



Turning Knowledge
Into Value

Report





Inspection of Diamond Harbour Wharf

Prepared for Christchurch City Council

26 August 2020

Calibre Consulting Ltd

QUALITY ASSURANCE STATEMENT

TASK	NAME	SIGNATURE
Project Manager	Tom Arthur	
Prepared by	Tom Arthur & William Southby	
Reviewed by	Bevan White	
Approved for Issue by	Tom Arthur	

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
00	26/08/2020	First Issue	TA & WS	BW	TA

H:\CHC\7105xx\710552.009 CCC Diamond Harbour Wharf Inspection\400 Deliverables General\Report Rev 0

COMMERCIAL IN CONFIDENCE

This document including any intellectual property is confidential and proprietary to Calibre and may not be disclosed in whole or in part to any third party nor used in any manner whatsoever other than for the purposes expressly consented to by Calibre in writing. Calibre reserves all legal rights and remedies in relation to any infringement of its rights in respect of its confidential information | © Calibre Group Pty Ltd.

Contents

1. Executive Summary	1
2. Introduction	2
2.1 Important Notes About this Report.....	2
2.2 Background.....	2
2.3 Proposed Wharf Improvements	2
3. Description of Wharf	3
3.1 Structural Form	3
3.2 Recent Repairs	3
3.3 Current Use of Wharf	3
4. Survey	4
4.1 Description of Survey	4
4.2 Survey Results.....	4
4.3 Summary of Dive Survey Results	5
5. Repairs and Maintenance	6
5.1 Background to repair.....	6
5.2 Notes about Cost Estimates.....	6
5.3 Details of Repairs.....	7
5.4 Modifications for Proposed Wharf Improvements	7
6. Conclusions and Recommendations	10

Tables

Table 4.1	CC condition rating description	5
Table 4.2:	Condition grade and remaining life	5
Table 5.1	Repair priority.....	6
Table 5.2	Priority 2 repairs.....	7
Table 5.3	Priority 3 repairs.....	7
Table 5.4	Priority 4 repairs.....	7
Table 5.5	Modifications for wharf improvements.....	8

Figures

Figure 1:	Bottom of ramp, around 1 hour after low tide still above the water	2
Figure 2	The derrick crane on Diamond Harbour Wharf, the pole below is at least 4m long and corroded.....	9
Figure 3:	Mixture of old and new decking timber, with 15-20mm difference in height.....	9
Figure 4:	Decking plan	10

Appendices

Appendix A	Inspection Drawings
Appendix B	Dive Survey Results
Appendix C	Condition Rating Table
Appendix D	Photographs
Appendix E	Proposed Wharf Improvements

1. Executive Summary

Diamond Harbour wharf is owned and maintained by Christchurch City Council (CCC). CCC plan to add a pontoon structure to the south east corner of the wharf. This report summarises the modifications to the existing wharf required to accommodate the pontoon structure and makes recommendations for repairs and maintenance.

Calibre visited the structure on 10th July 2020 and inspections were completed by boat at low tide. A dive inspection of the underwater elements was completed by Sub-Aqua Solutions on 24th July 2020. The wharf was found to be in moderate condition, the majority of the timber members are showing some degree of deterioration.

The repairs have been split into four priority groups with the timing and costs summarised, a detailed breakdown of the repairs is provided in Section 5.3. The repairs have been specified based on maintaining the current usage, as described in Section 3.3. Drawings showing the defect locations and concept repair details are included in Appendix A.

The costs for the repairs and improvements are summarised below:

Description of works	Timing	Cost Estimate
Priority 1 Repairs	Immediate	(none recommended)
Priority 2 Repairs	Within 6 months	\$13,500
Priority 3 Repairs	Within 2-3 years	\$27,100
Priority 4 Repairs	Within 10 years	\$1,300
Wharf improvements		\$143,300
Professional Fees (provisional sum)		\$25,000
Total (excluding GST)		\$210,200.00

We have provided cost estimates for modifications to the wharf related to the addition of the pontoon such as moving the crane, replacement decking, bracing for a wave wall etc. The cost for building the pontoon, installing a new lighting column and the cost of the wave wall itself are not included.

For detailed notes about the basis of the cost estimates refer to Section 5.2.

A large proportion of the wharf improvement cost is for replacing the timber deck. The existing deck is a mixture of old and new timber of differing heights which results in an uneven surface. During replacement of the deck, the stringers below should be inspected as they typically deteriorate from the top surface down. We have allowed \$20,000 contingency for the replacement of stringers during the installation of the new deck.

We have included a provisional sum for professional fees which covers detailed design of the wharf repairs / modifications, construction specification and construction observation. We have excluded contract administration and tendering as this has previously been completed in-house by CCC.

2. Introduction

2.1 Important Notes About this Report

The main purpose of this report is to prioritise and plan repairs and work related to the installation of the pontoon.

Where costs are included in the report, these are engineer's estimates that have been based on ongoing repair and maintenance contracts. GST and price escalation are excluded. Where contingencies are recommended, these should be included in budgets as there is an inherent uncertainty in quantifying work of this nature.

This report must be read in full and no excerpts of the report may be taken as representative of the findings.

This report is intended for the exclusive use of the Christchurch City Council and Calibre do not accept any liability for any use of or reliance on the report by third parties.

2.2 Background

Christchurch City Council (CCC) owns and maintains Diamond Harbour wharf. CCC are planning to upgrade the wharf by adding a pontoon and improving the walkway on the deck.

The July 2020 inspection was arranged to assess the modifications necessary to accommodate the planned improvements, a condition assessment was also completed.

Previous inspections by WSP in 2015 and 2018, have recommended ongoing repairs to structural members as they reach the end of their useful life. The last repairs were completed in 2019 by Maintenance Management Services and these repairs were also inspected.

2.3 Proposed Wharf Improvements

A pontoon has been designed by OCEL Ltd, for drawings of the improvements refer to Appendix E. The changes to the wharf are summarised below:

1. Addition of a floating pontoon accessed via a ramp from the existing wharf,
2. Existing derrick crane to be relocated to the Northern corner,
3. 'Wave protection wall' fixed to the existing piles,
4. New lighting post to Southern corner of wharf,
5. Access improvements to the deck to allow easier movement for wheelchair users, handrail to extend along Southern edge of wharf.

During the low tide inspection, it was noted the ramp along the south eastern side of the wharf finishes 300mm above the low water line, a photograph of the ramp is provided in Figure 1. This will make using the ramp to launch boats difficult around low tide, we recommended extending the ramp is considered as part of the proposed wharf improvements. There is space beyond the existing end of the ramp for an extension although proximity to the proposed pontoon access would need to be considered.

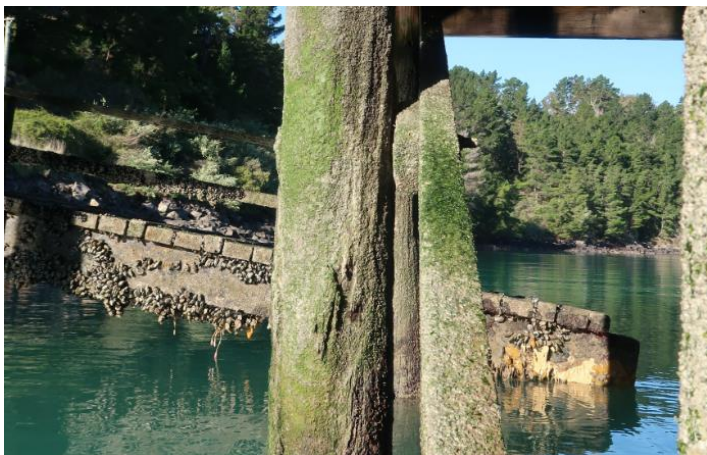


Figure 1: Bottom of ramp, around 1 hour after low tide still above the water

3. Description of Wharf

3.1 Structural Form

The wharf at Diamond Harbour is a traditional hardwood structure. The construction of the original jetty is thought to be completed in the late 1800s. The structure has been extensively modified over its life, starting as a simple rectangular jetty, to its current form with a triangular head. The wharf is not listed as a heritage structure in the CCC district plan. The wharf is 34.4m long, by 5.9m wide with a 16.9m wide triangular head. The total wharf area is approximately 285m².

The structure consists of 10 bents - 8 rows of 330mm diameter piles, with bent 1 being the concrete abutment and bent 4 piles having been removed. 330 x 300mm hardwood capping beams span over the piles with 350 x 150mm stringers supporting the softwood decking.

The lateral load resisting system for the wharf is a combination of bracing and raking piles. The raking piles are located along bent 9 providing lateral load resistance in the longitudinal direction. Bracing is installed to most of the outer bents providing lateral resistance in the transverse direction.

Bents 2 and 3 are braced and have concrete walls encasing both the piles and bracing. Other braced bays are bents 6, 7 and 8.

A small canopy shelter and storage sheds are located on the northern face of the approach. A derrick crane is located on the south east corner, the crane is no longer used for lifting but is enjoyed by children as a swing to jump from the wharf.

3.2 Recent Repairs

Following the 2018 inspections by WSP Opus and Sub Aqua, repairs were completed in 2019 by Maintenance Management Services. The repairs are detailed in the CCC Design Features Report dated December 2018 and are summarised below:

- Handrail repair south of pile 8F
- Installation of steel pile jackets to piles 6A2, 7D, 9C1 and 9D
- Raker pile 9G2 removed, pile 9F2 removed. Bracing installed between piles 9G1 & 9F1
- Repairing deck planks between bents 6 and 8
- Additional bolted connection between main canopy strut and horizontal restraint beam.
- Repair the bracket connection between the deck and jetty head shelter.
- Repair the broken fender strip at Pile 10B

The repairs were visually inspected during the 2020 inspection and found to be complete, with the exception of the full removal of the raker pile at grid 9G2. The removal of this pile at or near the seabed is recommended and included in the priority 2 maintenance items.

3.3 Current Use of Wharf

The wharf remains in regular use, with traffic during the day of the inspection. The Black Cat Ferry operates ferry services to the wharf hourly throughout the day. The wharf is also used by recreational boat owners and people regularly fish from and jump from the structure.

The wharf is considered to be occupancy class C3 as per (AS/NZS 1170.1) and subject to light vehicle loading,

- 4 kPa, 4.5 kN vertical for approach and head
- 0.75 kN/m horizontal for barrier

Vehicle loading

- Light vehicle (3.5t GVM) for approach (note barriers not designed for vehicle loads)

Vessel loading (from previous reports)

- Recreational vessels and passenger ferry

4. Survey

4.1 Description of Survey

Diamond Harbour wharf was inspected by Calibre both from the wharf deck and by boat at low tide on the 10th July 2020. All structural members above water level were visually inspected. Where necessary, marine growth was scraped from members in the tidal zone (where there is typically a high incidence of decay) to ensure inspection of the element could be completed. Handrails, ladders and lights were visually inspected, but not tested.

A dive inspection of the piles was completed by Sub-Aqua Solutions on the 24th July 2020, the results of that inspection are included in Appendix B.

The Calibre and Sub-Aqua surveys were visual inspections and did not include intrusive investigation, so any non-visible damage will not have been picked up during the assessment.

4.2 Survey Results

The wharf was found to be in moderate condition, the decking timbers are worn allowing fresh water to accelerate the deterioration of the timber structure below. The majority of the timber members are showing some degree of deterioration.

The CCC condition grade criteria was used during the survey as the basis for repair recommendations and prioritisation, the condition grade criteria are described in Table 4.1.

Condition Grade	Condition description	Description
1	Excellent	<ul style="list-style-type: none"> • Sound physical condition, design to appropriate standards and well maintained with no defects. • Like to perform effectively under the current maintenance regime for 10+ years.
2	Good	<ul style="list-style-type: none"> • As for condition grade 1 but showing signs of superficial wear, tear and deterioration or not up to appropriate standards. • Normal maintenance needed to prevent initial stages of decay or dereliction commencing. • Deterioration has no significant impact on stability, safety or appearance of the structure. • In 5-10 years deterioration expected, but unlikely to fail. • Examples of defects include hairline crack, weathering of timber, staining of fastenings. No decay or scour of supports.
3	Moderate	<ul style="list-style-type: none"> • Functionally sound structure. • Early stages of decay or dereliction are becoming evident with minor components requiring replacement or repair, or reactive maintenance costs rising. • Some deterioration beginning to affect the stability, safety or appearance of the structure. • Failure unlikely within 3 years, but further deterioration likely and major replacement required within 10 yrs. • Examples of defects include cracks < 2mm, minor spalling, slight decay of timber, mild corrosion of fastenings, surface staining, some loss of protective coating. vandalism. No scour of supports.
4	Poor	<ul style="list-style-type: none"> • Structure functioning but with significant defects and high maintenance costs arising. • Structural integrity becoming affected. • No immediate risk to health and safety but work required within 1-2 years to ensure asset remains safe. • Examples of defects include rotting and splitting of timber, loosening of fastenings, moderate scour of supports, loss of slip resistant features. cracks 2-5mm, spalling, staining of concrete.
5	Fail	<ul style="list-style-type: none"> • Serious structural problems having a detrimental effect on the performance of the asset. • Site safety at risk.

Condition Grade	Condition description	Description
		<ul style="list-style-type: none"> • Failure imminent or maintenance costs excessive. • Major work or replacement required urgently.

Table 4.1 CC condition rating description

Each individual structural element has been rated and this information is collated in the condition rating table, **Error! Reference source not found.** The typical condition grades and useful remaining life of the member types are summarised below in Table 4.2.

Member	Condition Grade (typical)	Useful remaining life
Deck	3	5 – 10 years
Stringers	3	5 – 10 years
Capping Beams	3	10 years
Piles	2	10 years
Overall (average)	2-3	5 – 10 years

Table 4.2: Condition grade and remaining life

Structural drawings have been prepared showing the layout of the piles, capping beams & stringers and deck. The drawings are based on the previous drawings using the same grid system. The drawing itemises the recommended repairs, a repair detail for improving the support to the top of the stairs over piles 7D & 7E is provided.

The structural drawings can be found in Appendix A, and photographs in Appendix D.

The condition of some decking timbers is poor, much of the decking has been replaced and the older timber is typically well worn. The worn decking is a trip hazard and allows fresh water to settle over the structural timber below accelerating deterioration.

4.3 Summary of Dive Survey Results

The results of the dive inspection completed by Sub Aqua Solutions can be found in Appendix B. Two piles were identified as being in marginal condition and one as non-viable (condition grade 5). The non-viable pile is at grid 9G2, a brace has recently been installed making the raker pile redundant. The redundant raker pile is noted in the dive inspection as being a hazard to swimmers and so its removal is recommended.

The dive inspection notes marine borer to many piles and it is likely that further hidden deterioration is occurring in the intertidal zone. This is a common issue for wharf structures of this age and type and ongoing maintenance and repair/replacement of piles should be expected in the coming years.

Repairs are recommended to piles 2A2 and 2D, these piles are noted as being marginal (condition grade 4) with loss of section noted at the seabed. It is recommended these piles are repaired via concrete encasement to prevent further section loss.

5. Repairs and Maintenance

5.1 Background to repair

The wharf appears to have been well maintained and no urgent health and safety hazards were found.

We have prioritised repairs using a similar system to that used in previous reports, the priority levels are summarised below in Table 5.1.

Repair Priority	
1	Health & Safety Hazard to users Close wharf or repair immediately
2	Severe reduction in capacity Deterioration of defect will reduce structural integrity Repair or replace within 6 months
3	Moderate reduction in member capacity, repairs required to prolong life Repair or replace with 2-3 years
4	Minor reduction in member capacity Monitor and repair as required

Table 5.1 Repair priority

The repair work is believed to be a permitted activity based on the ECAN “Regional Coastal Environment Plan for the Canterbury Region”, statement; “The reconstruction, alteration, or extension of an Authorised Structure, or any part of an Authorised Structure, outside the Operational Area of a Port, provided that: (i) the reconstruction or alteration shall be for the purpose of repairing or maintaining the structure with like materials; and (ii) there shall be no change to the location or external dimensions of the structure as it was originally authorised.” We interpret that this means that the wharf can be repaired with similar materials and within the same area of the existing wharf, we recommend this interpretation is checked by the CCC planning team.

5.2 Notes about Cost Estimates

The cost estimates are based on rates from similar maintenance activities that have been completed recently on other traditional hardwood wharf structures.

- GST is excluded
- Figures are in FY20, no account has been taken of price escalation
- No allowance has been made for the possible impact of COVID-19 in terms of restrictions on activities that might be able to be undertaken at a given time, extensions to construction programmes, cost of materials or impacts on international shipping, for example of hardwood.

5.3 Details of Repairs

This section outlines the repairs and maintenance recommended for Diamond Harbour wharf.

It is understood that CCC are considering upgrading the deck for Diamond Harbour Wharf, the replacement of localised defective decking that would otherwise be within priority 2 maintenance is therefore included in Section 5.4.

No priority 1 repair work was identified during the inspection.

Ref	Priority 2 Maintenance Items	Qty	Unit Cost	Cost Estimate
1	Improve seating of stringers on capping beam spanning between piles 7D – 7E	1	\$8,000	\$8,000
5	Cut fender timber at deck over pile 10B, install mooring cleat onto new blocking fixed to existing stringers	1	\$3,000	\$3,000
2	Replace handrail posts	5	\$300	\$1,500
15	Cut redundant raker pile 9G2 at seabed	1	\$500	\$500
13	Install bracket between pile 7A and capping beam	1	\$500	\$500
Total (excluding GST)				\$13,500.00

Table 5.2 Priority 2 repairs

Ref	Priority 3 Maintenance Items	Qty	Unit Cost	Cost Estimate
6	Concrete encasement to piles 2A2 & 2D	2	\$3,500	\$7,000
4	Repair capping beam spanning between piles 7D-8D-8G, install new beam alongside existing	1	\$7,000	\$7,000
3	Remove bent fixing, install new fixing and blocking between pile and brace (connection to pile 7E)	1	\$500	\$500
7	Install new stringer alongside existing member with notch in middle of beam. Stringer l between bents 8 & 9.	1	\$6,000	\$6,000
9	Install new stringer alongside existing, stringer is rotten and has fire damage at southern end. Stringer f between bents 8 & 9.	1	\$6,000	\$6,000
12	Replace failed fixing between pile 9E and corbel, pile 8C1 and capping beam	2	\$300	\$600
Total (excluding GST)				\$27,100.00

Table 5.3 Priority 3 repairs

Ref	Priority 4 Maintenance Items	Qty	Unit Cost	Cost Estimate
17	Install splitter bolt to stringer n, between bents 8&9 to prevent crack propagating at notch	1	\$500	\$500
18	Replace outrigger on bent 1 cap beam supporting the northern shelter	1	\$800	\$800
Total (excluding GST)				\$1,300.00

Table 5.4 Priority 4 repairs

5.4 Modifications for Proposed Wharf Improvements

A pontoon is proposed and this is planned to be located to the south east corner of the wharf. The structure has been designed by OCEL, drawings for the pontoon and associated improvements are included in Appendix E.

To accommodate the pontoon, it is proposed that the derrick crane is relocated, the handrail is extended, and a lighting column added.

We understand replacement of the decking is being considered by CCC so we have included a cost estimate for replacing the deck from bent 5 outwards, refer to Figure 4.

Whilst the deck is being replaced, there is a rare opportunity to inspect the stringers from above where typically there is hidden deterioration. We have recommended a contingency for replacing stringers that are found to be in poor condition. We have summarised the works recommended below, note the costs for the construction of the pontoon, lighting columns and wave wall itself are excluded.

Ref	Modifications for wharf improvements	Qty	Unit Cost	Cost Estimate
10	Relocate crane, install blocking to deck for fixings	1	\$5,000	\$5,000
11	Install handrail along gridline A either side of proposed pontoon ramp	6m	\$800	\$4,800
8	Install blocking for lighting column	1	\$1,000	\$1,000
19	Bracing added to bent 7, 8 & 9 for support to potential wave protection wall	3	\$10,000	\$30,000
16	Replace decking planks, adding damp proof membrane to top of stringers, bent 5 outwards	150m ²	\$500	\$75,000
14	Install anti-slip walkway (assumes even surface below)	30m ²	\$25	\$7,500
	Contingency			\$20,000
Total (excluding GST)				\$143,300.00

Table 5.5 Modifications for wharf improvements

5.4.1 Crane Relocation

The relocation of the crane is necessary as the connection between Diamond Harbour wharf and the planned pontoon is where the crane is currently situated.

The crane is no longer used for the lifting of materials / goods but is enjoyed by wharf jumpers who climb and sling from the rope attached to the end of the crane. The proposed location is above water of a similar depth to the current crane position and is slightly further away from the ferry berth.

A redundant raker pile in the vicinity of the new crane location is scheduled to be cut near the seabed and removed as it is a hazard. The risk of landing directly on the pile is deemed low as the pile is below the wharf, however the pile is near the bottom of the stairs where people will likely swim to get back onto the wharf.

We recommend a risk assessment on the crane relocation is completed by CCC, the objective being to identify and mitigate hazards associated with jumping from the crane.

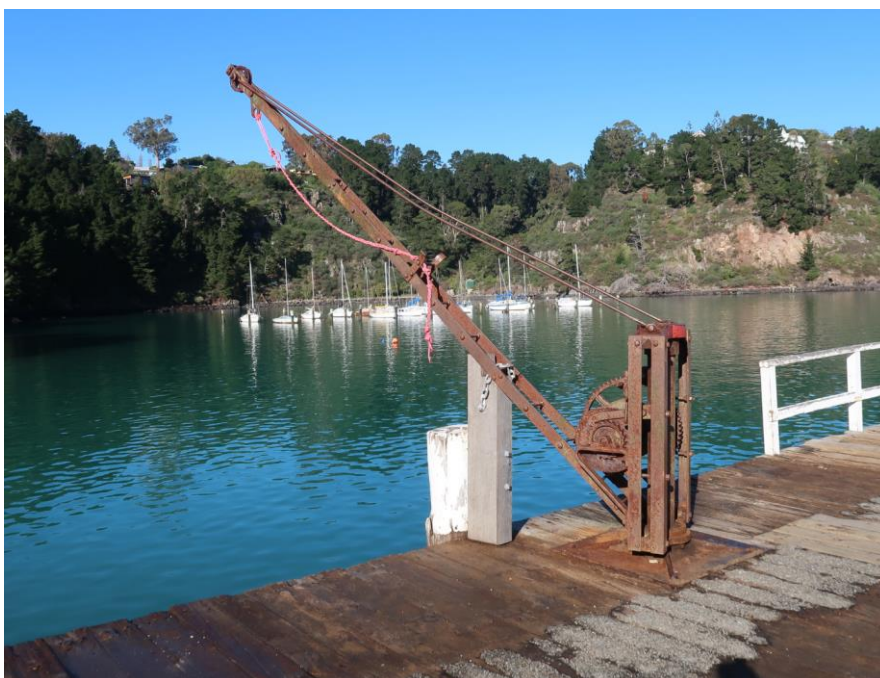


Figure 2 The derrick crane on Diamond Harbour Wharf, the pole below is at least 4m long and corroded.

The relocation of the crane is complicated by the presence of a 4m long pole connected to the underside of the crane. It is recommended that this pole is removed permanently as it is in poor condition. If the crane is to be kept intact whilst being relocated, a significantly larger crane would be required as the crane would need to be raised at least 4m vertically for the pole to be lifted clear of the wharf deck. It is recommended the relocation and potential modification of the crane is discussed with CCC's heritage team.

5.4.2 Discussion on deck surface improvements

As part of the wharf improvements, a level non-slip walking path is proposed to the ferry berth, the walkway is shown in Figure 4 and also connects to the proposed pontoon. The wharf deck is a mixture of old and new timbers, with the newer timbers up to 20mm thicker than the old. This uneven timber decking complicates making improvements to the surface, we have summarised options for consideration below:

1. Replace the old decking timber and install a similar anti-slip coating to that already used at the start of the wharf.
2. Level the decking timbers by replacing the thicker decking or install plywood on shallower decking. Then apply anti-slip coating

It is recognised that replacing the deck would be disruptive and expensive, however much of the decking is in poor condition and it will require replacement in the next 5 - 10 years in any case. Improvements made to the walking surface over poor decking timber would need to be redone as decking planks are replaced. If replacement of the entire deck is prohibitively expensive, replacing decking locally below the route to the ferry should be considered.



Figure 3: Mixture of old and new decking timber, with 15-20mm difference in height

Replacement of the deck would also allow the stringer beams to be inspected. Typically, these beams rot from the top down, especially where a porous timber deck allows fresh rainwater onto the structure below. We have allowed contingency for the replacement of stringers found to be in poor condition and recommended a damp proof membrane is installed on top of the stringers to reduce the rate of deterioration.

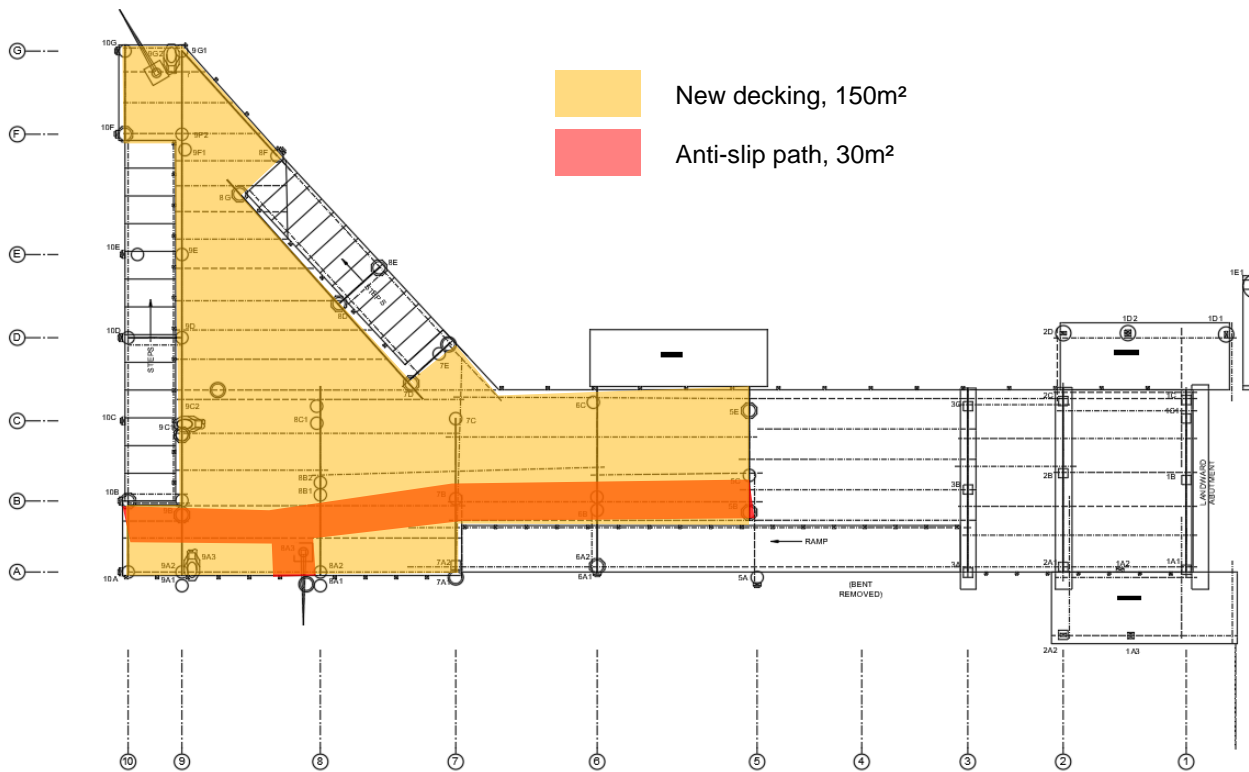


Figure 4: Decking plan

6. Conclusions and Recommendations

The wharf was found to be in moderate condition, the majority of the timber members are showing some degree of deterioration. Repairs and maintenance were completed last year and there are no immediate (priority 1) repairs recommended. Priority 2-4 repairs and maintenance works are recommended, these could be coordinated with activities related to construction of the new pontoon.

Due to the age and condition of the wharf, regular surveys are needed as elements will continue to deteriorate and require repair. The current 3 year cycle for inspections and maintenance is considered appropriate given the condition of the structure. If the wharf continues to be regularly inspected and maintained, it's useful remaining life is over 10 years.

We recommend the following:

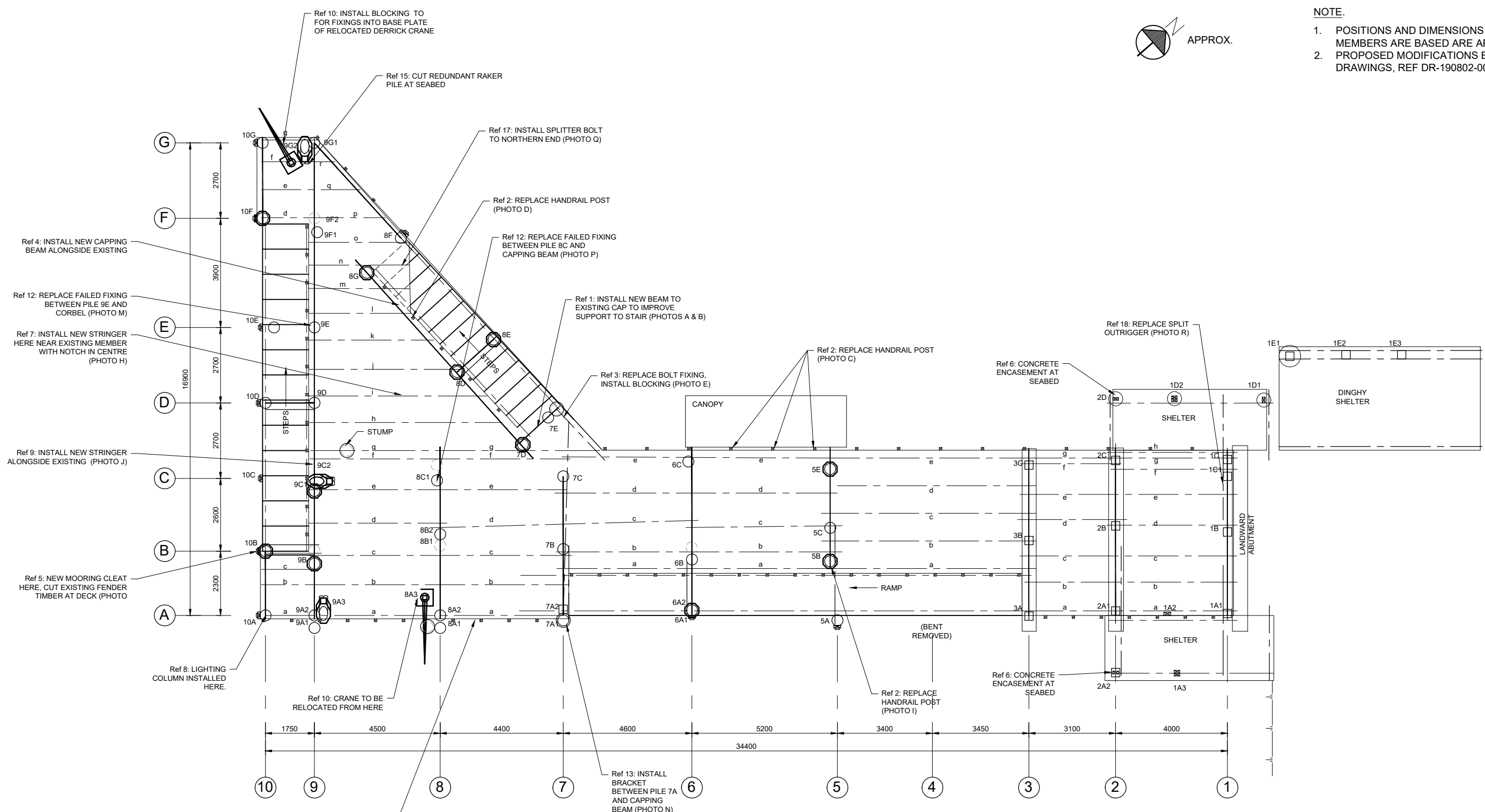
- The repairs identified in this report are completed within the indicated timeframes
- The decking is replaced from bent 5 outwards. If this is not financially viable the deck should be replaced between grids A and B, below the route to the ferry berth.
- CCC planning team review consenting requirements of planned works
- A risk assessment for the proposed crane relocation is completed
- Extending the ramp on the south eastern side of the wharf is considered to improve access at low tide

Appendix A Inspection Drawings



APPROX.

- NOTE.**
1. POSITIONS AND DIMENSIONS OF STRUCTURAL MEMBERS ARE BASED ARE APPROXIMATE
 2. PROPOSED MODIFICATIONS BASED ON OCEL DRAWINGS, REF DR-190802-004 & 005



PILE PLAN
 1:75 (A1)
 1:150 (A3)

- KEY**
- BEARING PILES (BP)
 - PILE WITH EXISTING STEEL JACKET (PESJ)
 - PILE WITH EXISTING CONCRETE JACKET (PECJ)
 - RAKER PILE (RF)
 - RAKER PILE WITH STEEL JACKET (RPSJ)
 - CAPPING BEAM.
 - STRINGER BEAM, WITH REFERENCE.
 - REDUNDANT PILE (RP)
 - PILE (P)
 - PILE FENDER (PF)

Revision	App	Date	Approved

Surveyed	Designed	Drawn	Reviewed	Client	Date
	Tom Arthur	Lorena Balli	Tom Arthur	Christchurch City Council	06/20
					06/20
					08/20



Project Title
DIAMOND HARBOUR WHARF MAINTENANCE WORKS 2020

Sheet Title
PILE PLAN

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

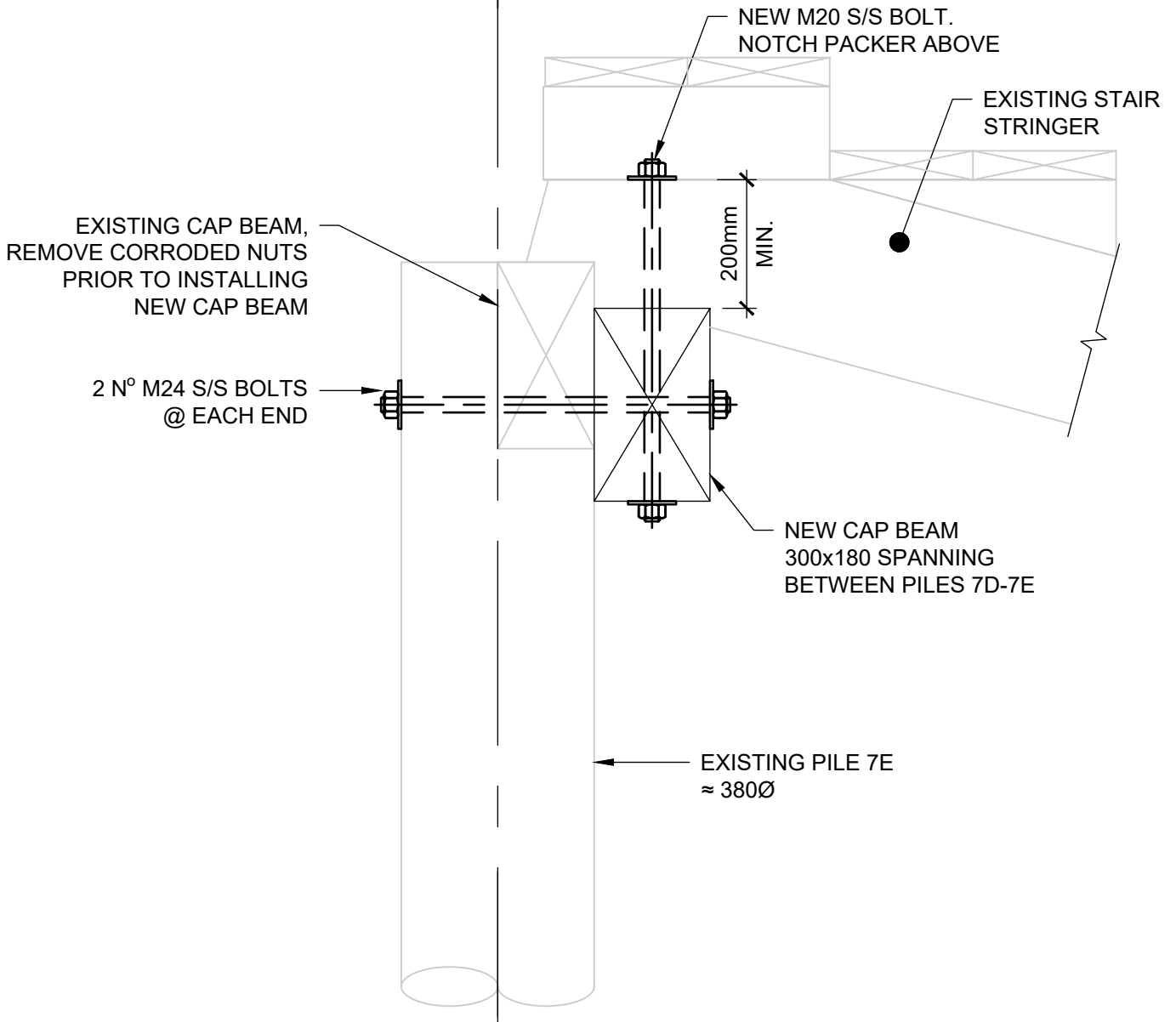


Scale (A1 Original) 1: (A3) 1:

Project No	Sheet	Revision
710552.009	S101	0

Verify all dimensions on site before commencing work. Prioritise figured dimensions over scaling. Refer all discrepancies to Calibre. This document and the copyright in this document remain the property of Calibre Consulting Limited. The contents of this document may not be reproduced either in whole or in part by any means whatsoever without the prior written consent of Calibre Consulting Limited.

7E



FOR DISCUSSION
NOT FOR CONSTRUCTION

Revision
Designed TA
Approved

App Date
AUGUST 2020

Client
Christchurch City Council

Project Title
DIAMOND HARBOUR WHARF MAINTENANCE WORKS 2020

Sheet Title
REPAIR TO STAIRS AT GRID 7D - 7E

Project
710552.009

Sheet
SK01

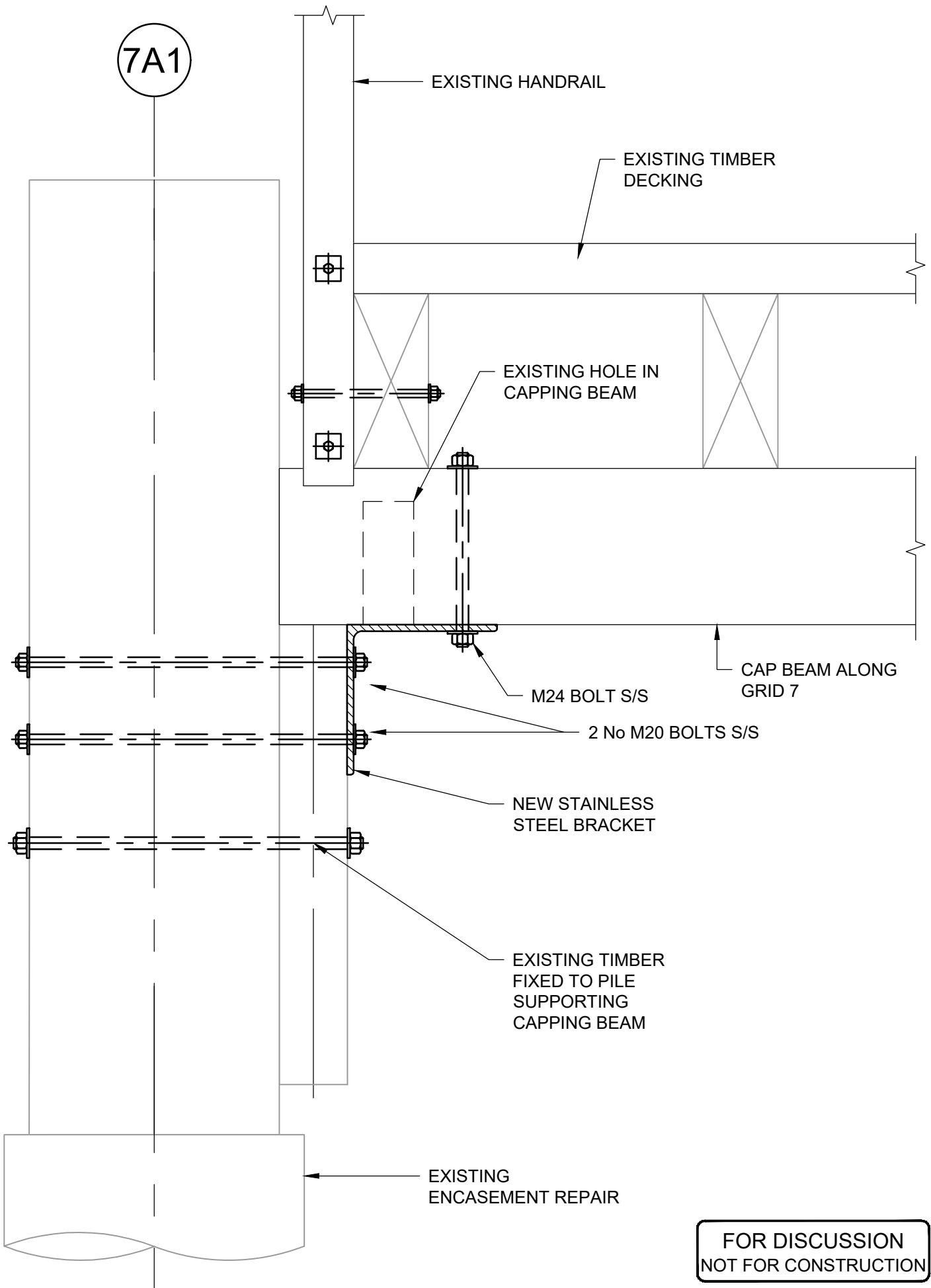
Revision
-

Scale 1:10



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

7A1



FOR DISCUSSION
NOT FOR CONSTRUCTION

Revision	App	Date
Designed TA		AUGUST 2020
Approved		

Client
Christchurch City Council

Project Title
DIAMOND HARBOUR WHARF MAINTENANCE WORKS 2020

Sheet Title
REPAIR TO STAIRS AT GRID 7A1

Project
710552.009

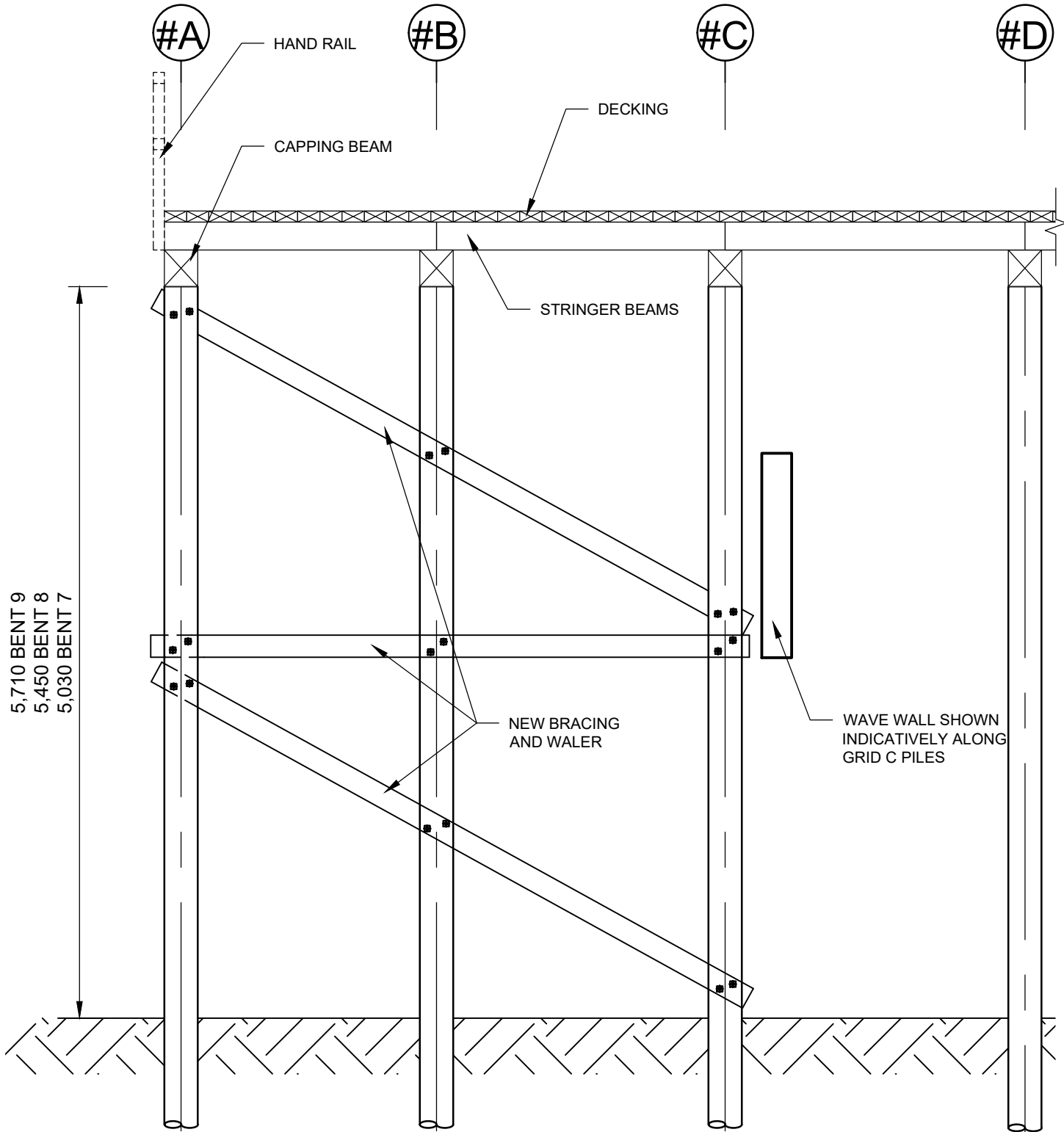
Sheet
SK02

Revision
-

Scale 1:10



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



FOR DISCUSSION
NOT FOR CONSTRUCTION

Revision	App	Date
Designed TA		AUGUST 2020
Approved		

Client
Christchurch City Council
 Project Title
DIAMOND HARBOUR WHARF MAINTENANCE WORKS 2020

Sheet Title
CONCEPT STRENGTHENING FOR WAVE BARRIER

Project
 710552.009
 Sheet
 SK03
 Revision
 -
 Scale 1:10



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

Appendix B Dive Survey Results

Results of Sub-Aqua underwater survey (pile inspection)

BENT	PILE	CIRC TOP/BOTTOM	DESCRIPTION	VIABLE	NON-VIABLE	MARGINAL	
1	1A1	360 x 300mm	Concrete base / Hardwood pile	X			
	1A2	200 x 100mm	Concreted into rock / New pile	x			
	1A3	200 x 100mm	Concreted into rock / New pile	x			
	1B	350 x 280mm	Concrete base / Hardwood pile	x			
	1C	360 x 300mm	Concrete base / Hardwood pile	x			
	1C1	300 x 200mm	Concrete base / New pile	x			
	1D1	250 x 120mm	Round concrete base / Hardwood pile	x			
	1D2	250 x 100mm &	Bolted together	x			
		200 x 100mm	Round concrete base / Hardwood pile	x			
	1E1	300 x 200mm	Round concrete base / New hardwood pile	x			
	1E2	350 x 215mm	Concrete base / Hardwood pile	x			
	1E3	350 x 200mm	Concrete base / Hardwood pile	x			
	2	2A1	350 x 300mm	130mm above concrete abutment	x		
		2A2	200 x 100mm	Square concrete base / fluking at base			x
2B		350 x 300mm	130mm above concrete abutment	x			
2C		350 x 300mm	130mm above concrete abutment	x			
2D		2 x 250 x 100mm	Bolted together / Round concrete base				
		Warn at the bottom			x		
3	3A	200 x 300mm &	Butted together				
		360 x 300mm	370mm out of concrete abutment	x			
	3B	360 x 300mm	380mm out of concrete abutment	x			
	3C	360 x 300mm	440mm out of concrete abutment	x			
5	5A	1190mm / 1130mm	Old bolt hole 100x100mm @900 down from cap	x			
	5B		Jacket to old pile, Denso top	x			
	5C	1260mm / 1250mm	Old pile	x			
	5E		Jacket to old pile,	x			
6	6A1	200 x 100mm	Fender pile	x			
	6A2	1140mm / 1190mm	Old pile	x			
	6B	1030mm / 980mm	Old pile	x			
	6C	1040mm / 1030mm	Old pile	x			
7	7A1	Circ bot 1060mm	Old round midwater concrete jacket	x			
	7A2	750mm / 700mm	Old round pile	x			
	7B	1320mm / 1320mm	Old pile	x			
	7C	1240mm / 1260mm	Old pile	x			
	7D	1045 above jacket	Steel jacket / new pile	x			
	7E	1300mm / 1340mm	Old pile	x			
8	8A1	1115mm / 1010mm	Fender pile	x			
	8A2	1355mm / 1300mm	Old pile	x			
	8A3		Steel derrick pole / does not go to seabed	x			
	8B1		Pile missing / 600mm hanging from top				

BENT	PILE	CIRC TOP/BOTTOM	DESCRIPTION	VIABLE	NON-VIABLE	MARGINAL
			Base sticking up 500mm from seabed			
	8B2	1215mm / 1125mm	Old pile Minor fluting 10/15mm from outer dia	x		
	8C1	1255mm / 1145mm	Old pile	x		
	8D		Steel jacket old pile	x		
	8E	1230 above jacket	Steel jacket new pile	x		
	8F	1250mm / 1180mm	Main / old pile	x		
	8G	1150 above jacket	New pile with jacket	x		
9	9A1	1010mm / 920mm	Fender pile, bit of fluting	x		
	9A2	1190mm / 1020mm	Mild worm damage	x		
	9A3	Circ top 1010mm	Raker pile, jacket on base, Mild to medium worm damage	x		
	9B	940 above jacket	New pile with jacket	x		
	9C1	1030mm / 970mm	new pile	x		
	9C2	Circ top 910mm	Raker pile, jacket on base, Denso on top, mussells getting under wrap.	x		
	9D	1105mm / 1040mm	Main pile, light worm damage	x		
	9E	1090mm / 1080mm	Main pile, light worm damage	x		
	9F1	1250mm / 1210mm	Main pile	x		
	9F2		gone			
	9G1	1310mm / 1260mm	Main pile,	x		
	9G2	Cut of at top Old Raker pile	Swimming hazard partially exposed Sharp edges		X	
10	10A	1260mm / 1220mm	Main pile	x		
	10B	1000mm above jacket	New pile with jacket	x		
	10C	100mm x 220mm	Fender pile, 2 x square piles going into seabed	x		
	10D	1370mm / 1360mm	Main pile	x		
	10E	740mm / 740mm	Main pile, small circ	x		
	10F	Circ bot 1080mm	Main pile mid water jacket	x		
	10G	1090 above jacket	New pile with jacket	x		

Appendix C Condition Rating Table

Diamond Harbour Wharf Condition Report

Item Ref	Stringer Ref	Element Type	Location		Inspection Findings		Condition Grade	Photograph file name (Appendix D photograph reference in brackets)	Repair Recommendation (repair reference in brackets)	Repair Priority
			Row	Bent	Inspected by	Inspection Date				
1		Abutment	A-C	1	TA & WS	10-Jul-20	2			
2		Pile	A1	1	TA & WS	10-Jul-20	2	IMG_1319		
3		Pile	A2	1	TA & WS	10-Jul-20	2	IMG_1319		
4		Pile	A3	1	TA & WS	10-Jul-20	2	IMG_1319		
5		Pile	B	1	TA & WS	10-Jul-20	2	IMG_1318		
6		Pile	C1	1	TA & WS	10-Jul-20	2	IMG_1318		
7		Pile	C	1	TA & WS	10-Jul-20	3	IMG_1320		
8		Pile	D1	1	TA & WS	10-Jul-20	3	IMG_1320	Monitor next inspection	
9		Pile	D2	1	TA & WS	10-Jul-20	2	IMG_1320		
10		Pile	E1	1	TA & WS	10-Jul-20	2	IMG_1320		
11		Pile	E2	1	TA & WS	10-Jul-20	2	IMG_1320		
12		Pile	E3	1	TA & WS	10-Jul-20	3	IMG_1320		
13		Pile	A1	2	TA & WS	10-Jul-20	2	IMG_1324		
14		Pile	A2	2	TA & WS	10-Jul-20	4	IMG_1317	Concrete encasement at seabed, (ref 6)	3
15		Pile	B	2	TA & WS	10-Jul-20	2	IMG_1324		
16		Pile	C	2	TA & WS	10-Jul-20	2	IMG_1325		
17		Pile	D	2	TA & WS	10-Jul-20	4	IMG_1322	Concrete encasement at seabed, (ref 6)	3
18		Pile	A	3	TA & WS	10-Jul-20	2	IMG_1323		
19		Pile	B	3	TA & WS	10-Jul-20	2	IMG_1323		
20		Pile	C	3	TA & WS	10-Jul-20	3			
21		Pile	A	5	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1332		
22		Pile	B	5	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_2013		
23		Pile	C	5	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_2013		
24		Pile	E	5	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1889		
25		Pile	A1	6	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_2040, IMG_2041, IMG_2042 & IMG_2044		
26		Pile	A2	6	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3			
27		Pile	B	6	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1985, IMG_1996, IMG_1997 & IMG_1998		
28		Pile	C	6	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1889 & IMG_1998	Monitor next inspection	
29		Pile	A1	7	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	4	IMG_2040, IMG_2041, IMG_2042 (photo N) & IMG_2044	Connection Repair, pile - capping beam. (Ref 13)	2
30		Pile	A2	7	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_2014		
31		Pile	B	7	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_2014 & IMG_2038		
32		Pile	C	7	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1984 & IMG_2017		
33		Pile	D	7	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1977, IMG_1998 & IMG_2017		
34		Pile	E	7	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1982 & IMG_2017		
35		Fender Pile	A1	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_2036		
36		Pile	A2	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1951		
37		Pile	A3	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	5	IMG_1873, IMG_1951, IMG_1952 & IMG_1952	Proposed Upgrade Work	
38		Pile	B1	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	N/A	IMG_1941		
39		Pile	B2	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1873, IMG_1941 & IMG_2036		
40		Pile	C	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	4	IMG_1873, IMG_1973 (photo P) & IMG_2035	Connection Repair, pile - capping beam. (Ref 12)	3
41		Pile	D	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_2034		
42		Pile	E	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_2018		
43		Pile	F	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2			
44		Pile	G	8	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1890 & IMG_1909		
45		Fender Pile	A1	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1949		
46		Pile	A2	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1934, IMG_1936, IMG_1937 & IMG_1949		
47		Raker Pile	A3	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1934, IMG_1936, IMG_1937 & IMG_1949		
48		Pile	B	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1888 & IMG_1932		
49		Pile	C1	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1888 & IMG_2035		
50		Raker Pile	C2	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1922 & IMG_1923, IMG_1925 & IMG_1963		
51		Pile	D	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_2034 & IMG_2035		
52		Pile	E	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	4	IMG_1890, IMG_1920 (photo M) & IMG_2034	Connection Repair, pile - corbel below stairs. (Ref 12)	3
53		Pile	F1	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1890		
54		Pile	F2	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	N/A	IMG_1902 & IMG_1903	Redundant pile, no action necessary	
55		Pile	G1	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1894		
56		Raker Pile	G2	9	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	N/A		Remove redundant pile, cut at seabed. (Ref 15)	2
57		Pile	A	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1922	Monitor next inspection	
58		Pile	B	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1949		
59		Pile	C	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1927		
60		Pile	D	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3			
61		Pile	E	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1913	Monitor next inspection	
62		Pile	F	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	3	IMG_1890 & IMG_1911		
63		Pile	G	10	Sub Aqua, TA & WS	24/07/2020, 10/07/2020	2	IMG_1891		
64		Capping Beam	A-C	1	TA & WS	10-Jul-20	2	IMG_1318	Monitor outrigger next inspection	
65		Capping Beam	A-C	2	TA & WS	10-Jul-20	2	IMG_1324		
66		Capping Beam	A-C	3	TA & WS	10-Jul-20	2	IMG_1323		
67		Capping Beam	B-E	5	TA & WS	10-Jul-20	2	IMG_1332, IMG_1889 & IMG_2008		
68		Capping Beam	A-B	6	TA & WS	10-Jul-20	3	IMG_1997 & IMG_1998		
69		Capping Beam	B-C	6	TA & WS	10-Jul-20	3	IMG_1889, IMG_2000, IMG_2007, IMG_2008 & IMG_2009		
70		Capping Beam	A-C	7	TA & WS	10-Jul-20	2	IMG_1987 & IMG_1941		
71		Capping Beam	D-E	7	TA & WS	10-Jul-20	4	IMG_2016, IMG_2017, IMG_2025 (photo B) & IMG_2060 (photo A)	Install new capping beam along side, to improve support to stairs. (Ref 1)	2
72		Capping Beam	D-G	7-8	TA & WS	10-Jul-20	4	IMG_1997, IMG_1909 & IMG_1876 (photo F)	Capping Beam Repair (Ref 4)	3
73		Capping Beam	A-C	8	TA & WS	10-Jul-20	2	IMG_1941, IMG_1952 & IMG_1989		
74		Capping Beam	D-E	8	TA & WS	10-Jul-20	2	IMG_2019		
75		Capping Beam	F-G	8-9	TA & WS	10-Jul-20	2	IMG_1891		

Diamond Harbour Wharf Condition Report

Item Ref	Stringer Ref	Element Type	Location		Inspection Findings		Inspection Date	Comment	Condition Grade	Photograph file name (Appendix D photograph reference in brackets)	Repair Recommendation (repair reference in brackets)	Repair Priority
			Row	Bent	Inspected by							
76		Capping Beam	A-D	9	TA & WS		10-Jul-20		2	IMG_1888, IMG_1932 & IMG_1963		
77		Capping Beam	D-E	9	TA & WS		10-Jul-20		2	IMG_1888		
78		Capping Beam	E-G	9	TA & WS		10-Jul-20		2	IMG_1901		
79		Capping Beam	B	9-10	TA & WS		10-Jul-20	Horizontal split member	4	IMG_1869 (photo G)	Install new cap along side existing, for proposed mooring cleat above. (Ref 5)	2
80		Capping Beam	D	9-10	TA & WS		10-Jul-20		3			
81		Capping Beam	A-B	10	TA & WS		10-Jul-20		2			
82		Capping Beam	F-G	10	TA & WS		10-Jul-20		3			
83	a	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1892 & IMG_1911		
84	b	Stringer	A-C	1-2	TA & WS		10-Jul-20	Some splitting to underside	2	IMG_1319	Monitor next inspection	
85	c	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1318		
86	d	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1318		
87	e	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1318		
88	f	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1318		
89	g	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1318		
90	h	Stringer	A-C	1-2	TA & WS		10-Jul-20		2	IMG_1318		
91	a	Stringer	A-C	2-3	TA & WS		10-Jul-20	Split at end. Only 40mm seating on capping beam	3	IMG_1323, IMG_1324 & IMG_1327		
92	b	Stringer	A-C	2-3	TA & WS		10-Jul-20		2	IMG_1323 & IMG_1324		
93	c	Stringer	A-C	2-3	TA & WS		10-Jul-20		2	IMG_1323 & IMG_1324		
94	d	Stringer	A-C	2-3	TA & WS		10-Jul-20		2	IMG_1323 & IMG_1324		
95	e	Stringer	A-C	2-3	TA & WS		10-Jul-20		2	IMG_1323 & IMG_1324		
96	f	Stringer	A-C	2-3	TA & WS		10-Jul-20		2			
97	g	Stringer	A-C	2-3	TA & WS		10-Jul-20		2			
98	a	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1332		
99	b	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1333		
100	c	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1334		
101	d	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1335		
102	e	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1336		
103	f	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1337		
104	g	Stringer	A-C	3-5	TA & WS		10-Jul-20	New 360x230 stringers	1	IMG_1338		
105	a	Stringer	A-C	5-6	TA & WS		10-Jul-20		2	IMG_1985, IMG_2000 & IMG_2049		
106	b	Stringer	A-C	5-6	TA & WS		10-Jul-20	Rot to stringer	3	IMG_1985, IMG_2000 & IMG_2053	Monitor next inspection	
107	c	Stringer	A-C	5-6	TA & WS		10-Jul-20		2	IMG_1985		
108	d	Stringer	A-C	5-6	TA & WS		10-Jul-20		2	IMG_1985		
109	e	Stringer	A-C	5-6	TA & WS		10-Jul-20		2			
110	f	Stringer	A-C	5-6	TA & WS		10-Jul-20		2	IMG_2005		
111	g	Stringer	A-C	5-6	TA & WS		10-Jul-20		2	IMG_2005 & IMG_2010		
112	a	Stringer	A-C	6-7	TA & WS		10-Jul-20		2	IMG_2000		
113	b	Stringer	A-C	6-7	TA & WS		10-Jul-20		2	IMG_2000		
114	c	Stringer	A-C	6-7	TA & WS		10-Jul-20		2			
115	d	Stringer	A-C	6-7	TA & WS		10-Jul-20		2			
116	e	Stringer	A-C	6-7	TA & WS		10-Jul-20		2			
117	f	Stringer	A-C	6-7	TA & WS		10-Jul-20		2			
118	g	Stringer	A-C	6-7	TA & WS		10-Jul-20		2			
119	h	Stringer	A-C	6-7	TA & WS		10-Jul-20		2			
120	a	Stringer	A-C	7-8	TA & WS		10-Jul-20		3	IMG_1979 & IMG_2043		
121	b	Stringer	A-C	7-8	TA & WS		10-Jul-20		3	IMG_1979 & IMG_1993		
122	c	Stringer	A-C	7-8	TA & WS		10-Jul-20	Moisture staining	3	IMG_1979		
123	d	Stringer	A-C	7-8	TA & WS		10-Jul-20		3	IMG_1979		
124	e	Stringer	A-C	7-8	TA & WS		10-Jul-20		3	IMG_1979		
125	f	Stringer	A-C	7-8	TA & WS		10-Jul-20		2	IMG_1977		
126	g	Stringer	A-C	7-8	TA & WS		10-Jul-20		2	IMG_1977		
127	a	Stringer	A-G	8-9	TA & WS		10-Jul-20		3	IMG_1943, IMG_1968 & IMG_1969		
128	b	Stringer	A-G	8-9	TA & WS		10-Jul-20		3	IMG_1943, IMG_1968 & IMG_1969		
129	c	Stringer	A-G	8-9	TA & WS		10-Jul-20	Moisture staining	3	IMG_1943, IMG_1968 & IMG_1969		
130	d	Stringer	A-G	8-9	TA & WS		10-Jul-20		3	IMG_1943		
131	e	Stringer	A-G	8-9	TA & WS		10-Jul-20		3	IMG_1943		
132	f	Stringer	A-G	8-9	TA & WS		10-Jul-20	Severely decayed and fired damaged stringer at stair end	4	IMG_1965 (photo J) & IMG_2066	Install new stringer alongside existing damaged member. (Ref 9)	3
133	g	Stringer	A-G	8-9	TA & WS		10-Jul-20	notch in stringer	3		Monitor next inspection	
134	h	Stringer	A-G	8-9	TA & WS		10-Jul-20	notch in centre of stringer span	4	IMG_1888 (photo H) & IMG_1975	Install new stringer alongside existing member with notch in middle of beam. Stringer I between bents 8 & 9. (Ref 7)	3
135	i	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
136	j	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
137	k	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
138	l	Stringer	A-G	8-9	TA & WS		10-Jul-20	New stringer	2	IMG_1909		
139	m	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
140	n	Stringer	A-G	8-9	TA & WS		10-Jul-20	split in stringer near support	3	IMG_1884 (photo Q) & IMG_1886	Install splitter bolt to prevent crack propagating at notch	4
141	o	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
142	p	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
143	q	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
144	r	Stringer	A-G	8-9	TA & WS		10-Jul-20		2			
145	a	Stringer	A-B	9-10	TA & WS		10-Jul-20		2			
146	b	Stringer	A-B	9-10	TA & WS		10-Jul-20	Stringers have been turned upside down. Minor splitting to underside	3	IMG_1929		
147	c	Stringer	A-B	9-10	TA & WS		10-Jul-20		2			
148	d	Stringer	F-G	9-10	TA & WS		10-Jul-20	split to underside of stringer	3	IMG_1907	Monitor next inspection	
149	e	Stringer	F-G	9-10	TA & WS		10-Jul-20		3	IMG_1899		
150	f	Stringer	F-G	9-10	TA & WS		10-Jul-20		3	IMG_1899		
151	g	Stringer	F-G	9-10	TA & WS		10-Jul-20		3	IMG_1892		
152		Stair Stringer	E-F	7-8	TA & WS		10-Jul-20	Stringer fixing failed, notch over capping is too large	5	IMG_2017 & IMG_2018	Install new cap along side existing, for proposed mooring cleat above. (Ref 5)	2
153		Stair Stringer	D-G	7-8	TA & WS		10-Jul-20	Very little seating on capping beam at top end	5	IMG_2024, IMG_2061, IMG_2025 (photo B) & IMG_2060 (photo A)	Install new capping beam along side, to improve support to stairs. (Ref 1)	2
154		Stair Stringer	B-F	9	TA & WS		10-Jul-20		3	IMG_1917		
155		Stair Stringer	B-F	10	TA & WS		10-Jul-20	moderate split to inside of stringer	3	IMG_1913, IMG_1914, IMG_1915	Monitor next inspection	
156		Stair Stringer	A	3-7	TA & WS		10-Jul-20		3			
157		Stair Stringer	B	3-7	TA & WS		10-Jul-20		3			
158		Brace	A-C	2	TA & WS		10-Jul-20	Braces are encased in concrete	2	IMG_1324		
159		Brace	A-C	3	TA & WS		10-Jul-20	Braces are encased in concrete	2	IMG_1323		
160		Brace	A-C	6	TA & WS		10-Jul-20	Moderate decay at lower end of brace	3	IMG_1864, IMG_1985		
161		Brace	A-C	7	TA & WS		10-Jul-20	Blocking between pile and brace had fallen away so bolt in bending	4	IMG_1941, IMG_1981 (photo E), IMG_1984 & IMG_1987	Remove bent fixing, install new fixing and blocking between pile and brace, connection to pile 7E. (Ref 3)	3
162		Brace	A-C	8	TA & WS		10-Jul-20	Hollowing behind brace at lower end	3	IMG_1941, IMG_1951, IMG_1956, IMG_1989 & IMG_1990	Monitor next inspection	
163		Brace	F-G	9	TA & WS		10-Jul-20	New brace	1	IMG_1891 & IMG_1894		

Appendix D Photographs



Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
A	1	Poor seating to stairs on capping beam spanning between piles 7D – 7E	B	1	Poor seating to stairs on capping beam spanning between piles 7D – 7E
					



Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
C	2	Handrail posts requires replacement due to splitting (below canopy, northern side of approach)	D	2	Failed fixing to handrail post, (post to capping beam between pile 8D & 8G)
					

Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
E	3	Replace bent fixing, reseal bracing flush to pile and install new bolt	F	4	Split to capping beam spanning piles 8D-8G

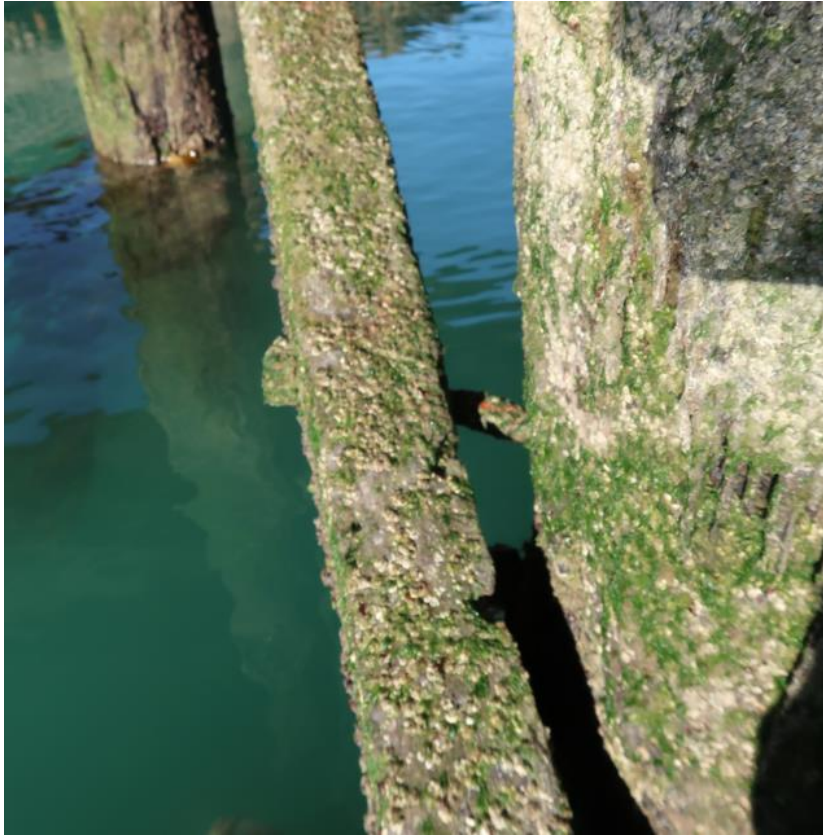




Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
G	5	Cut fender backing timber at deck and install mooring cleat.	H	7	Existing stringer has notch near centre, new stringer to be installed alongside.
					

Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
I	2	Handrail post to be replaced, post located near to 5B	J	9	End of stringer bearing on cap beam along grid 9 is rotten and has fire damage, top ¼ of stringer has lost integrity.






Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
K	10	Install blocking for relocated crane	L	11	The pontoon ramp will be installed approximately where the derrick crane is currently located. A handrail will need to be installed




Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
M	12	Fixing between pile 9E and corbel below stair stringer has failed and requires replacement.	N	13	Poor connection between pile 7A and capping beam
					


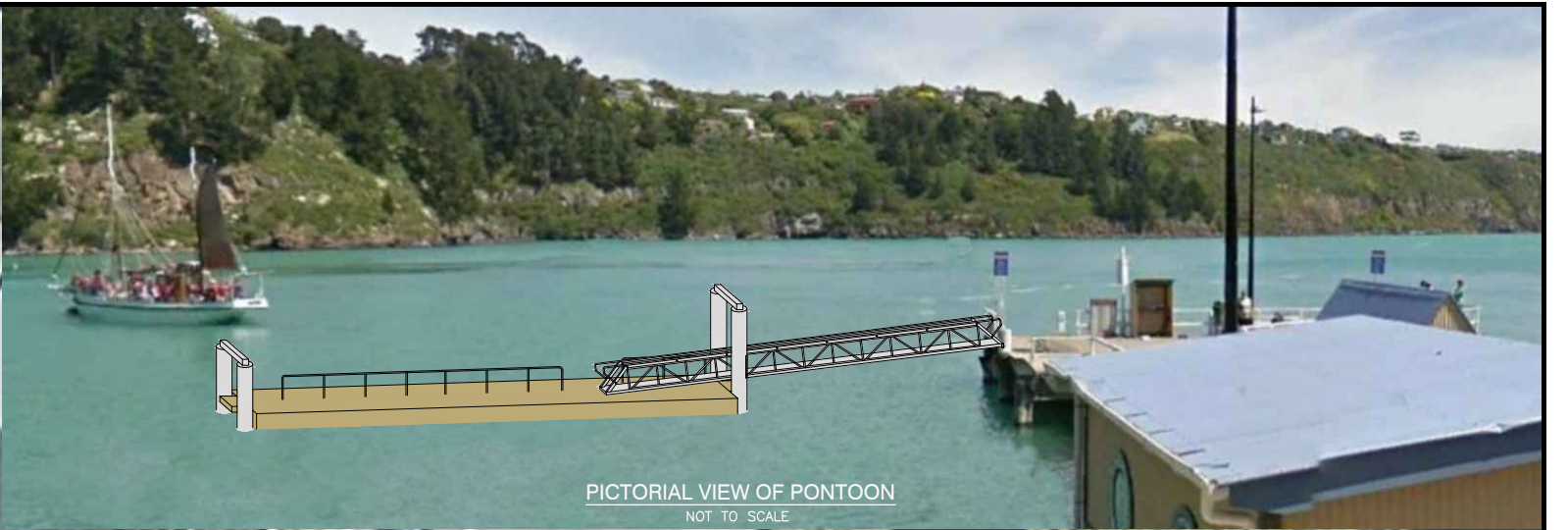
Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
O	16	Worn decking members, some previously replaced and asphalt covering in moderate - poor condition.	P	12	Connection between pile 8C1 and capping beam has failed and requires replacement.
					

Photo Reference	Item Reference	Description	Photo Reference	Item Reference	Description
Q	17	Horizontal split in stringer n, between bents 8 & 9. Crack to be monitored with a splitter bolt installed if the crack develops.	R	18	Outrigger supporting northern shelter, attached to bent 1 capping beam is split. Note diagonal bracing to outer end provides support to outer.



Appendix E Proposed Wharf Improvements

OCEL Drawings DR-190802-004 & 005



Amendments	Rev'n	Date	Drawn	Issued for	Checked	Approved
GANGWAY WIDTH INCREASED TO 1.8m, PONTOON WIDTH INCREASED TO 4.5m	2	28/02/2020	RVE	INFORMATION		
ISSUED FOR INFORMATION	1	08/11/19	RVE	INFORMATION		

Drawn	RVE
Checked	
Traced	
Approved	
Date	08/19

OCEL OFFSHORE AND COASTAL ENGINEERING LIMITED

14 Richardson Terrace
PO Box 877
Christchurch
Tel (03) 3790444
Fax (03) 3790333

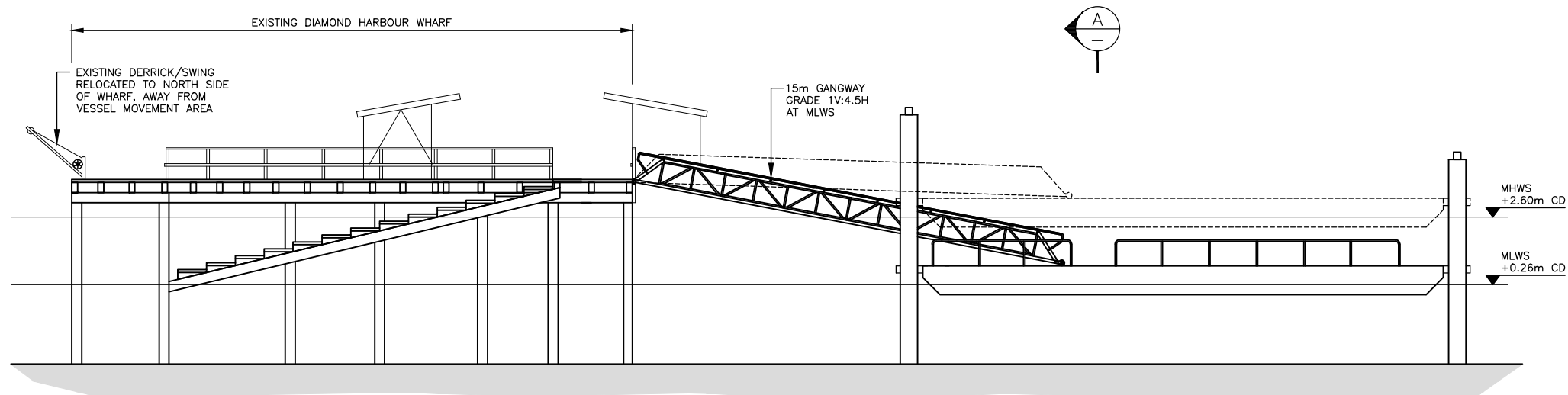
49 Crown Hill Street
PO Box 151
New Plymouth
Tel (067) 512310
Fax (067) 512310

This drawing and its content is the property of Offshore and Coastal Engineering Limited
Any unauthorised use or reproduction of it is forbidden

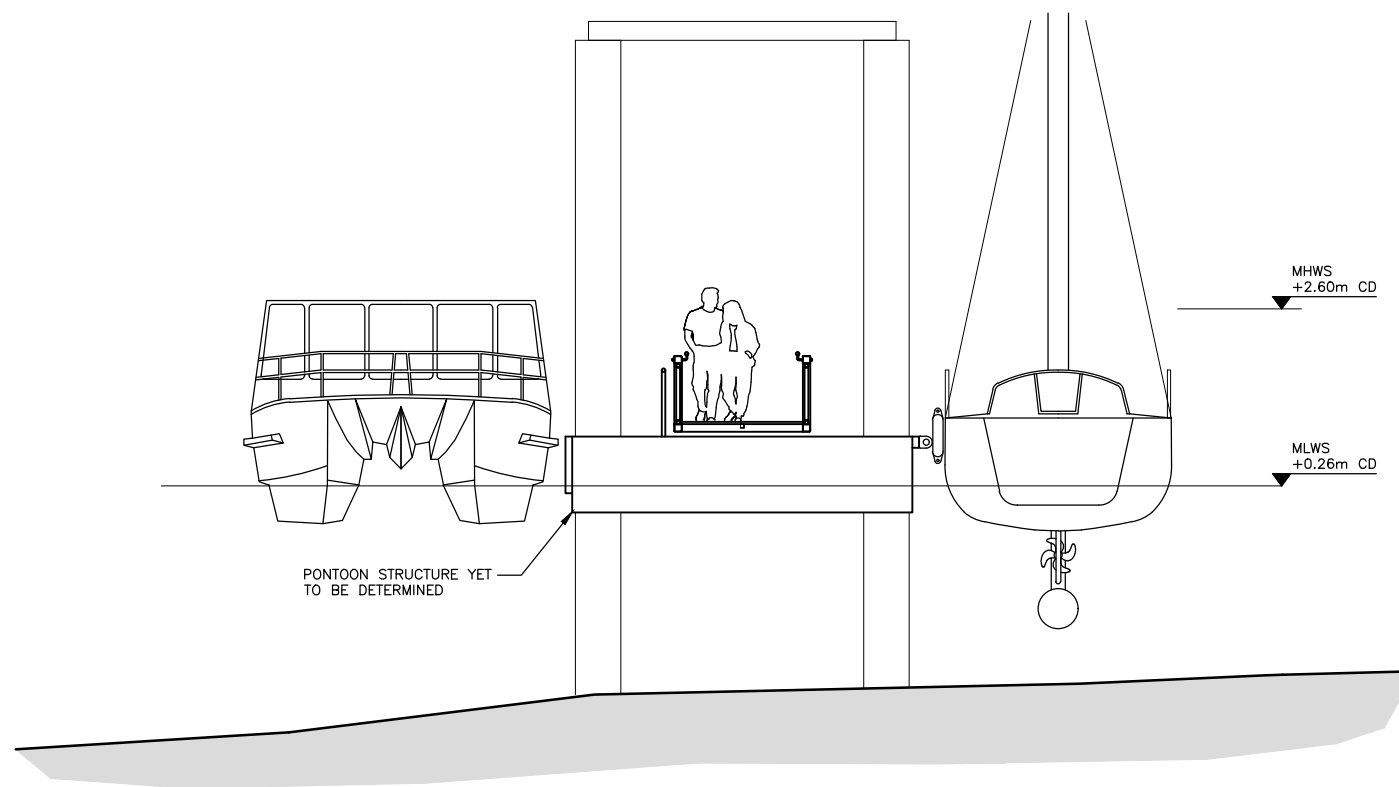
CHRISTCHURCH CITY COUNCIL
DIAMOND HARBOUR WHARF FLOATING JETTY
PLAN OF PROPOSED PONTOON

Scale (A3)	ACAD Filename
1:250	190802/DR-190802-004R2
Drawing No.	Rev.
DR-190802-004	2

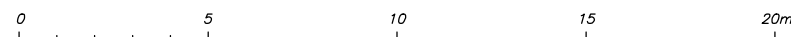
PRELIMINARY



SIDE ELEVATION OF PONTOON
Scale 1:200



SECTION A
Scale 1:100



Scale 1:200



Scale 1:100

DO NOT SCALE FROM DRAWING

PRELIMINARY

							Drawn	RVE	 OFFSHORE AND COASTAL ENGINEERING LIMITED 14 Richardson Terrace PO Box 877 Christchurch Tel (03) 3790444 Fax (03) 3790333	49 Crown Hill Street PO Box 151 New Plymouth Tel (067) 512310 Fax (067) 512310	This drawing and its content is the property of Offshore and Coastal Engineering Limited Any unauthorised use or reproduction of it is forbidden.	CHRISTCHURCH CITY COUNCIL		Scale (A3)	ACAD Filename
GANGWAY WIDTH INCREASED TO 1.8m, PONTOON WIDTH INCREASED TO 4.5m AND PONTOON LENGTH INCREASED TO 18m ISSUED FOR INFORMATION							Checked					DIAMOND HARBOUR WHARF FLOATING JETTY		1:100, 200	190802/DR-190802-005R2
Amendments Rev'n Date Drawn Issued for Checked Approved							Traced					ELEVATIONS OF PROPOSED PONTOON		Drawing No.	Rev.
2 28/02/2020 RVE INFORMATION 1 08/11/19 RVE INFORMATION							Approved							DR-190802-005	2



Contact Us

Calibre Consulting Ltd

Level 1, 323 Madras St
Christchurch 8013
PO Box 13875, Christchurch 8041
+64 3 375 6415