (WTP), ECan, Community Board Members, Council Heritage and Urban Design. Input from Ōnuku Rūnanga was obtained following the workshops and considered in the MCA.

The MCA identified that preliminary location Options A and B are favoured, the scores were similar with Option A scoring highest. Options 0 and D score significantly lower. Sensitivity analysis did not affect the order of preference.

Preliminary Location Options				
Option 0	Option A	Option B	Option C	Option D
-2425	2350	1900	1550	-3475

Figure 23: MCA Weighted scores for preliminary location options (BECA)

Option 0 scores highly in the cultural objective due to it maintaining the current location and materials from the existing wharf. It scores negatively in most other aspects due to the inability of the wharf to be altered to meet the needs of the community, and the impact on the wharf users during construction.

Options A and B scored similarly in most areas. They scored highly on the ability of the upgraded wharf to meet the current and future demand of the wharf by all user groups. They scored quite poorly on the impacts on the existing wharf during construction and the impact on the natural environment. Option A was scored better in some of the cultural topics.

Option C scored similarly to Options A and B on the ability to cater for wharf user demands but was scored more negatively due to its cultural impact due to the change in location having a negative impact on the waterfront area.

Option D scored poorly due to its cultural and environmental impacts and the significant increase in cost associated with this site.

The MCA identified that preliminary structural Options 1 and 2 are favoured with Option 1 scoring slightly better. These options favour retaining traditional wharf character for the new structure. Option 1 was more favourable in regard to feasibility and the cultural aspect with the heritage form of the wharf able to be maintained, even if the materials are being replaced. Option 2 scored favourably in the feasibility and affordability aspects. Option 3 scored poorly in the cultural objectives as the current form and historic feel of the wharf would be lost by constructing it from modern materials.

Structural Options 1 & 2 have similar scored and cost estimates and so both will be considered in the developed design.

Preliminary Structural Options			
Option 0	Option 1	Option 2	Option 3
-375	1025	775	-1000

Figure 24: MCA Weighted scores for preliminary structural options (BECA)

Further discussion of the MCA results, including details of the sensitivity analysis, can be found in the BECA report.

The options developed in the MCA assumed the retention of the existing wharf abutment. Further investigation and preliminary review of construction methodology has identified that the 134-year old abutment would need to be removed as a part of a rebuild for Options A and B.

7 DEVELOPMENT OF PREFERRED OPTION

7.1 Location Option

Based on the MCA the project team looked into the development of location Options A & B. The Options have similar cost estimates with Option A; rebuilding the current wharf location is the preferred option based on the following.

- less onerous planning requirements
- maintains the iconic setting, look and feel of the wharf within the greater Akaroa landscape and coastal context;
- link to the land is simplified, makes use of the existing transport linkages to Akaroa township;
- allows for easier connection for the existing, privately-owned buildings that currently attach to the wharf;
- lesser environmental impact on the seabed;
- annual dredging not required;
- requires the least restrictive consenting requirements under the Christchurch District Plan, Canterbury Regional Coastal Plan and the New Zealand Coastal Policy Statement; and
- provides an opportunity to integrate mana whenua identity and values into the design of the wharf and acknowledge the significance of the foreshore location and connection to the Britomart Reserve.

7.2 Material / Structural Option

Material Options 1 & 2 are favoured, both will be considered as part of the developed design. Option 1 is rebuilding using like for like materials and Option 2 is a mixture of traditional and modern materials.

There is a cost saving from using modern materials of around 1% of the total capital expenditure. The sourcing of hardwood timber needs to be done with consideration of the impact on the environment.

Re-using timber materials from the existing wharf has been considered. The poor condition of the piles, beams and decking precludes their use in volume. Repurposing timber beams to form timber decking has been discussed with timber mills. Typically they are reluctant to do this due to the hardwood being onerous on their saws and the presence of metal fixings being hazardous.

Calibre are investigating the availability of timber from a large hardwood wharf that is being partially replaced. There is a very large volume of timber available, and it is hoped using recycled hardwood decking is an option for Akaroa.

7.3 Design Principles and Objectives

Isthmus Group have summarising the functional, cultural and contextual priorities the new wharf. This has led to the development of the concept renders for the new wharf shown below.



Figure 25: Render of wharf from north (Isthmus)



Figure 26: Render of wharf from west (Isthmus)

7.4 Next Steps

The recommended next steps in the process are to include the following:

- Consult on developed options: 1 December 2021- 31 January 2022
- Collate community and stakeholder feedback: February 2021
- Report to Te Pātaka o Rākauhautū-Banks Peninsula Community Board, then to Council for approval to design, consent and construct March – April 2022
- Procure design team and specialists May – June 2022
- Complete final design 2022 - 2023
- Implement tender and consent process 2023
- Construction 2025 - 2025
- Completion 2025

8 CONSTRUCTION

The methodology and timing of the construction of the wharf will be determined once further information is determined on a preferred option for the structure as this will drive the staging and process that is developed by Council.

8.1 Environmental Impact

The Cawthron Institute has recently completed a preliminary ecological risk assessment of cruise ship visits in the Akaroa Harbour (Johnston, 2019), which provides a suitable background on the risks associated with undertaking works in the Akaroa Harbour and provides a good foundation for further works.

It is recommended that CCC engage an environmental consultant to undertake a study on the effects that the proposed option will have on the local flora and fauna. The study should include both the marine and terrestrial impact during and after construction.

The construction has an increased level of environmental risk so we recommend marine ecologists review the construction methodology and provide feedback on how to mitigate impact on the environment. An environmental effect and impacts report will be required for a resource consent application.

8.2 Level of Service During Construction

Due to the critical nature of the wharf within the Akaroa community the construction methodology will need to allow some degree of continued use during construction. The level of use will need to be agreed between the affected stakeholders and CCC and may vary seasonally. The final option chosen for detailed design will also have a major impact on the level of use available during construction. Some factors to consider regarding the level of service include:

- What is the minimum area of wharf that can be publicly accessible during construction.
- How many passengers need to be able to be accommodated at one time, for tour operators.
- Size and location of lay down area. It is likely that the lay down area will need to be away from the wharf due to space requirements, with plant and equipment barged to the site. There will still need to be some area on the wharf set aside for construction laydown.
- Restriction on harbour navigation during construction, particularly during the pile driving phase. This may affect the construction scheduling to ensure that piling doesn't occur during peak times.
- Restriction of access / use of privately owned buildings next to wharf, extent / timing of removal. This will depend on the option chosen but will need to be discussed with the building owners and the CCC legal and property team.
- Facilities for fishing/mussel vessels

8.3 H&S Considerations

It is important to consider health and safety early in the project to ensure that any significant hazards are mitigated by design where possible. Some key health and safety considerations for this project include:

- Conflict between construction traffic and tourist traffic, including both pedestrian traffic and vessels.
- Separation of public and commercial operations both during construction and once the wharf is fully opened.
- Construction and future maintenance works will need to be completed over water so thought should be given to how to minimise this risk, i.e., provide access from above. A safety in design analysis and report is recommended.
- Identify hazards and maintain the project risk register

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10 LIMITATIONS AND DISCLAIMERS

This report has been prepared by Calibre Consulting Ltd (**Calibre**) at the request of or Christchurch City Council (**CCC**) for the purpose of facilitating a discussion based on the Scope herein. This report has been prepared on the terms of the CCC Panel Agreement for the Provision of Design and Advisory Services Marine Structures (dated 1 January 2018), and as per the Akaroa Wharf Rebuild – Technical Support and Planning Offer of Professional Services dated 20 September 2019.

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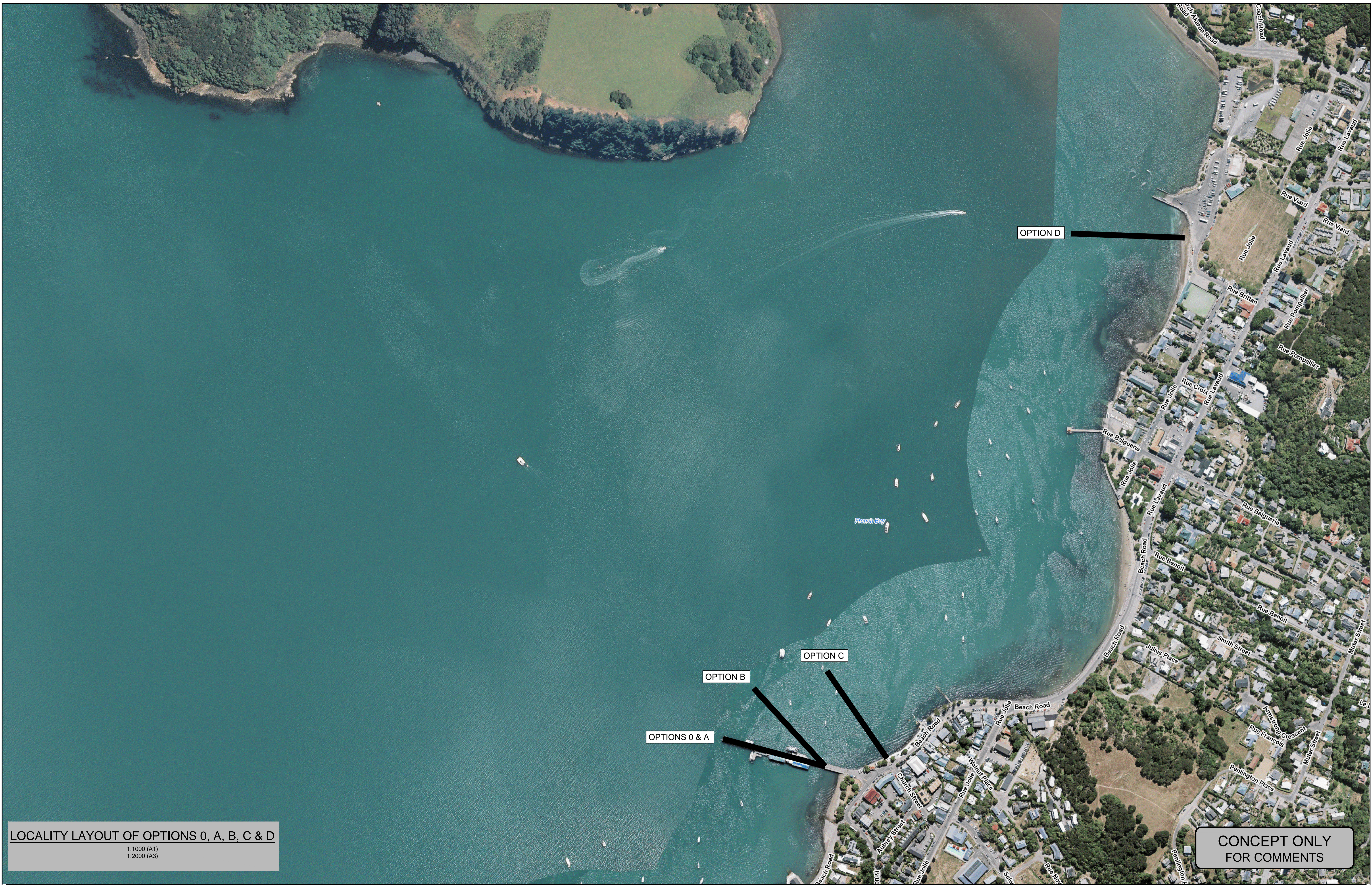
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- These limitations and disclaimers shall apply notwithstanding that the report may be made available to other third parties and for the purpose of public consultation.
- This report is limited to the description of the scope, and excludes anything which is not expressly recorded including (but not limited to):
 - The degree of compliance with the New Zealand Building Act 1994 or any other relevant codes or standards other than the structural aspects of the structure; and
 - The drawings included in Appendix A are for concept designs and are not final. These are provided only for the purpose of considering options.

In accepting delivery of, and in using this report, CCC accepts and agrees that the report is subject to the disclaimers and exclusions contained herein, and indemnifies Calibre for all losses, expenses or claims arising from the use or reliance on this report by any third party, including but not limited to the users or occupiers of the structure.

Appendix A - Concept Drawings



LOCALITY LAYOUT OF OPTIONS 0, A, B, C & D

1:1000 (A1)
1:2000 (A3)

**CONCEPT ONLY
FOR COMMENTS**

Revision	App	Date	Approved

Client

Project Title
**Akaroa Wharf
Preliminary Rebuild Concept**

Sheet Title
**LOCALITY LAYOUT
OPTIONS 0, A, B, C & D**

Level 1
323 Madras Street
Christchurch 8042
+64 3 374 6515
calibreconsulting.co

Scale (A1 Original) 1:	(A3) 1:	
SCALE AS NOTED		
Project No	Sheet	Revision
711779	S050	-

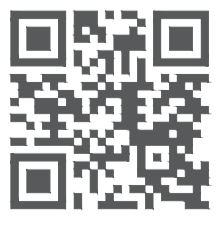
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OPTION A - CURRENT LOCATION (WHARF WIDENED)

1:200 (A1)
1:400 (A3)

**CONCEPT ONLY
FOR COMMENTS**



Revision App Date Approved

Surveyed	Designed	Drawn	Reviewed	App	Date	Approved
	Tom Arthur	Lorena Baliili	Tom Arthur		11/19	

Client
Christchurch City Council

Project Title
Akaroa Wharf Preliminary Rebuild Concept

Sheet Title
OPTION A NEW WHARF AT CURRENT LOCATION

Level 1
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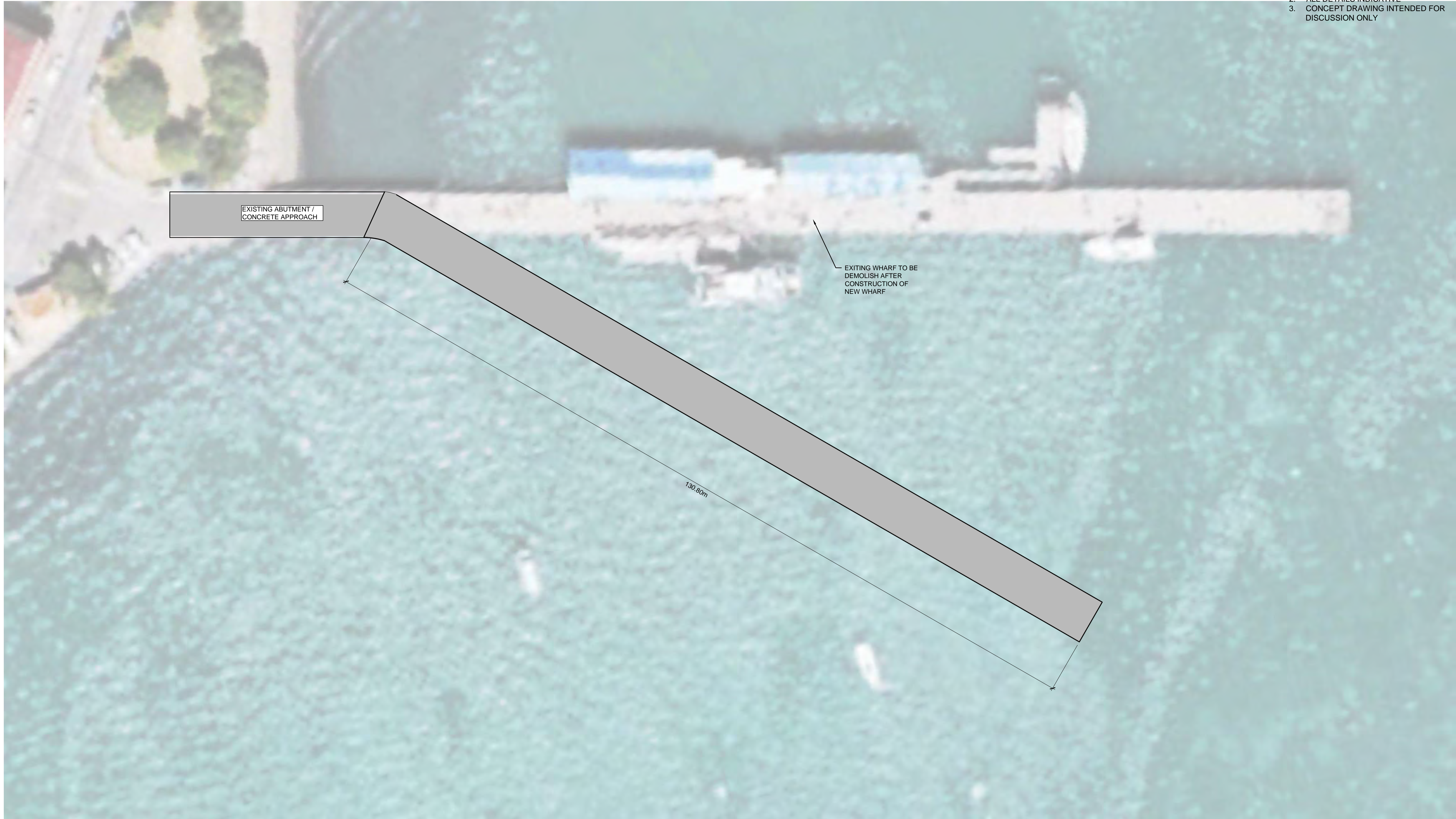
Scale (A1 Original)
SCALE AS NOTED

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711779	S110	-

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NOTES:

1. CONCEPT BASED ON DISCUSSION AT 2ND PUBLIC CONSULTATION MEETING
2. ALL DETAILS INDICATIVE
3. CONCEPT DRAWING INTENDED FOR DISCUSSION ONLY



OPTION B, NORTH OF CURRENT WHARF FROM CURRENT ABUTMENT

1:150 (A1)
1:300 (A3)

**CONCEPT ONLY
FOR COMMENTS**



A CONCEPT
Revision

TA 09/19
App Date

Surveyed	Designed	Drawn	Reviewed	Approved
Tom Arthur	Tom Arthur	Lorena Balili	Tom Arthur	
11/19	11/19	11/19	11/19	

Client



Project Title

Akaroa Wharf
Preliminary Rebuild Concept

Sheet Title

OPTION B
NEW WHARF TO THE
NORTH OF EXISTING

Level 1
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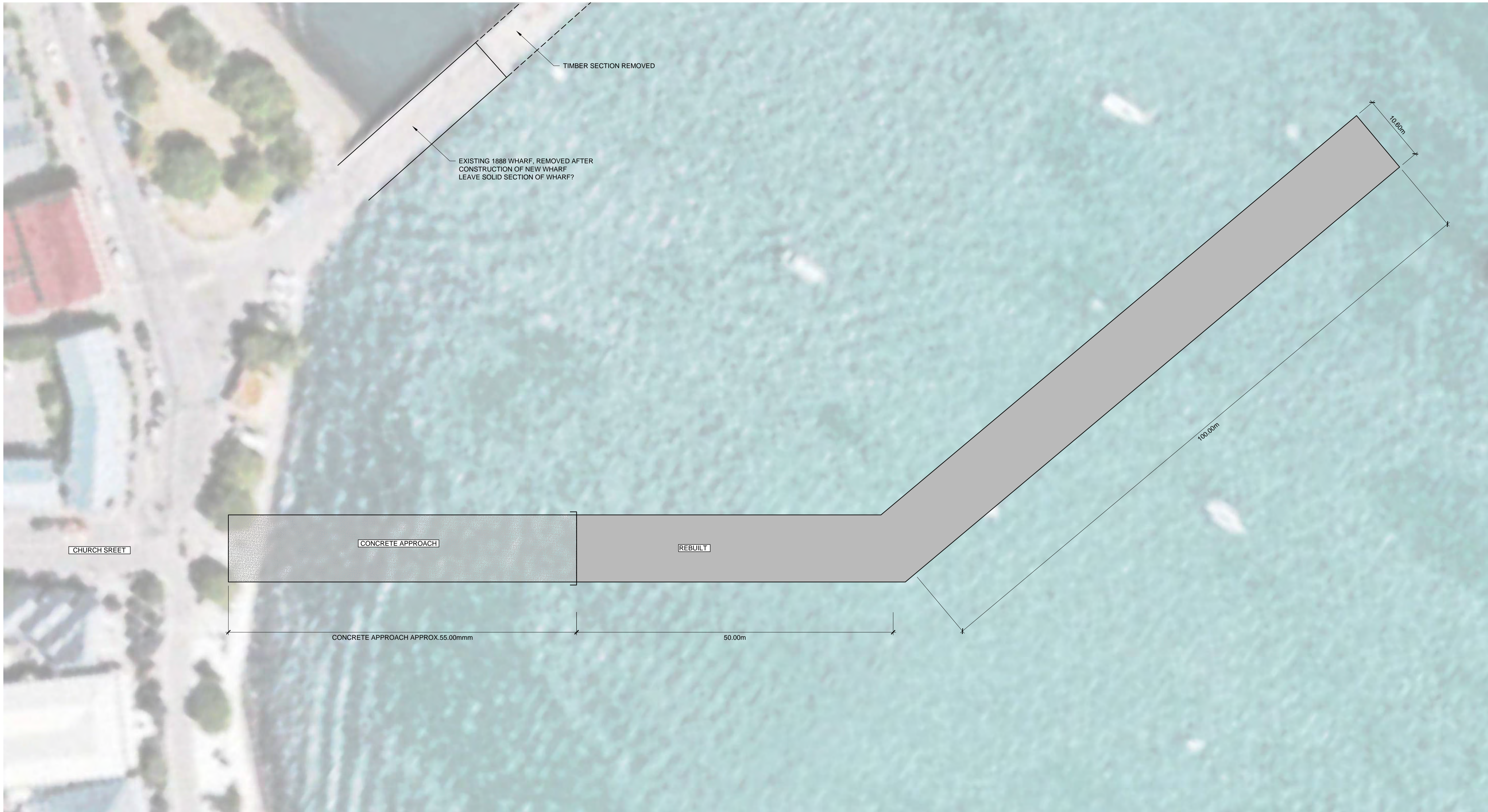


Scale (A1 Original)

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711779	S120	-

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OPTION C - CHURCH STREET

1:300 (A1)
1:600 (A3)

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FOR COMMENTS**



Revision

App Date Approved

Surveyed	Designed	Drawn	Reviewed	App	Date	Approved
	Tom Arthur	Lorena Baliili	Tom Arthur		11/19	

Client
Christchurch City Council

Project Title
Akaroa Wharf Preliminary Rebuild Concept

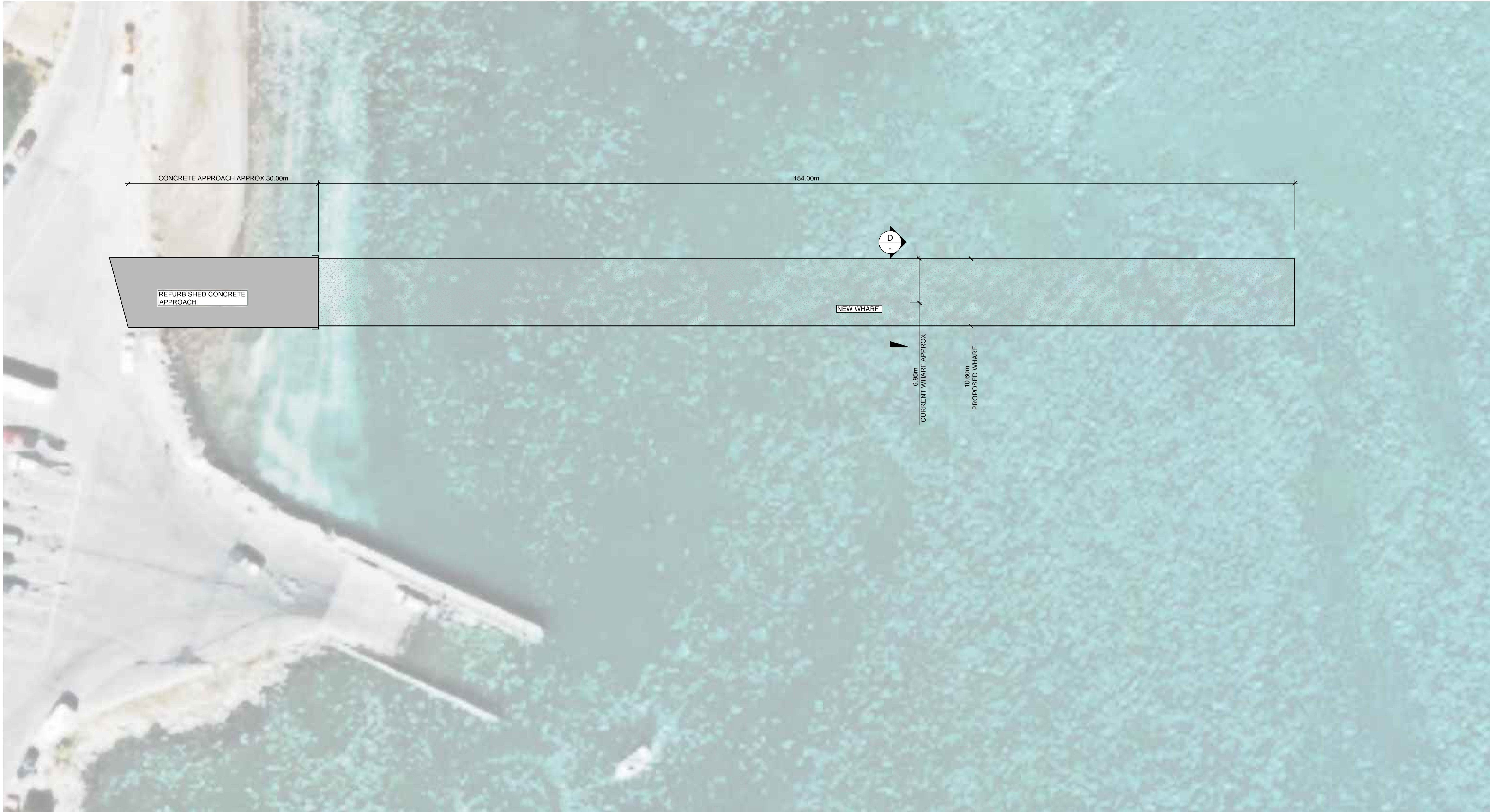
Sheet Title
OPTION C NEW WHARF AT CHURCH STREET

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323 Madras Street
Christchurch 8042
+64 3 374 6515
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Scale (A1 Original)		
SCALE AS NOTED		
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711779	S130	-

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PLAN VIEW DECK OPTION D - CHILDRENS BAY

1:300 (A1)
1:600 (A3)

CONCEPT ONLY
FOR COMMENTS



Revision

App Date Approved

Surveyed	Designed	Drawn	Reviewed	App	Date	Approved
	Tom Arthur	Lorena Balili	Tom Arthur		11/19	11/19

Client



Project Title

Akaroa Wharf
Preliminary Rebuild Concept

Sheet Title

OPTION D
NEW WHARF AT
CHILDRENS BAY

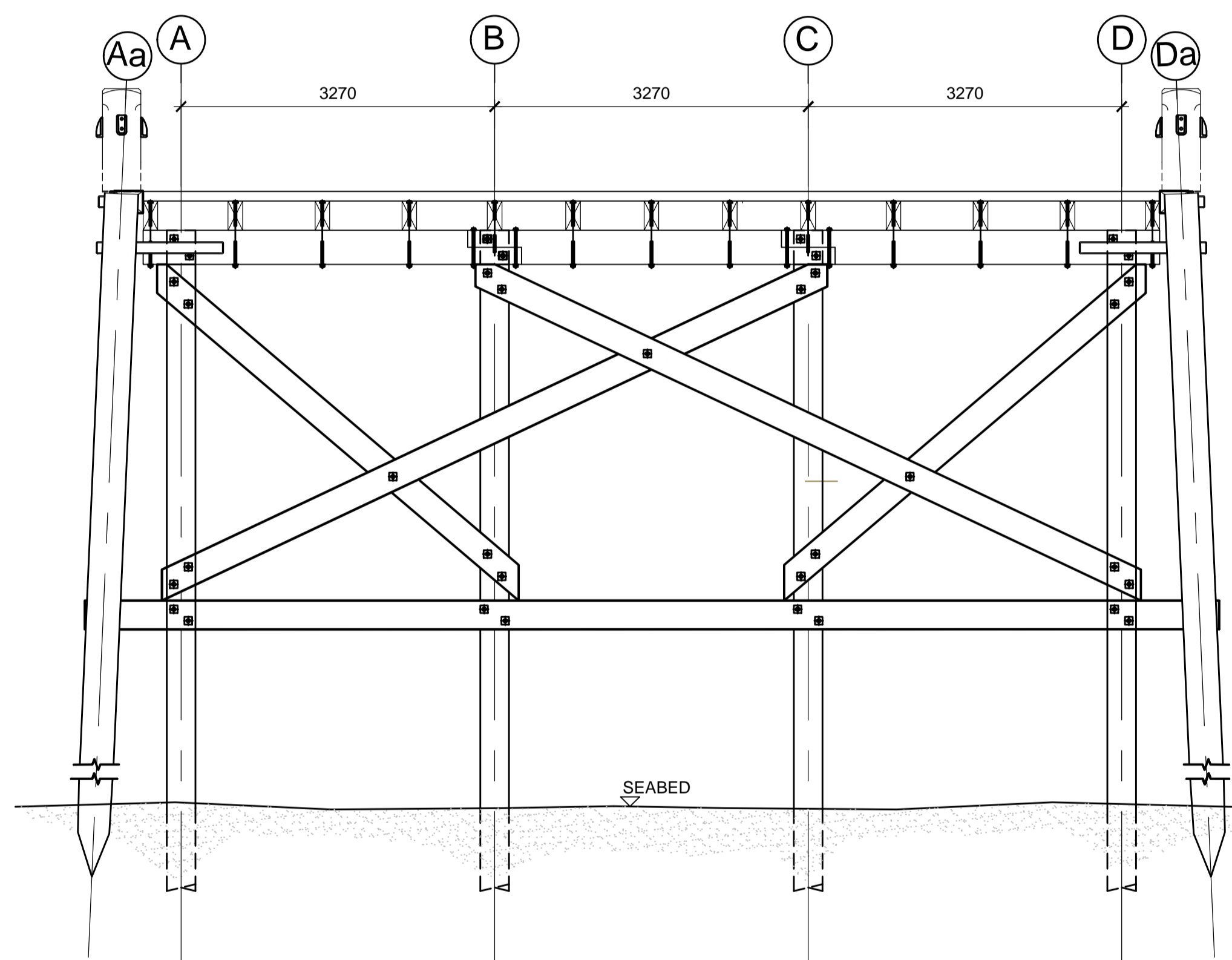
Level 1
323 Madras Street
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+64 3 374 6515
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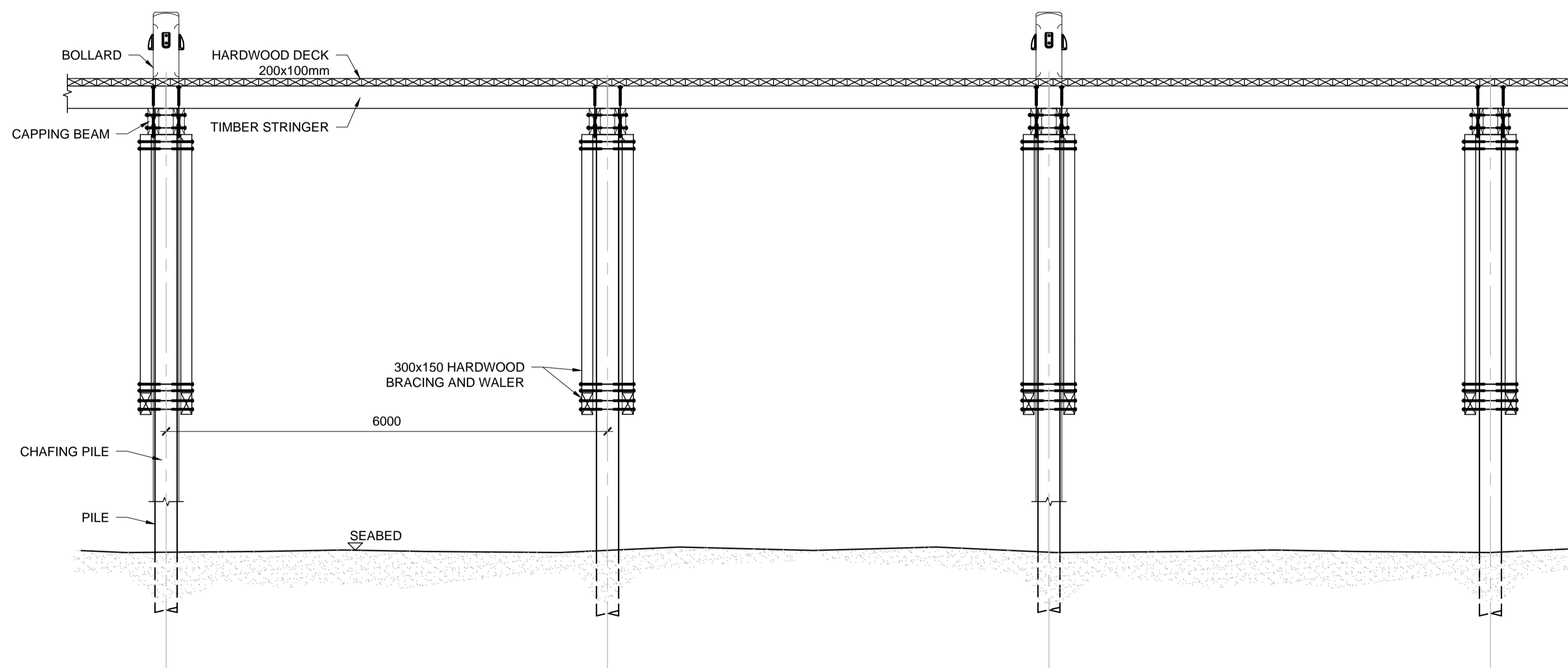
Scale (A1 Original)

SCALE AS NOTED

Project No	Sheet	Revision
711779	S140	-



TYPICAL SECTION



TYPICAL ELEVATION

**OPTION 1 - NEW WHARF STRUCTURE WITH LIKE-FOR-LIKE
HARDWOOD TIMBER (CONCRETE ABUTMENT)**

1:50 @ A1
1:100 @ A3

CONCEPT ONLY
FOR COMMENTS



Revision

App Date

Surveyed	Client
Designed Tom Arthur 11/19	Christchurch City Council
Drawn Lorena Balili 11/19	
Reviewed Tom Arthur 11/19	
Approved	

Client



Project Title

Akaroa Wharf
Preliminary Rebuild Concept

Sheet Title

OPTION 1 - NEW WHARF
LIKE-FOR-LIKE
HARDWOOD TIMBER
(CONCRETE ABUTMENT)

Level 1
323 Madras Street
Christchurch 8042
+64 3 374 6515
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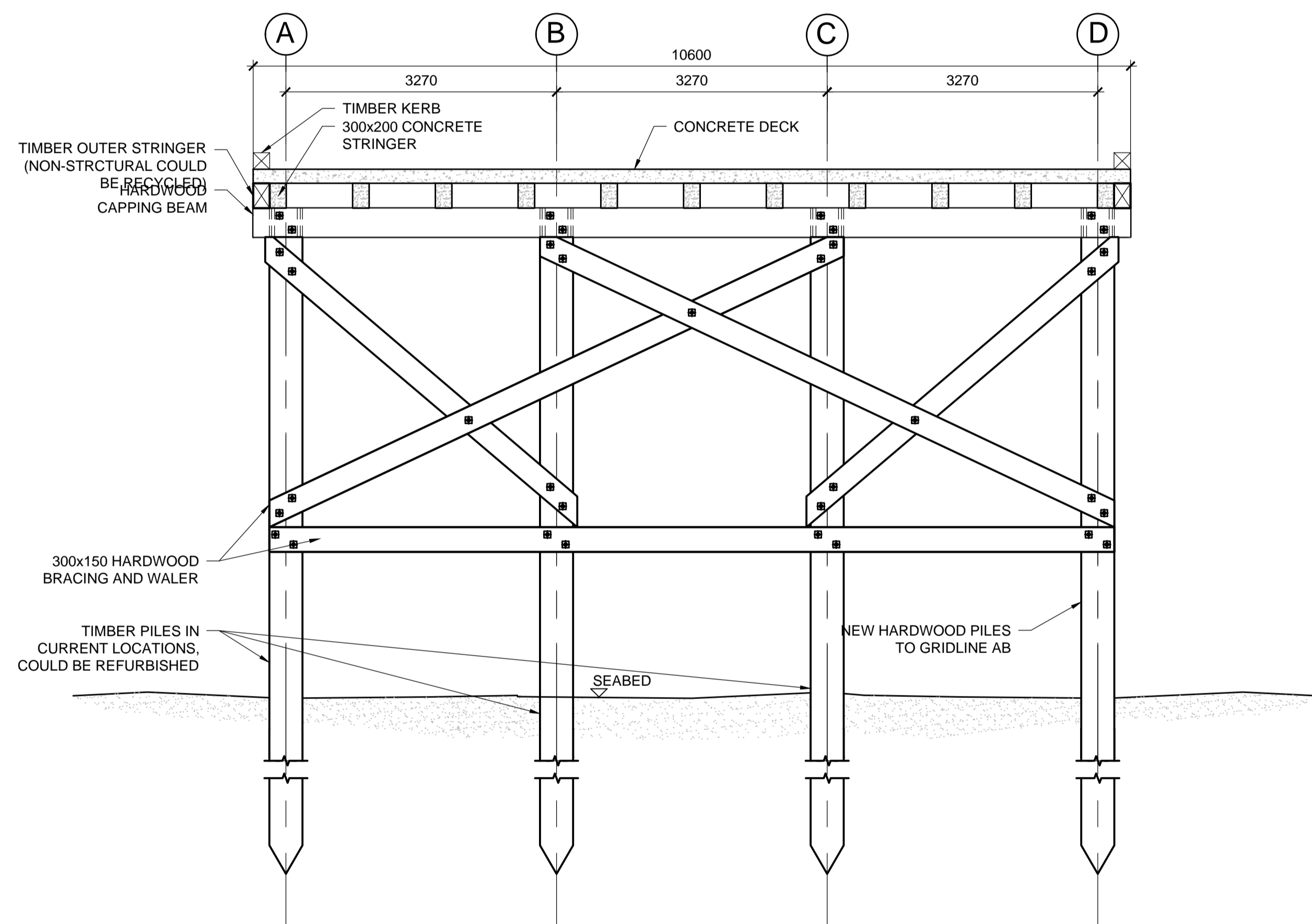


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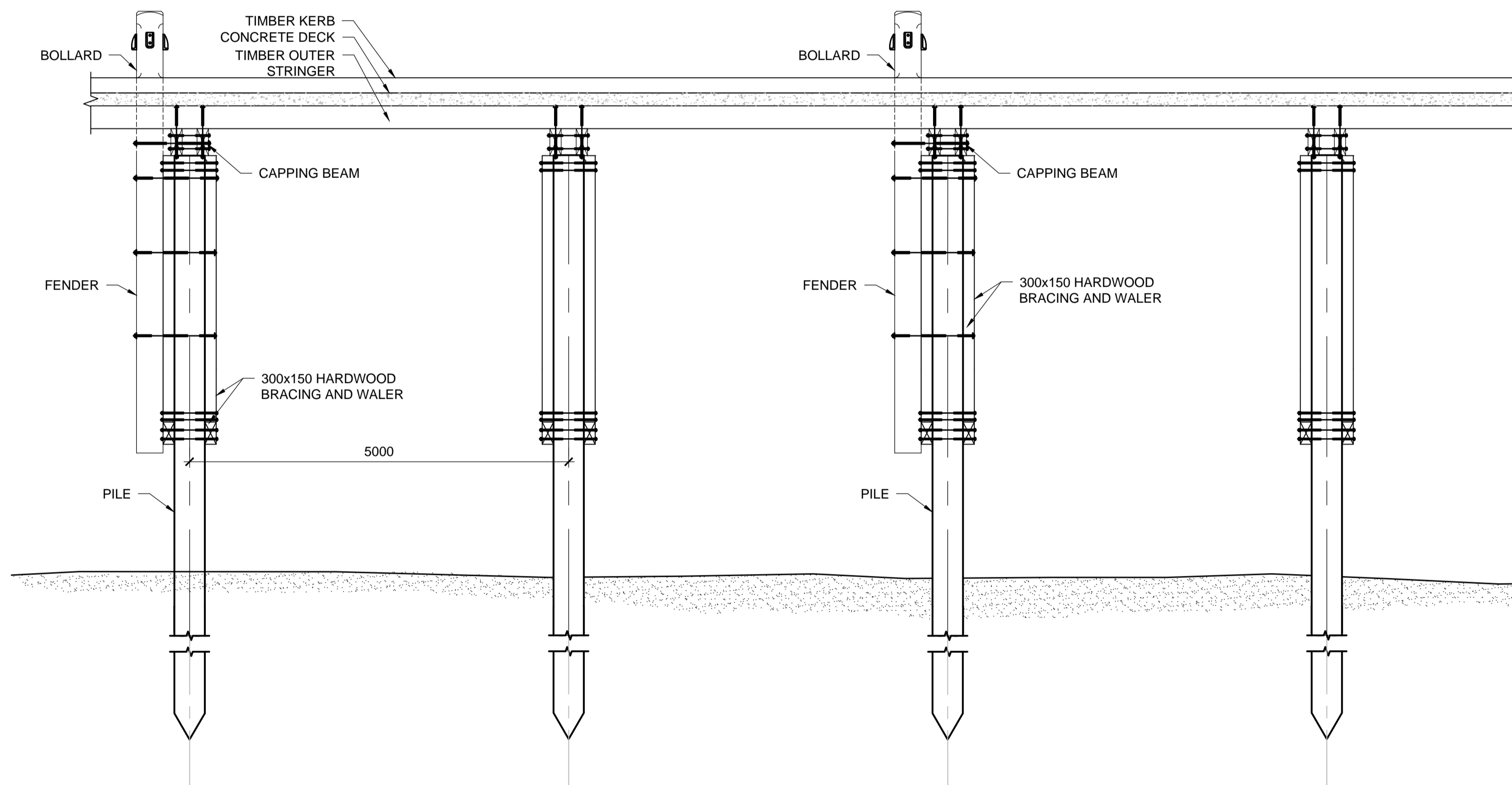
SCALE AS NOTED

Project No	Sheet	Revision
711779	S230	-

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TYPICAL SECTION



TYPICAL ELEVATION

OPTION 2 - WHARF WITH A MIX OF CONCRETE AND HARDWOOD TIMBER.

1:50 @ A1
1:100 @ A3

CONCEPT ONLY
FOR COMMENTS



Revision

App Date

App	Date	Approved
Surveyed		
Designed	Tom Arthur	11/19
Drawn	Lorena Balili	11/19
Reviewed	Tom Arthur	11/19

Client



Project Title

Akaroa Wharf
Preliminary Rebuild Concept

Sheet Title

OPTION 2 - WHARF WITH A
MIX OF CONCRETE AND
HARDWOOD TIMBER

Level 1
323 Madras Street
Christchurch 8042
+64 3 374 6515
calibreconsulting.co

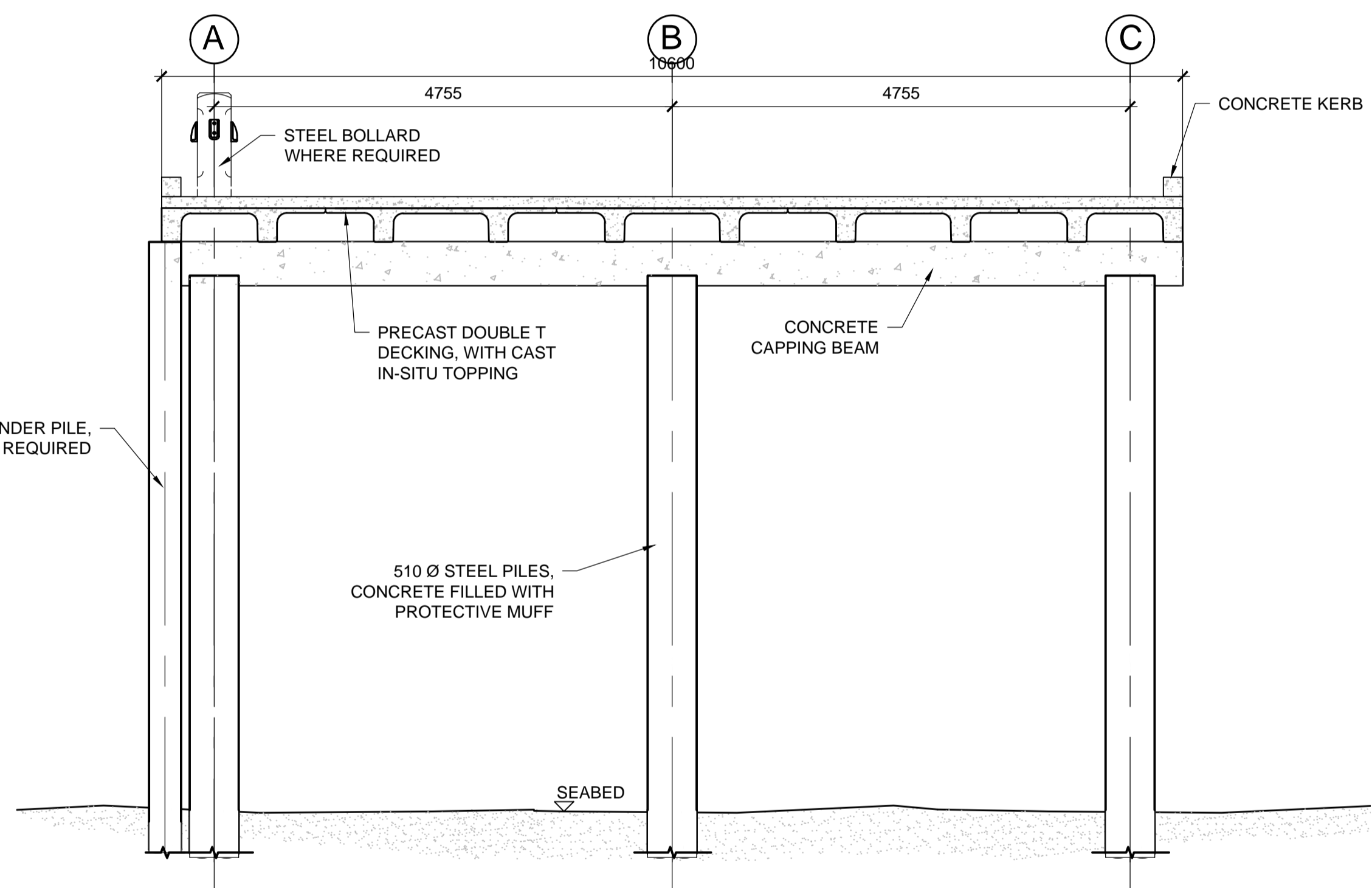


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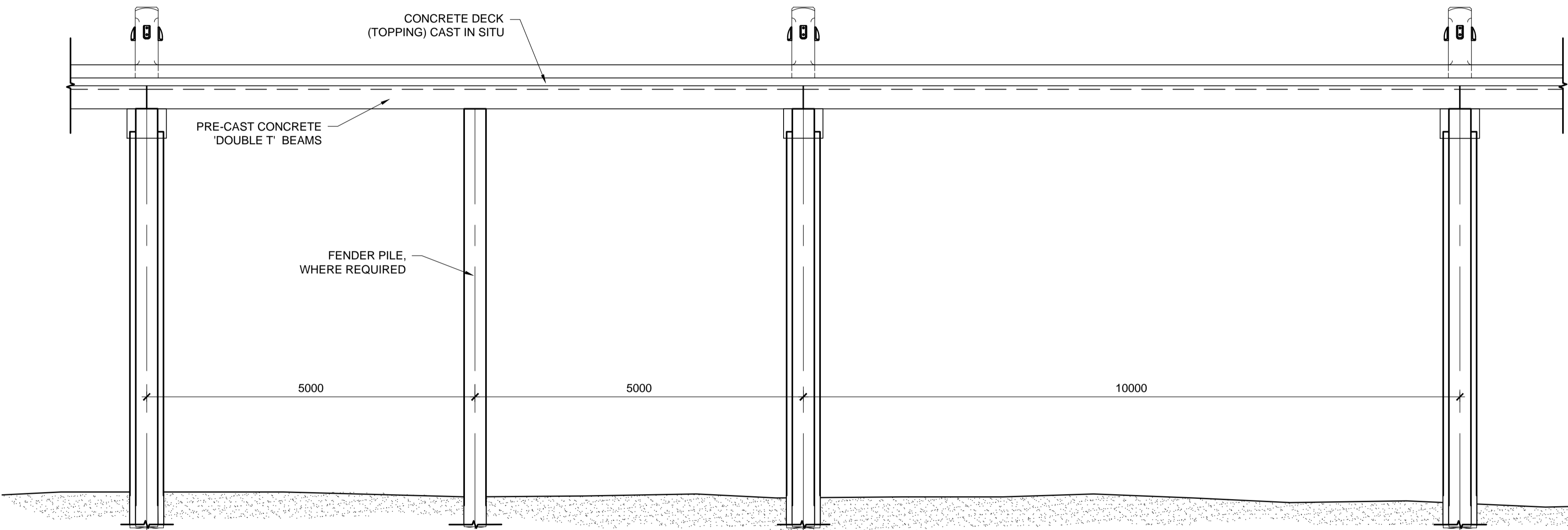
SCALE AS NOTED

Project No	Sheet	Revision
711779	S240	-

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TYPICAL SECTION

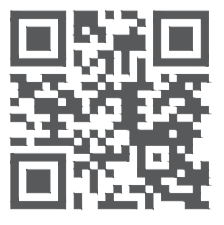


TYPICAL ELEVATION

OPTION 3 - MODERN CONCRETE WHARF STRUCTURE

1:50 @ A1
1:100 @ A3

CONCEPT ONLY
FOR COMMENTS



Revision	App	Date	Approved

Surveyed	Designed	Drawn	Reviewed	App	Date	Approved
	Tom Arthur	Lorena Baiili	Tom Arthur		11/19	

Client
Christchurch City Council

Project Title
Akaroa Wharf
Preliminary Rebuild Concept

Sheet Title
OPTION 3 - MODERN
CONCRETE WHARF
STRUCTURE

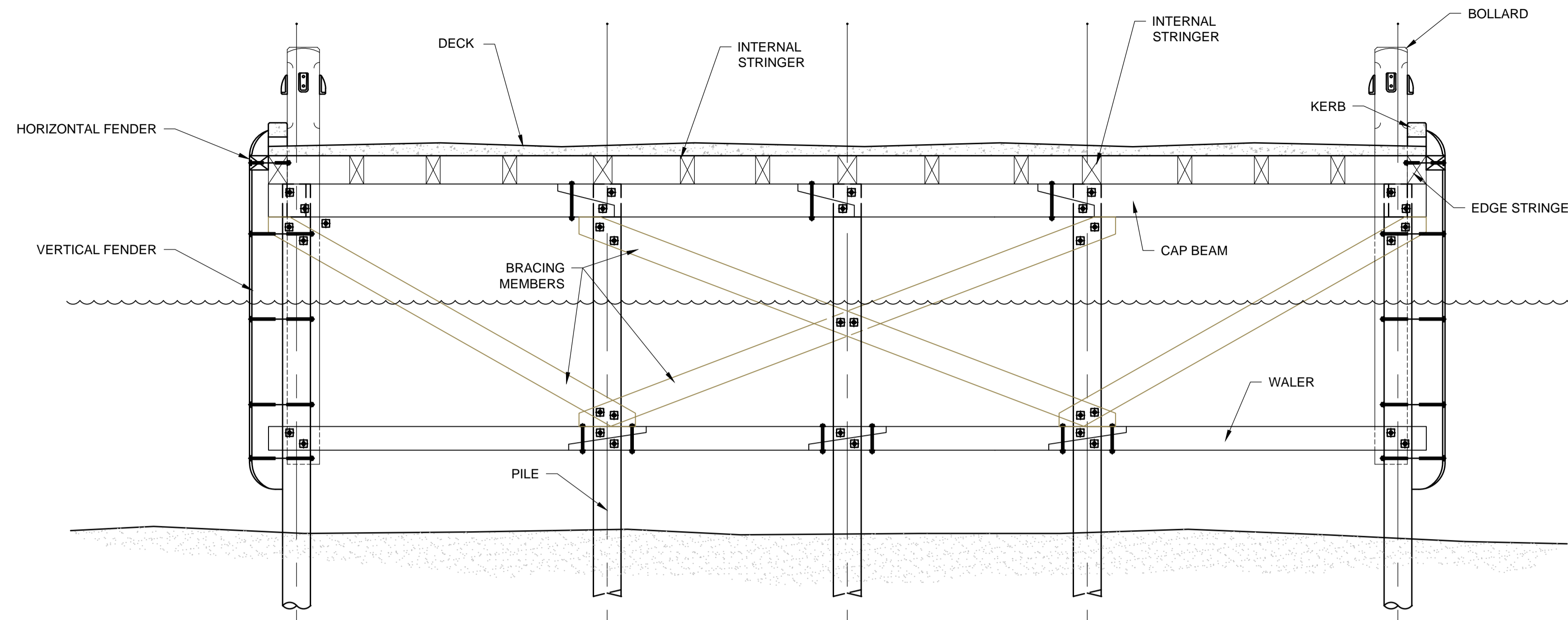
Level 1
323 Madras Street
Christchurch 8042
+64 3 374 6515
calibreconsulting.co



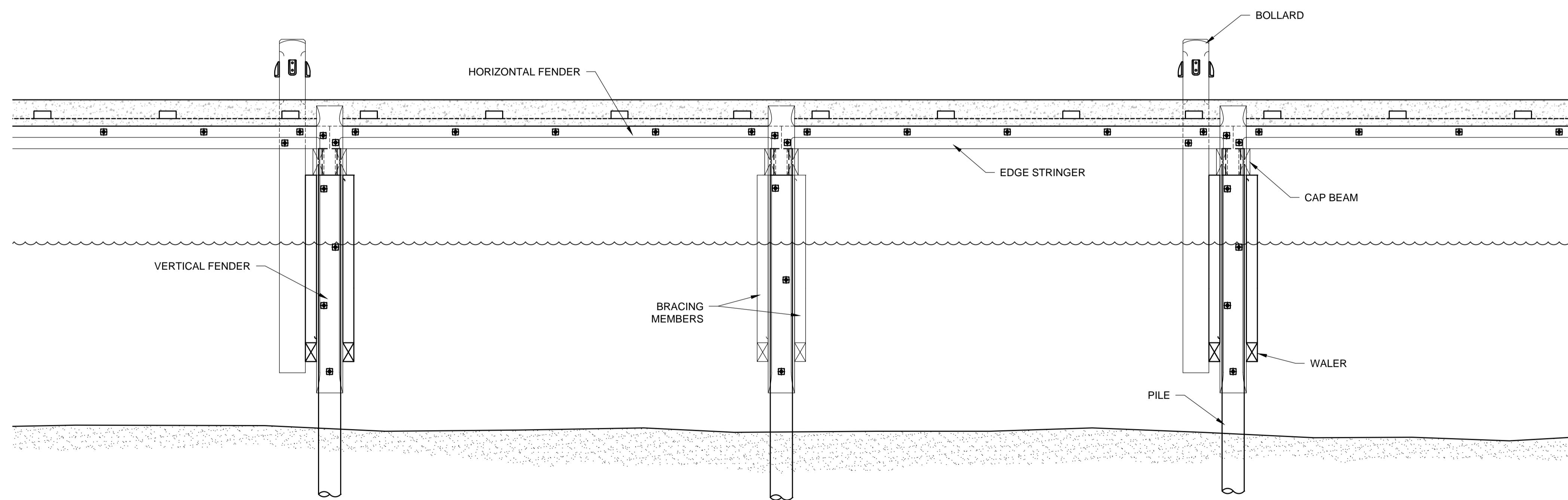
Scale (A1 Original)		
SCALE AS NOTED		
Project No	Sheet	Revision
711779	S250	-

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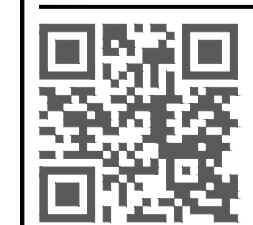
Appendix B - Typical Wharf Components



TYPICAL WHARF SECTION



TYPICAL WHARF ELEVATION



Revision App Date Approved

Surveyed
Designed -
Drawn -
Reviewed -
Approved -



Project Title
Akaroa Wharf
Upgrade Options Report

Sheet Title
Typical Wharf Component
diagram

Level 13
Kordia House
109-125 Willis Street
Wellington 6011
+64 4 384 2029
calibregroup.com



Scale (A1 Original)
NTS
Project No 711779
Sheet -
Revision -

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Appendix C - 1887 Construction Drawings

AKAROA JETTY.

(SITE)

(Scale 3 chains to 1 inch)



Wm. F. D. Lewis

Governor

Approved subject to the modifications noted on plan marked M D 1334

MD 1333

NATIONAL ARCHIVES
 GROUP 11
 No MD 1333
 DATE 1887

Wm. F. D. Lewis

Chief Executive Council W. F. D. Lewis

Authorised Surveyor Akaroa Harb. 1887.

GROUP 11

No MD 1333

DATE 1887

RECORD SET

RETURN TO H.O. PLAN RECORDS

M. D. 1333

Roll

Akaroa Borough Council.

Mr. F. D. Servois
Governor

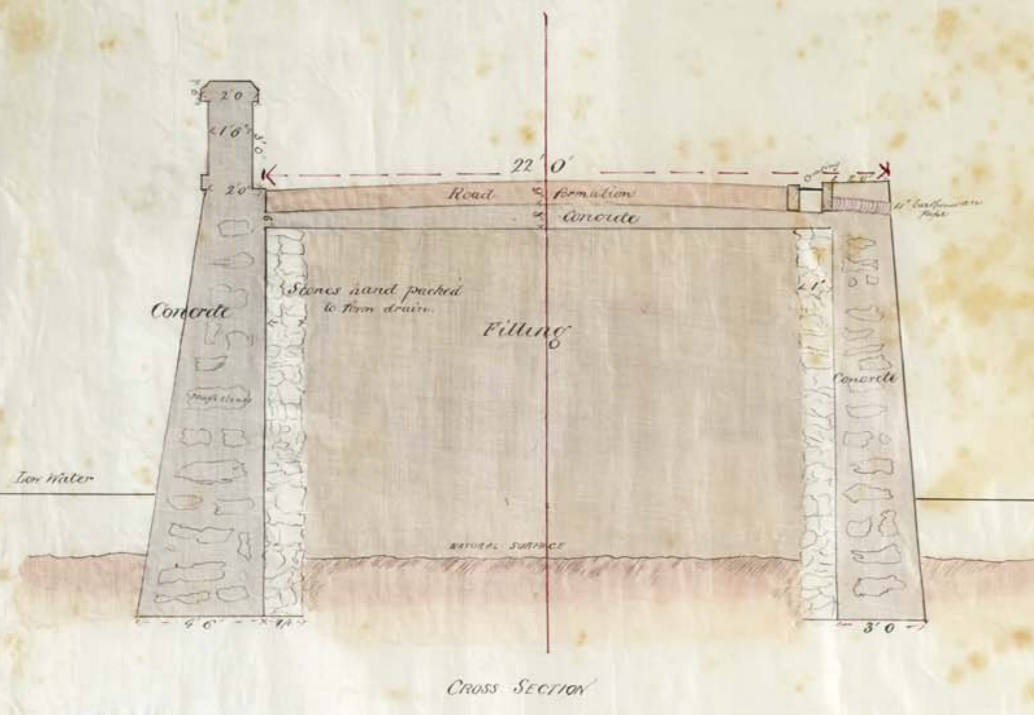
AKAROA JETTY.

Approved in Council subject to the following modifications

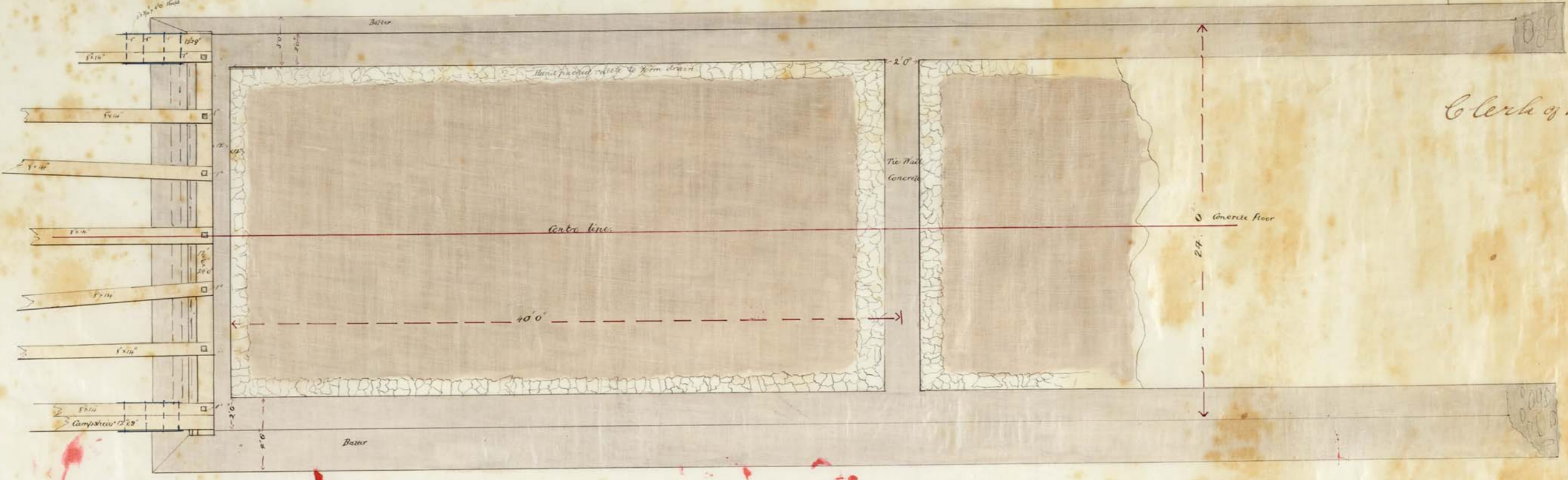
- 1st Not more than the first 100 feet of the wharf shall be built solid & solid side walls for the outer forty feet of the solid part shall be made not less than 4 ft 6 inches thick and ends of such walls to follow with the end wall of the solid part shall have a footing of 5 ft 6 inches wide and 18 inches thick
- 2nd The concrete tie wall shall be about 40 feet from the end of the wharf between the walls & also the concrete floor below the metalling shall be omitted
- 3rd Weep holes shall be provided in the walls and the cradled packed stones shown inside the walls from top to bottom to act as drains shall be omitted, it shall be the bye time of drains and pipes shall be on the side of the solid part of the wharf

W. D. Williams
Akaroa
April 1887

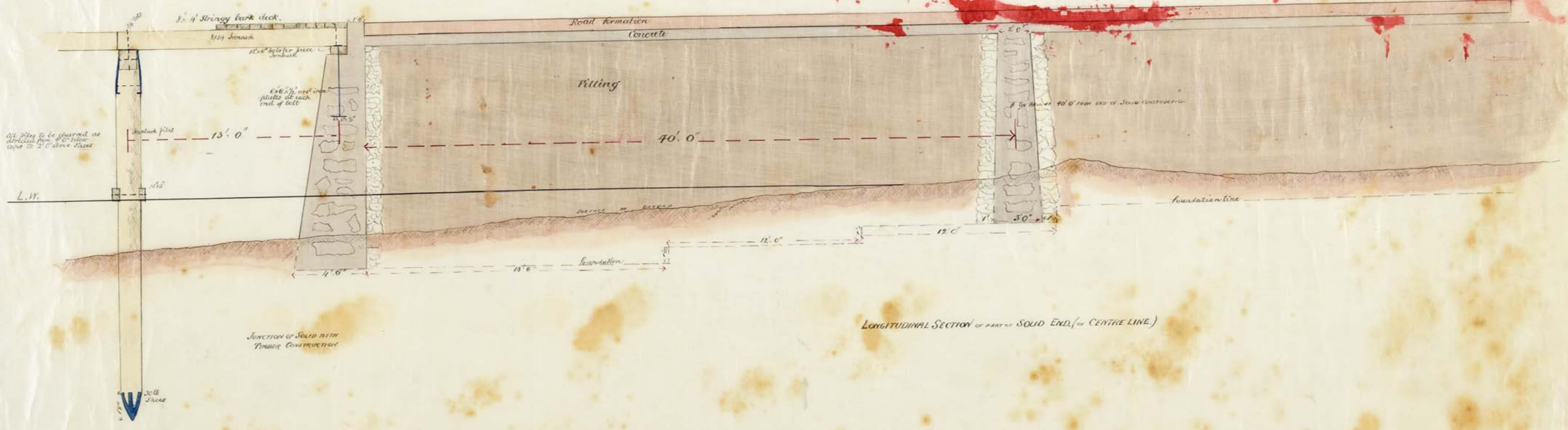
Clerk of Executive Council
Jan 23 1887



Cross Section



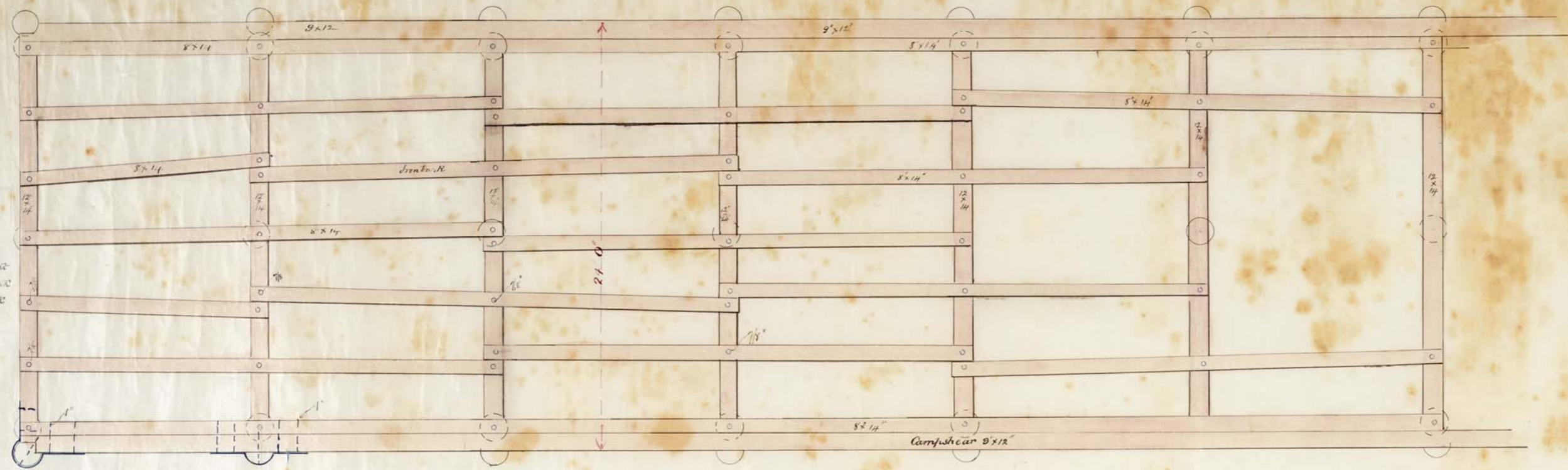
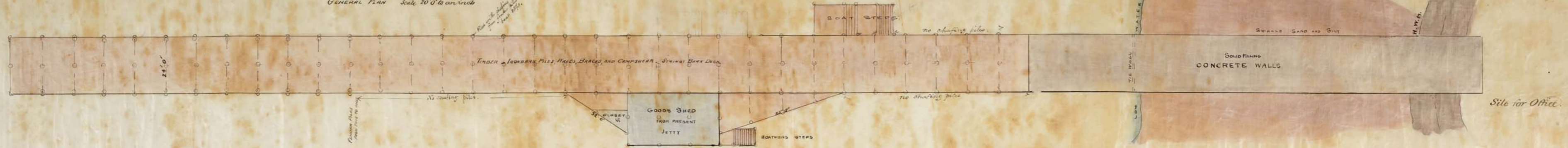
PLAN OF PART OF SOLID END



LONGITUDINAL SECTION OF PART OF SOLID END (ON CENTRE LINE.)

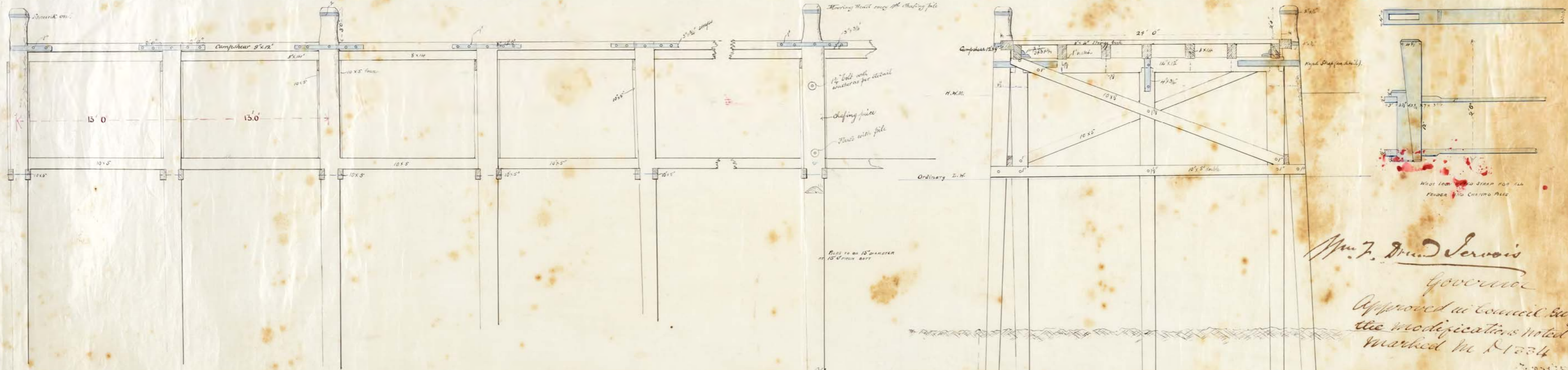
Scale 4.0 to 1 inch.

GENERAL PLAN Scale 20' to 1" on inch



AKAROA JETTY.

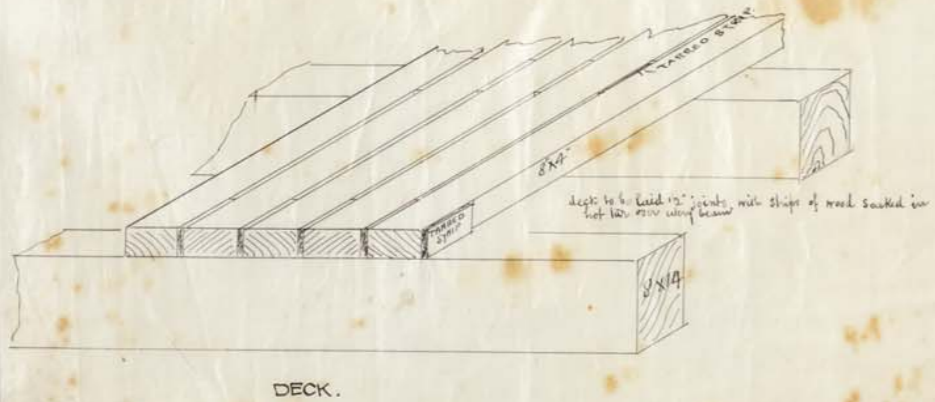
W.D. Williams
April 1887.



ELEVATION
4' 0" TO 1"

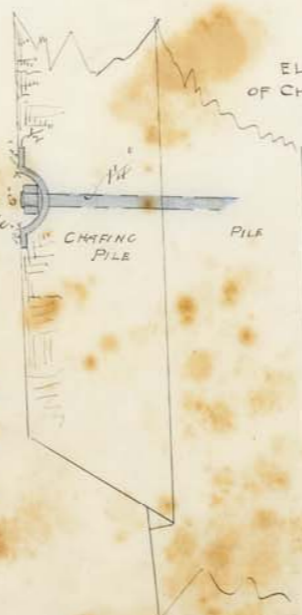
ELEVATION
OF CHAFING PILES.

SECTION
4' 0" TO ONE INCH



DECK.

Cutbed so both may
be raised with file.



W.D. Williams
Governor
Approved at Council subject to
the modifications noted on plan
marked M.D. 1334
June 28th 1887
Clark of Executive Council

RETURN TO
H.O. PLAN RECORDS
RECORD SET

M. D. 1335

Datum lines assumed 50 feet below decks of present and proposed jetties.
 Scale 20' to an inch (horizontal). Levels in feet and inches.
 Depths at L.W. shown in red, and H.W. in blue.

AKAROA JETTY.

Wm. T. Drum Servois

Governor

Approved in Council subject to the
 modifications noted on plan marked
 H. O. 1334

Soundings.

W. D. Williams

Akaroa

April 27.

Clerk of Executive Council

Tides
 Rise Springs
 Neaps

8 1/2
 6 1/2



RETURN TO
 H.O. PLAN RECORDS
 RECORD SET M J

MO 1334

Appendix D - Current Wharf Configuration



AERIAL VIEW
1:400@A3

CONCEPT ONLY
FOR COMMENTS



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Client

Christchurch City Council

Project Title
Akaroa Wharf
Preliminary Rebuild Concept

Sheet Title
Aerial view of existing wharf

Level 1
323 Madras Street
Christchurch 8042
+64 3 374 6515
calibreconsulting.co



Scale (A1 Original) 1:	(A3) 1:	
SCALE AS NOTED		
Project No	Sheet	Revision
711779	S100	-

Appendix E – Consideration of Public Consultation feedback

CONSIDERATION OF PUBLIC CONSULTATION FEEDBACK

The wharf requires significant investment to remain safe for public use in the medium and long term, and CCC have provision for this in their current (2018 – 2028) and proposed (2021 – 2031) long term plan. Demolition of the wharf without replacement has been discounted due to the economic, heritage and social value of the wharf. The Akaroa wharf is an iconic feature for the community and is the focus for community, heritage, recreational and commercial activities in town. Below is a summary of some options that were raised through the public consultation process (Christchurch City Council, 2019). Submissions varied on whether the heritage character of the wharf should be maintained, with feedback also indicating that the function of the wharf was important to the community.

Use of existing (upgraded) infrastructure within Akaroa Harbour

One option that was raised at the workshop was to upgrade other marine infrastructure in Akaroa Harbour, specifically the wharves at French Farm or Wainui (as identified through the consultation process). The rationale behind the use of another existing wharf is to allow for loading and unloading of the cruise ship tenders and dropping passengers at buses to be taken directly to Christchurch. This option would have the benefit of significantly reducing the cruise ship traffic on Akaroa Wharf and within the Akaroa township.

To upgrade multiple wharves, the budget would need to be increased or a smaller, simpler wharf be built in Akaroa. The road networks around French Farm and Wainui would also need upgrading to ensure the safe travel of the additional traffic.

There is uncertainty around the medium – long term cruise ship traffic, more research is needed to determine whether there is sufficient demand to justify the investment.

Construct a breakwater south of wharf

One submission discussed the possibility of incorporating a breakwater to the south of the wharf. This would provide shelter from the prevailing wind, making it easier and safer to berth alongside the existing wharf. This submission suggested retaining and repairing the existing wharf, which is not recommended due to the current condition of the wharf. The current wharf would still require an almost full replacement of its members at a minimum to maintain its current amenity.

The cost implications of constructing a new breakwater and a full repair of the current wharf make this option challenging. Another factor to consider when investigating the breakwater is the impact on ship navigation within the Harbour, whilst it is not expected to present a safety hazard it would mean a less direct route from the wharf to the outer Harbour.

The effects of this option on the marine life around the wharf and the accretion/erosion of sediment would need to be further investigated. The breakwater would also add time to journeys into and out of the harbour and impact the view from the town.

One element of this submission that could be carried forward into the new wharf design (though in a modified form) would be the inclusion of baffle breakwaters under the wharf. This may help reduce the wave action for vessels berthing on the north side of the wharf, providing a safer berthing as per the motivation of the breakwater.

The seawall could reduce the loading on the wharf from berthed vessels, however it is likely the wharf could be strengthened for less than the cost of the seawall.

Marina

Several submitters raised the possibility of a marina to be supported by the wharf for mooring of local and visiting yachts.

A marina has not been considered for this project due to the additional cost and it is recognised that this opportunity could be explored in the future by a commercial operator.



CONTACT US

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PO Box 13875, Christchurch 8141
+64 3 374 6515

WWW.CALIBREGROUP.COM