West Bay, Gambier Island
Ports Condition Assessment

DRAFT FOR CLIENT REVIEW
2023.03.03

February 28, 2023

Prepared for:

Sunshine Coast Regional District
1975 Field Road
Sechelt, BC
V0N 3A1

Attention: Kelly Koper, Capital Projects Coordinator
[Ports]

Prepared by:

Herold Engineering Limited
Unit 7, 1920 Lyche Road
Ucluelet, BC
V0R 3A0

HEROLD ENGINEERING

www.heroldengineering.com

PORTS CONDITION ASSESSMENT

WEST BAY, GAMBIER ISLAND

Prepared for:

Sunshine Coast Regional District (SCRD)
1975 Field Road
Sechelt, BC
V0N 3A1

Attn: Kelly Koper, Capital Projects Coordinator, [Ports]

Prepared by:

Herold Engineering Limited
Unit 7, 1920 Lyche Road
Ucluelet, BC
V0R 3A0

Submittal Date: February 28, 2023

Herold Project No.: 4551-012

Prepared by:

_____
Shannon Summersides, P. Eng.
Project Engineer

Reviewed by:

_____
Craig Work, P. Eng., FEC
Principal

Executive Summary

The scope of the assignment includes above and below water assessment of the West Bay port facility followed by preparation of a site specific condition assessment report. The report includes health and safety considerations and load rated capacities for the overall structure, as well as residual life estimates for individual members. A brief gap analysis between the existing structure and locally accepted Best Management Practices for marine facilities was completed using cited reference material (see Section 1.3). The Best Management Practices utilized for the analysis were generated and apply to Howe Sound, Pender Island and the Sunshine Coast region.

The assessment was conducted on November 28 and 29, 2022. The purpose of the assessment was to document the overall physical condition of the facility through review of provided reference material (previous reports/drawings) and visual and tactile assessment of accessible elements from above and below water. The above water assessment was conducted by Herold Engineering and the underwater portion of the work was completed by Westcoast Diving Contractors Limited under direct audio and visual communication with Herold Engineering.

The port facility is in overall serviceable condition. Assessment results indicate that minor remedial work to the fixed structures (approach & wharfhead) is required, as well as a full replacement of the float structure.

There are some items identified as recommended to be repaired/replaced within the next year as follows:

- One cross brace is to be replaced
- One bearing pile is to be replaced
- Upgrades to all of the brace connection on the wharfhead
- Replacement of the float in its entirety

The gap analysis identified minor items which could be completed at the facility to bring it closer to adherence with BMPs. The following could be considered during the next maintenance cycle/upgrade:

- Consideration should be given to prohibiting vessel moorage in the winter season.

The following recommendations pertain to Health and Safety at the facility:

- Safety ladder spacing and signage does not conform to WorkSafe BC regulations.
- Handrails do not conform to OH&S standards.

The load rating was established using The Canadian Highway Bridge Code (CAN/CSA S16-19), and assumes that all repairs identified to qualify the rating have been completed. The fixed structure(s) has been rated a maximum area load of 4.2kPa. The float is no longer in serviceable condition and is not recommended to have large occupancy (assembly) loads or area loads at any time. Signage to this effect is recommended visible from both water and land access points.

WEST BAY, GAMBIER ISLAND
PORTS CONDITION ASSESSMENT
Table of Contents

1.0 INTRODUCTION

Facility: West Bay, Gambier Island

Assessment by: Shannon Summersides, P. Eng. (Herold Engineering Ltd.)
Westcoast Diving Contractors Ltd. (3 man crew)

Date: November 28 and 29, 2022

1.1 Purpose of Assignment

The assessment was conducted to identify members either requiring repairs or showing signs of deterioration. The following report will provide information regarding maintenance, repair, replacement and health and safety on a 10 year forecasted time period, allowing for a prioritized repair and maintenance program to be implemented. Other items noticed during the assessment will be reported only in terms of general overall condition.

The assessment included detailed above water visual / tactile assessment of the following facility components:

- Abutment headwall
- Handrails
- Vehicle Guard
- Cleats
- Safety Ladders
- Deck Planks
- Stringers
- Pile Caps
- Cross Bracing
- Piles

Items assessed specific to floats:

- Gangways and connections
- Bull rails
- Rub boards
- Decking
- Floatation
- Mooring system (piles, anchor chains)

The facility was previously reviewed from above water by Herold Engineering in December 2018, and below water in 2016 by GreenWave Marine Services (GreenWave). The facility was also reviewed by Pelagic Technologies Inc. (Pelagic) in 2009. Reference drawings indicating noted bearing pile condition, as well as the chain and anchor mooring layout were provided to Herold Engineering. It is assumed that this reporting was conducted via underwater assessment.

1.2 Scope of Work

The assessment of the facility components was completed to the standards set out below. The work included facility components noted in Section 1.1.

The condition assessment and residual life estimates were based on previous experience, as well as the reference material noted below.

The load rating and capacity calculations were executed following the recommendations in the reference material noted below and best engineering practice.

All recommendations related to occupational health and safety were provided based upon current WorkSafe BC regulations, as well as our experience with facilities similar in form and function.

A gap analysis was conducted for the facility to evaluate compliance with several best management practices documents. The documents were prepared by municipalities and First Nations groups along the coast of Vancouver Island and the Coastal Mainland for the maintenance and construction of marine infrastructure. All documents were provided by The Sunshine Coast Regional District and are reference in Section 1.3 below.

1.3 Reference Material

- Procedures for Inspection and Assessment of Fixed Timber Docks – 1994 September – 4th Edition by R.G. Sexsmith Ltd.
- Standard Practice Manual for Underwater Investigations by the American Society of Civil Engineers, Ports and Harbors Committee, May 2000.
- Canadian Highway Bridge Design Code CAN/CSA S6-19.
- WorkSafeBC Occupation Health and Safety Regulations for Wharves, Docks and Mooring Floats
- Pender Harbour Dock Management Plan. Ministry of Forests, Lands, Natural Resource Operations and Rural Development. March 2021.
- Shisha'lh Nation Best Management Practices for Marine Docks. Version 20180605.
- Atl'ka7tsem/Howe Sound Biosphere Region Best Management Practices for Marine Docks. Draft 10. June 13, 2021.
- Canadian Navigable Waters Act. R.S.C, 1985, c.N-22. Canadian Minister of Justice. December 12, 2022.

1.4 Methodology

The facility was reviewed from above water by Herold Engineering Limited (Herold Engineering) and below water by Westcoast Diving Contractors Ltd (WDC) under direct audio and visual supervision of Herold Engineering.

The assessment involved a visual and tactile assessment of the structural elements, and select hammer soundings of timber elements. Refer to Section 5 for assessment results, as well as Appendix D for detailed remediation recommendations. Although these assessments are able to verify much of the visible and tactile damage, they are somewhat limited in assessing the severity and extent of internal damage, especially damage as a result of marine borer activity.

Load capacity calculations were completed using CAN/CSA S6-19. Residual life estimates for various elements were completed using guidelines provided in the reference material noted in Section 1.3. The findings are based on "as found" conditions at the time of the assessment.

2.0 DESCRIPTION

2.1 Location

West Bay Port Facility is located on the southern aspect of Gambier Island, approximately 30 kilometers northwest of Vancouver, B.C across the Strait of Georgia. Refer to the following aerial figure (Figure 2.1) for port location.

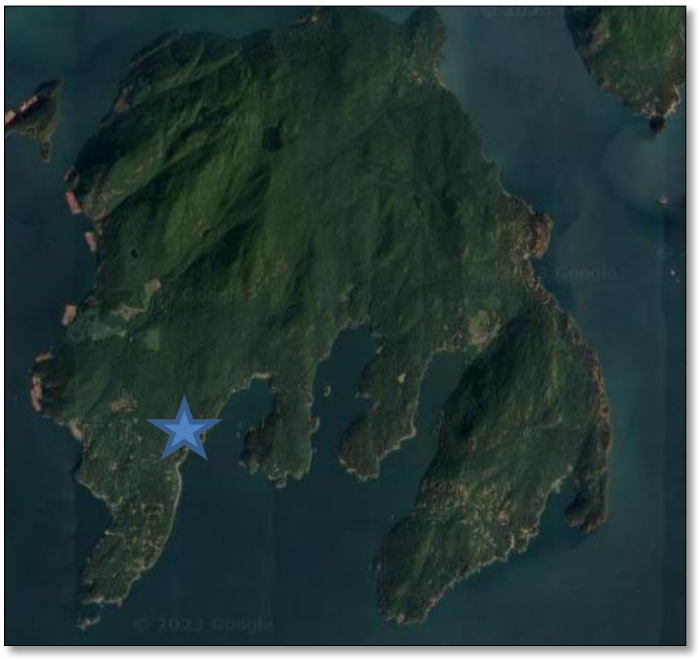


Figure 2.1: West Bay Site Location (Gambier Island)

2.2 Geometry

The overall geometry of the facility's main components is as follows:

Approach	-	2.4m x 196.6m
Wharfhead	-	5.1m x 6.7m
Gangway	-	1.2m x 13.3m
Float	-	6.4m x 15.6m

The general layout of the facility is as per the Herold Engineering Drawings 4551-012 S01 and S02 located in Appendix C.

2.3 Reference System

The reference system used for this report is as per the drawings found in Appendix C. For the purpose of this report, the approach, wharfhead, gangway, and float all generally run north to south

Along the approach and wharfhead the pile bents are numbered from the abutment (Bent 0) to the wharf face (Bent 32). The pile rows are lettered from east to west as Gridlines A through to C.

There is one float at the facility, accessed by a steel gangway. The float is moored by a chain and anchor mooring system.

The general arrangement of the facility is shown in Photograph 1 & 2, located in Appendix A.

2.4 Approach & Wharfhead

The facility is a typical legacy Transport Canada facility. The approach and wharfhead are primarily treated timber construction. Topside elements include handrails and guards along either side of the approach, as well as a guard around the wharfhead perimeter. Timber decking provides a walking surface along the approach and wharfhead. There is a life ring, and safety mounted along the seaward edge of the wharfhead.

The substructure is comprised of treated timber stringers, pile caps and bearing piles. It is understood that the superstructure (handrails, guard, decking and stringers have been replaced within the last five years. The approach has intermittent lateral and longitudinal bracing and wale timbers.

The abutment (Bent 0) appears to be a buried timber construction. The arrangement was not accessible for review at the time of the assessment.

Typical member sizes and spans are as follows:

Handrails	-	38mm x 140mm handrail
	-	38mm x 89mm top-rail
	-	38mm x 89mm mid-rail
	-	89mm x 89mm x 1.5m posts spaced at 2.4m (±)
Timber Decking	-	75mm x 305mm treated, spanning approx. 610mm
Vehicle guard	-	140mm x 140mm (approach)
Risers	-	38mm x 140mm
Stringers	-	140mm x 279mm creosote treated
Pile caps	-	241mm x 292mm creosote treated
Cross Bracing	-	152mm x 203mm
All Piles	-	Size 36 (305Ø) creosoted treated/concrete
Wale Timbers	-	152mm x 203mm

2.5 Gangway

An aluminum gangway is located on the seaward edge of the wharfhead. The gangway provides access to a timber float. Truss member sizes are as follows:

Top Chord	-	HSS75x75
Bottom Chord	-	HSS75x75
Verticals	-	HSS75x75
Cross Beams	-	HSS75x75
Decking	-	51mm thick serrated aluminum

2.6 Float

Topsides of the float include painted timber bull rails and risers and treated timber decking. There is a timber landing pad with guide angles secured to the float deck.

The float substructure is a timber construction consisting of treated timber cross-ties, joists, stringers, and flanges. The float is moored by chain and anchor connected at the north and south ends of the float. The chains extend to various concrete anchors, as well as a timber pile and rock anchor points. The floatation is a mixture of fiberglass pontoon and polystyrene floatation.

Typical component sizes and spans are as follows:

Decking	-	38mm x 305mm
Bull Rails	-	89mm x 152mm
Risers	-	89mm x 152mm x 305mm long
Rubboards	-	75mm x 305mm

3.0 Health & Safety Background

Legacy Transport Canada marine facilities of this kind have a similar construction and arrangement which is somewhat typical within the Pacific region. The majority of marine facilities are not able to meet areas of governing regulations for health and safety. It is at the discretion of the owners of the facility as to the stringency with which the following requirements are followed.

3.1 OH&S Requirements

3.1.1 Ladders

Fixed ladders must be provided at every dock for access to and egress from the water and should:

- Be spaced at intervals not exceeding 30 meters.
- Extend from the top of the float or fixed wharf structure deck to at least 1 meter below the lowest water level.
- Be maintained free of barnacles and marine growth, and
- Have their location identified by high visibility paint on the curb or bull rail.

3.1.2 Lifesaving Equipment

Appropriate lifesaving equipment must:

- Be provided and maintained for the rescue of any worker/users in danger of drowning, and
- Be positioned at intervals not exceeding 50 meters in conspicuous locations as near as practicable to the danger area.
- Throwing lines fitted to lifebuoys or similar equipment must be of suitable size and length and made of buoyant material.
- Lifesaving equipment includes lifebuoys, throwing bags, grapples, boat hooks or other equipment appropriate to the circumstances.

3.1.3 Curbs, Bull Rails, Guardrails, and Barriers

A curb or bull rail must be installed along the open sides of each float, dock, wharf, pier and similar other area where mobile equipment might be used.

Each curb and bull rail must be of substantial construction and be at least 250mm high.
Where practicable, guardrails meeting the requirements of Part 4 (General Conditions)
must be installed at:

- Dangerous breaks in the continuity of the wharf, dock or pier and
- Dangerous corners, edges and other parts of a wharf, dock, or pier.
- See section 3.1.5 for Part 4 (General Conditions) requirements (below).

Moveable warning barriers may be used where the use of standard guardrails is impracticable.

3.1.4 Markings

Where circumstances require, curbs, bull rails, guardrails, and barriers must be painted solid yellow, yellow and black stripes or checkers, or yellow against a suitable contrasting background.

Retroreflective paint or patches must be applied to curbs, bull rails, guardrails, and barriers where mobile equipment is operated at night

3.1.5 Fall Protection (OH&S Part 4 – General Conditions)

An area accessible to workers must have guards or guardrails installed in any of the following circumstances:

- If a raised floor, open-sided floor, mezzanine, gallery, balcony, work platform, ramp, walkway, or runway is 1.22 meters or more above the adjacent floor or grade level;
- On both sides of any walkway over or adjacent to any substance which is a hazard if a worker fell in, or on it, or which is over machinery or work areas;
- Around the perimeter of any open container or containment area such as an open vat, bin, tank or pit which is 1.22 meters or more in depth and which has sides that do not extend at least as high as required for a guardrail above the adjacent grade or work surface;

It is to be noted that these requirements pertain to workers and may not be relevant for the use of a port facility.

3.2 Fire Protection

The placement of fire-extinguishing equipment shall be planned in cooperation with the authority having jurisdiction and the local responding fire departments at least annually in order to accommodate changing conditions and personnel responsible for fire control in the facility.

The placement of portable fire extinguishers on piers and along bulkheads where vessels are moored or are permitted to be moored shall meet the following criteria:

- Extinguishers listed for Class A, B, and C fires shall be installed at the pier/land intersection on a pier that exceeds 7.62m in length.
- Additional fire extinguishers shall be placed such that the maximum travel distance to an extinguisher does not exceed 22.86 meters.
- All portable fire extinguishers shall be maintained in accordance with Chapter 6 of NFPA 10, Standard for Portable Fire Extinguishers, and shall be clearly visible and marked.

4.0 Best Management Practices Gap Analysis

Pacific coastal municipalities and First Nations groups are beginning to provide regulations and guidelines for marine dock construction, management and remediation in attempts to ensure infrastructure is adhering as best as is practicable to Fisheries and Oceans Canada guidelines and best management practices.

A gap analysis has been conducted for the facility to identify items which may fall short of new regulations/guidelines and to identify items which the SCRD may want to use in the future to develop their own permitting requirements, regulations and best management practices for floating docks within their jurisdiction.

The following Best Management Practices (BMP) documents have been used in the gap analysis as provided by the SCRD:

- Pender Harbour Dock Management Plan. Ministry of Forests, Lands, Natural Resource Operations and Rural Development. March 2021.
- Shisha'lh Nation Best Management Practices for Marine Docks. Version 20180605.
- Atl'ka7tsem/Howe Sound Biosphere Region Best Management Practices for Marine Docks. Draft 10. June 13, 2021.

All three documents have very similar requirements/recommendations. Some items are specific to new construction; however, several items can be incorporated into existing facilities during regular service, repair, renovation and/or decommission activities to improve environmental and societal impacts.

It is to be understood that the water body surrounding Gambier Island and the Sunshine Coast Mainland is deemed by DFO and the Canadian Species at Risk Act to be a habitat for extirpated, endangered of threatened marine species. For this reason new construction and any major maintenance activities involving in water works are required to be reviewed,

at minimum, by DFO to ensure that all habitat and species are kept safe during the associated activities. For this reason, the best management practices noted above heavily emphasize DFO regulations and mitigation measures for marine facilities and construction. Some of the items do not apply to this port facility.

West Bay is a legacy port facility that was constructed as appropriate for its time. Since the facility is existing, and no reports of negative interactions with marine life have been reported during its current service life (ie: as a public facility), we can say that the infrastructure has now likely become part of the marine habitat and there is no known reason to believe the facility poses any threat to marine life.

The following checklist details the gap analysis between the West Bay Port Facility as found during the condition assessment and the BMP's outlined in the above documents.

Table 4.1 Gap Analysis Checklist

BEST MANAGEMENT PRACTICE	2022	REMARKS
Dock Facility that facilitate numerous upland owners	✓	*Facilities service large(r) communities with several people utilizing the facility*
No critical habitats are impacted per Canadian Species at Risk Act (SC 2022, c.29)	✓	*Not directly applicable to the structure in service, but it is considered during upgrades and maintenance activities.*
Do not block the free movement of water along the shoreline	✓	*Piled structures allow for this requirement to be met*
All building codes and bylaws administered by all levels of government must be adhered to for all structures	✓	*No service shed on structure(s)*
Clearance to underside of float is minimum 1.5 meters	✗	*Clearance at Lower Low Water Large Tide is less than 1.5 meters*
Aligned in a North to South direction	✓	*N/A*
Access ramps/walkways are minimum 1.0 meters above HHWLT	✓	*At high tide this facility is very close to this minimum. Consideration should be given to sea level rise during any changes to the walkway structures*
Access ramps/walkways 1.2 meters wide maximum	✗	*Wharfhead is wider than this. Serviceability for large (public) populations using the facility to bring in supplies makes achieving this BMP impractical*
Decking material allows (43%) light penetration	✗	*Timber decking does not allow through the minimum 43% light penetration. This is typical along the fixed structures, as well as the gangway and float.*
Use of encased, wrapped or uncovered polystyrene products	✗	*Floatation is not as recommended in the BMPs*
Using preferred materials	✓	*Structure(s) are constructed from preferred materials, but are not the BMP specified "best" material, which is steel.*
Upland dock elements (including anchor points) do not disturb the riparian area	✓	*N/A*
Maintenance and construction activities take place in appropriate DFO timing windows	✓	*N/A*
Consultation with appropriate First Nations stakeholders prior to construction, with specific sensitivity to archeological	✗	*Unsure if this is part of the SCRD process during upgrades/maintenance activities.*

BEST MANAGEMENT PRACTICE	2022	REMARKS
significance of site		
Allow access to shoreline for First Nations harvesting of marine resources FN	✓	*N/A*
Seasonal floats	✗	*Not seasonal*
No vessel moorage during winter	✗	*Temporary vessel moorage permitted all year round*
Construction does not include native materials	✓	*N/A*
Adhere to Canadian Navigable Waters Protection Act	✓	*No navigation hazards identified within site boundary at time of assessment*
Ongoing maintenance is in accordance with appropriate BMPs	✓	*N/A*

The facility adheres to several of the BMPs set out in the reference material. The majority of nonconformance is a result of the facility being existing at the time of BMP implementation.

There are items which currently do not adhere to the BMPs, but could be remediated during major upgrades/maintenance or changes to the service requirements as follows:

- Construct any future buildings on the structure to the most current edition of The British Columbia Building Code.
- Retrofit gangway with decking that allows 43% or greater light penetration.
- Consideration should be given to prohibiting vessel moorage in the winter season.

5.0 Assessment Results

The results of the on-site assessment are based mainly on visual review, probing and sounding timber with a hammer. While all the piles were reviewed, these assessments are somewhat limited in detection of the severity and extent of the damage particularly damage due to marine borers.

The general condition of the various elements is as indicated below. For information on specific components, see Appendix B.

The following is an explanation of the rating scale used in Section 4 as it relates to the estimated time before the next required repair to a specific item.

Critical: Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented, as necessary. Repairs may need to be carried out on a very high priority basis with strong urgency.

Serious: Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high priority

basis with urgency

Poor: Advanced deterioration or overstressing is observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.

Fair: All primary structural elements are sound, but minor to moderate defects or deterioration is observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.

Satisfactory: Limited minor to moderate defects or deterioration are observed, but no overstressing is observed. No repairs are required.

Good: No visible damage, or only minor damage is noted. Structural elements may show very minor deterioration, but no overstressing is observed. No repairs are required.

5.1 Approach and Wharfhead

General views of the approach, wharfhead, and floats are shown in Photograph 1 & 2 (Appendix A).

5.1.1 Topsides

Generally the topside elements (handrails, guard timber, and decking) are in overall good serviceable condition, with minor amounts of mechanical damage (cracking) at the hardware locations.

The handrails is in good condition and no remediation is required. The vehicle guard has significant cracking at the hardware locations due to overdriving of the thru bolts. Ongoing monitoring is recommended as the rate of deterioration will be accelerated. The decking is secured using screws, which is not considered best practices. Replace all screws with minimum 127mm spiral nails.

The signage is in fair condition with minor damage.

5.1.2 Abutment

The abutment is in overall satisfactory condition. Accessibility was limited at the time of the assessment.

5.1.3 Stringers

The stringers are in overall good condition. They appear to have been recently replaced.

5.1.4 Pile Caps

Generally, the pile caps are in overall fair condition, with minor to moderate biological and mechanical damage. Ongoing monitoring is recommended.

5.1.5 Bearing Piles

The bearing piles are in overall fair condition. Several bearing piles have been remediated using stainless steel strapping. The cracking in the affected piles is

considered to be moderate, and in some locations strapping is placed at intervals along the full exposed pile length. There are nine piles with steel strapping which are to be monitored with considerations given to replacement within the next three to five years. One of the strapped piles is recommended for replacement within the next year.

5.1.6 Cross-Bracing and Wale Timbers

The cross bracing at the facility is in good to fair condition. There is one brace which requires replacement.

There are several locations where a U-bolt has been used to secure the brace to the pile. The connections on the wharfhead are moderately corroded and are beginning to loosen off. It is recommended that the U-bolt connections be replaced with thru bolt style fasteners with appropriate nut and washer assemblies.

5.2 Soundings

Sounding were taken around the wharfhead and approach perimeter. The soundings may be used to identify any scouring, undermining, and/or sediment transport that may be happening at the facility. It is recommended that sounding measurements be taken during scheduled maintenance and periodic condition assessments to monitor variations in the seabed and/or listing of the structure(s).

Table 5.2.1 Wharf and Approach Sounding (m)
**All measurements were taken from top of deck to mudline.*

Location	2018	2022
33A	6.7m	6.7m
33B	6.9m	6.9m
33C	6.9m	7.0m

5.3 Gangway

The gangway is in overall good condition. The chain guarding at the shoreward end has failed at the connections and requires re-instatement. This damage is likely due to significant movement of the float structure during large wind/wave events. The additional movement is likely due to the deteriorated condition of the float structure, and can affect the behavior of the gangway and associated structures. This is also evident in the condition of the landing pad timbers which show heavy damage and wear with loss of cross section.

The chain guarding is recommended to be re-instated, and the landing pad timbers are recommended to be replaced. Replacement of the float in its entirety is recommended within the next year.

5.4 Main Float

The float is in no longer considered to be in serviceable condition. The topsides are in fair to poor condition. There decking is weathered with areas of localized failure. The bull rails have minor to moderate cross sections loss, but appear to have been re-coated recently. The landing pad is significantly deteriorated due to mechanical damage from the gangway. Three boards are recommended to be replaced

The substructure is in poor to very poor condition. The cross ties are significantly deteriorated at the connections, and there is a broken flange on the east edge of the float.

The mooring system is in overall good condition. It is to be noted that the chains are secured to the substructure of the float by looping around the cross tie members. Based on the condition observed on-site, the cross ties are not in acceptable condition to reliably resist mooring line loads. One mooring chain is showing signs of moderate corrosion and loss of section.

The floatation is in overall poor condition. There are raw polystyrene billets which are not considered to adhere to currently accepted environmental best practices. Some of the polystyrene is loose and floating within the float footprint.

Table 5.4.1 Main Float Freeboard Measurements (mm)
**All measurement from waterline to top of float deck*

Location	2018	2022
Northwest	584	558
Northeast	431	406
Southwest	279	279
Southeast	254	229

The freeboard around the float perimeter is inconsistent and deviates from acceptable design heights and tolerances. This is likely due to the deterioration within the substructure, as well as the condition of the polystyrene floatation.

The float is at/ near the end of its service life and consideration should be given to replacement within the next year.

5.5 Health and Safety

The following health and safety items were noted during the assessment.

5.5.1 Ladders

- Ladders along the float and the approach and wharfhead are spaced at intervals exceeding 30 meters.
- The ladder location is not identified with signage and/or high visibility paint on either side of the guard on the wharfhead.

5.5.2 Lifesaving Equipment

- The life ring is mounted to the wharfhead handrails, and is clearly identifiable when at the facility.

5.5.3 Curbs, Bull Rails, Guardrails, and Barriers

- The guard timber along the approach, as well as the float bull rail/riser arrangements do not meet minimum height requirements of 250mm consistently at the facility. This requirements is typically not met at facilities of this nature.

5.5.4 Fall Protection

The existing handrails are climbable, and have openings larger than 102mm at a deck elevation that exceeds 610mm.

5.5.5 Lighting

There are no lights installed at the facility.

5.5.6 Fire Protection

No observed portable fire extinguishers and/or fire protocols at the facility.

5.5.7 Navigation

No items were identified as being a navigation issue.

6.0 Load Rating & Residual Life Estimates

6.1 Load Rating

There is a no posted load rating for the approach and wharf head; however a load rating was generated for the structure(s) by Herold Engineering in 2019.

6.1.1 Approach, Wharfhead and Gangway

The approach width at West Bay is less than 3.0 meters wide, and vehicle loads are not considered to access facilities with this approach width. A steel traffic bollard is recommended should vehicle access be a concern.

Bending, shear and compressive capacities were determined using methods prescribed in Sections 3 and 9 of CAN/CSA S6-19. Member sizes and spacing were determined by field measurements. The analysis was done based on “as-new” condition of the structural elements and structural capacities assume that the recommended repairs have been completed (see Appendix B).

A maximum uniform load (in kilopascals (kPa), as well as a maximum point load (in kilonewtons (kN)), was determined for the structure, as well as for the gangway in accordance with CAN/CSA S6-19.

Material resistance factors used for design are as follows:

- Flexure (Φ_R) = 0.9
- Shear (Φ_R) = 0.9
- Compression (Φ_R) = 0.8

Load factors used for the load rating are as follows:

- Dead load factor (α_D) = 1.5 (deck) / 1.2 (other)
- Live load factor (α_L) = 1.7

Table D1 (Appendix D) summarize the results of the load rating and assumes all recommended repairs have been completed. By analyzing each element, an overall governing condition is determined as follows:

Table 6.1.1 Approach, Wharfhead and Gangway Load Rating Governing Condition

Load Type	Element	Failure Mode	Maximum Load (kPa)
Area Load	Pile Cap	Shear	4.2

Shear in the pile cap on the approach and wharfhead was determined to be the overall governing mode of failure. This maximum allowable live load exceeds the CAN/CSA S6-19 specified live load of 4.0kPa and is considered to be in conformance with generally accepted design guidelines for structures similar in nature. No load limit signage is recommended at the facility.

6.1.2 Gangway

The gangway is an aluminum truss construction. There were no load rating stamps identified at the time of the review. The following assumptions have been made for the load rating analysis:

- Aluminum material type: 6061-T6
- Tube section wall thickness = 3.2mm

Material resistance factors used for design are as follows:

- Flexure (Φ_R) = 0.9
- Shear (Φ_R) = 0.9
- Compression (Φ_R) = 0.8

Load factors used for the load rating are as follows:

- Dead load factor (α_D) = 1.5 (deck) / 1.2 (other)
- Live load factor (α_L) = 1.7

Table D1 (Appendix D) summarize the results of the load rating and assumes all recommended repairs have been completed. By analyzing each element, an overall governing condition is determined as follows:

Table 6.1.1 Approach, Wharfhead and Gangway Load Rating Governing Condition

Load Type	Element	Failure Mode	Maximum Load (kPa)
Area Load	Top Chord	Compression	1.5

Compression in the top chord of the truss was determined to be the overall governing mode of failure. This maximum allowable live load is not in accordance with CAN/CSA S6-19 specified live load of 4.0kPa. However, it does exceed the generally accepted design load of 1.2kPa for gangway structures. No load limit signage is recommended at the facility.

6.1.3 Float

The float is considered to be nearing the end of its service life. Assemblies and/or heavy loads should be prohibited on the float, and visible signage should be provided as you approach the float from land or water.

The float is recommended to be replaced with a new treated timber float. It may be possible to utilize the existing chain and anchor mooring system once the repairs are complete as noted above.

6.2 Residual Life Estimates

The residual life estimates are based on Section 2.5 of “Procedures for Inspection and Assessment of Fixed Timber Docks, 4th Edition” by R.G. Sexsmith Ltd. These estimates represent the worst case members inspected in any member group. For this reason, the overall condition of the member group is not necessarily reflected by the following residual life estimates. As noted in the above referenced material, the following applies:

- Where treated wood has been examined for presence of decay, and found sound, a life of 8-10 years is appropriate.
- Where evidence of some decay, but very limited extent was found present, a life of 3-6 years is appropriate.

- Where an element has weakened cross-section due to decay, the life can be presumed to be negligible (i.e. 0 years).

Residual life estimates for sacrificial items, intentionally designed for a shortened life span, have been approximated based on our previous experience with elements of this form and function and are as follow:

- Where element retains greater than 50% of its cross section and is secured to structure as designed, a life of 1-2 years is appropriate.
- Where the element retains less than 50% of its cross section and/or shows signs of fatigue/overstress at the connection points to structure, a life of less than one year is appropriate,
- Where the element retains 0% of its cross section (ie: failed) and/or has failed at any of the connection points it is considered to be “missing” and it is appropriate to presume the life of the element is negligible (0 years)

See Appendix B to determine which members the residual life estimate applies to.

6.2.1 Approach and Wharfhead

Topsides*	8-10 years (based on overall condition of elements)
Stringers	8-10 years (based on overall condition of elements)
Pile Caps	8-10 years (based on overall condition of elements)
Piles	3-5 years (based on nine vulnerable (strapped) piles), 8-10 years otherwise

**Note: topside items include handrails, vehicle guards, decking and any accessories which exist on the topside of the fixed structure(s).*

6.2.2 Gangway

Aluminum	8-10 years with ongoing maintenance
Serrated Aluminum Decking	1-3 years (based on overall condition of element)
Shoreward Transition	8-10 years with ongoing maintenance
Seaward Transition	Missing

6.2.3 Float

Bull Rails	1-3 years (based on overall condition of elements)
Timber Decking	1-3 years (based on overall condition of members)
Rub Boards	1-3 years (based on overall condition of members)
Flanges	0 years (based on one failed flange); 1-3 years otherwise
Cross Ties	1-3 years (based on overall condition of the elements)
Floatation	1-3 years (based on the condition of the uncovered billet floatation)
Chain	1-3 years (based on the condition of one chain); 8-10 years otherwise

Appendix A
Site Photographs

Photograph 1: West Bay, note: general arrangement from shore looking south

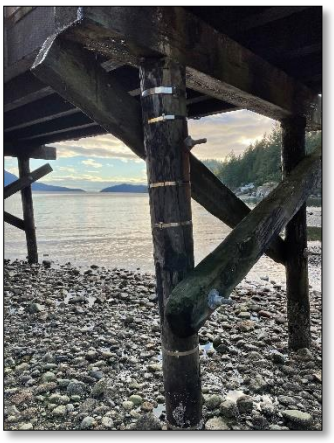
Photograph 2: West Bay, note: general arrangement from seaward end looking north

Photograph 3: Timber guard, note: cracking through hardware locations

Photograph 4: Decking, note: secured with screws

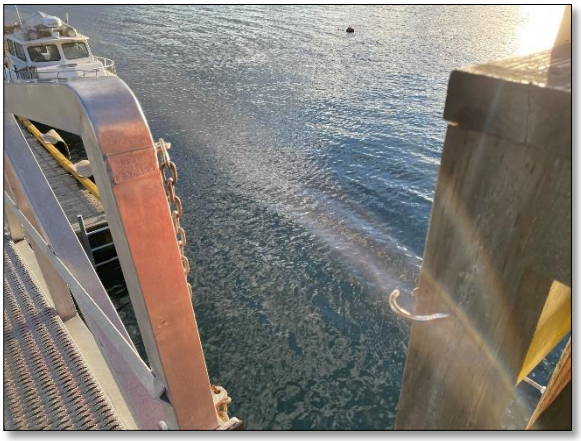
Photograph 5: Bearing pile 3A, note: strap repair

Photograph 6: Bearing pile 4B, note: strap repair

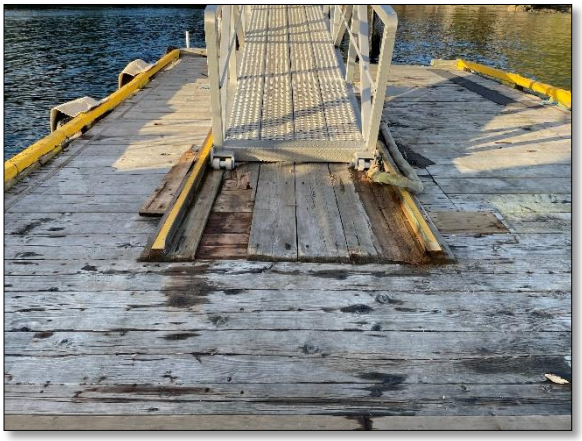


Photograph 7: Bearing Pile 6A, note: significant strapping

Photograph 8: Cross Brace 20B^{BOT}-20A^{TOP}, note: hollow at cut end



Photograph 9: Chain Guard, note: failed connection



Photograph 10: Gangway Landing Pad, note: mechanical damage to timbers

Photograph 11: Float Cross Ties, note: biological damage and deterioration

Photograph 12: Float decking, note: failed sections

Photograph 13: Mooring Chain Connection, note: wrapped to cross tie

Photograph 14: Southeast Chain, note: corrosion and cross section loss

Appendix B
Damage Table

Table B1 Facility Damage Table
Note: items required to certify the load rating in Section 5 are identified in **BOLD*

ITEM	LOCATION	DAMAGE	CONDITION	COMMENTS	RECOMMENDATION	REMEDIAL YEAR
Approach & Wharfhead						
Timber Guard	Typical	Mechanical	Fair	Guarding hardware appears to have been over-driven resulting in cracking along the guard lengths	Ongoing monitoring. Guarding my deteriorate more rapidly than anticipated as treatment layer is compromised	-
Decking	Typical	-	-	Deck boards are secured with screws. These back out easily under motion and are not considered best practice.	Replace all screws with minimum 5" long spiral nails	2023/2024
Pile Cap	Bent 15	Biological	Fair	Vegetative growth noted	Ongoing monitoring	-
Pile Cap	Bent 16	Mechanical	Fair	Check in pile cap	Ongoing monitoring	-
Bearing Pile	**6A**	**Mechanical**	**Poor**	**Pile is strapped from top to mudline and listing**	**Replace bearing pile**	**2023/2024**
Bearing Pile	**20A**	**Mechanical**	**Fair**	**Splitting in pile**	**Install stainless steel strapping**	**2023/2024**
Cross Brace	**20BBOT – 20ATOP**	**Mechanical/ Biological**	**Poor**	**Cross brace is deteriorated with significant softening due to biological damage**	**Replace cross brace**	**2023/2024**
Cross Brace/ Wale Timber Connections	**All bracing under the wharfhead**	**Corrosion**	**Poor to Fair**	**All bracing is U-bolted together. Hardware is corroded and several connections are loose**	**Replace all connections with typical marine thru-bolt connect**	**2023/2024**
Gangway						
Chain Guarding	Shoreward End	Mechanical	Poor	Connection to timber posts has failed at both locations	Re-instate chain guarding	2023/2024
Serrated Aluminum Grating	Two sections	Mechanical	Poor	Damage to the grating	Replace two sections of grating	2023/2024
Float						
Float	General	-	Very Poor	The float has reached the end of its service life. The float is listing considerably, with significant damage to the major structural elements.	Float is at the end of its service life. Replacement of the float is recommended.	2023/2024
Mooring System	Southwest Anchor Chain	Corrosion	Poor to Very Poor	Significant corrosion to chain links	Replace chain section	2023/2024
Floatation	East end of float	-	-	Exposed polystyrene floatation with significant damage and displacement	Float is at the end of its service life. Replacement of the float is recommended.	2023/2024

Appendix C
Reference Drawings

ARCHITECTURAL D 24" x 36"

GENERAL:

1. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS. REPORT ANY CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. NOTIFY THE ENGINEER 48 HOURS IN ADVANCE FOR INSPECTION OF STRUCTURAL CONNECTIONS BEFORE COVERING UP.
4. CONTRACTOR'S RESPONSIBILITY: THESE DRAWINGS SHOW COMPLETED STRUCTURAL COMPONENTS OF THE DOCKS. THE REQUIRED TEMPORARY BRACING AND SHORING TO PERFORM THE WORK SAFELY IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ENVIRONMENTAL WORK PROCEDURES, TIMING AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND LIMITATIONS OF THE FEDERAL DEPARTMENT OF FISHERIES AND OCEANS, AND THE PROVINCIAL MINISTRY OF WATER, LAND AND AIR PROTECTION.
6. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS OTHERWISE NOTED.
7. HORIZONTAL DATUM U.T.M NAD 83.
8. VERTICAL DATUM (ELEVATIONS AND CONTOURS) TO CHART DATUM (C.D.).
9. TIDE ELEVATIONS AT THE SITE ARE BASED ON VALUES PUBLISHED BY THE CANADIAN HYDROGRAPHIC SERVICE (CHS) FOR THE SITE AS FOLLOWS:

HIGHER HIGH WATER, LARGE TIDE (H.H.W.L.T.)	5.1 METRES
HIGHER HIGH WATER, MEAN TIDE (H.H.W.M.T.)	4.6 METRES
MEAN WATER LEVEL (M.W.L.)	3.2 METRES
LOWER LOW WATER, MEAN TIDE (L.L.W.M.T.)	1.3 METRES
LOWER LOW WATER, LARGE TIDE (L.L.W.L.T.)	0.1 METRES

10. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR FABRICATION.

ABBREVIATIONS:

CL.	–	CLEAR
C	–	CENTRELINE
CP.	–	COMPLETE PENETRATION
C/W	–	COMPLETE WITH
DWG.	–	DRAWING
EL.	–	ELEVATION
I.D.	–	INSIDE DIAMETER
LLH	–	LONG LEG HORIZONTAL
LLV	–	LONG LEG VERTICAL
MAX.	–	MAXIMUM
MIN.	–	MINIMUM
N.T.S.	–	NOT TO SCALE
OPP.	–	OPPOSITE
PL	–	PLATE
R	–	RADIUS
SIM.	–	SIMILAR
S.S.	–	STAINLESS STEEL
T.O.	–	TOP OF
TYP.	–	TYPICAL
U/S	–	UNDERSIDE
U.N.O.	–	UNLESS NOTED OTHERWISE
WP	–	WORK POINT

KEY PLAN
1:1000

DRAFT FOR CLIENT REVIEW
2023.03.03

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

ISSUES								
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2023.02.08	CLIENT REVIEW						

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED SPS
DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

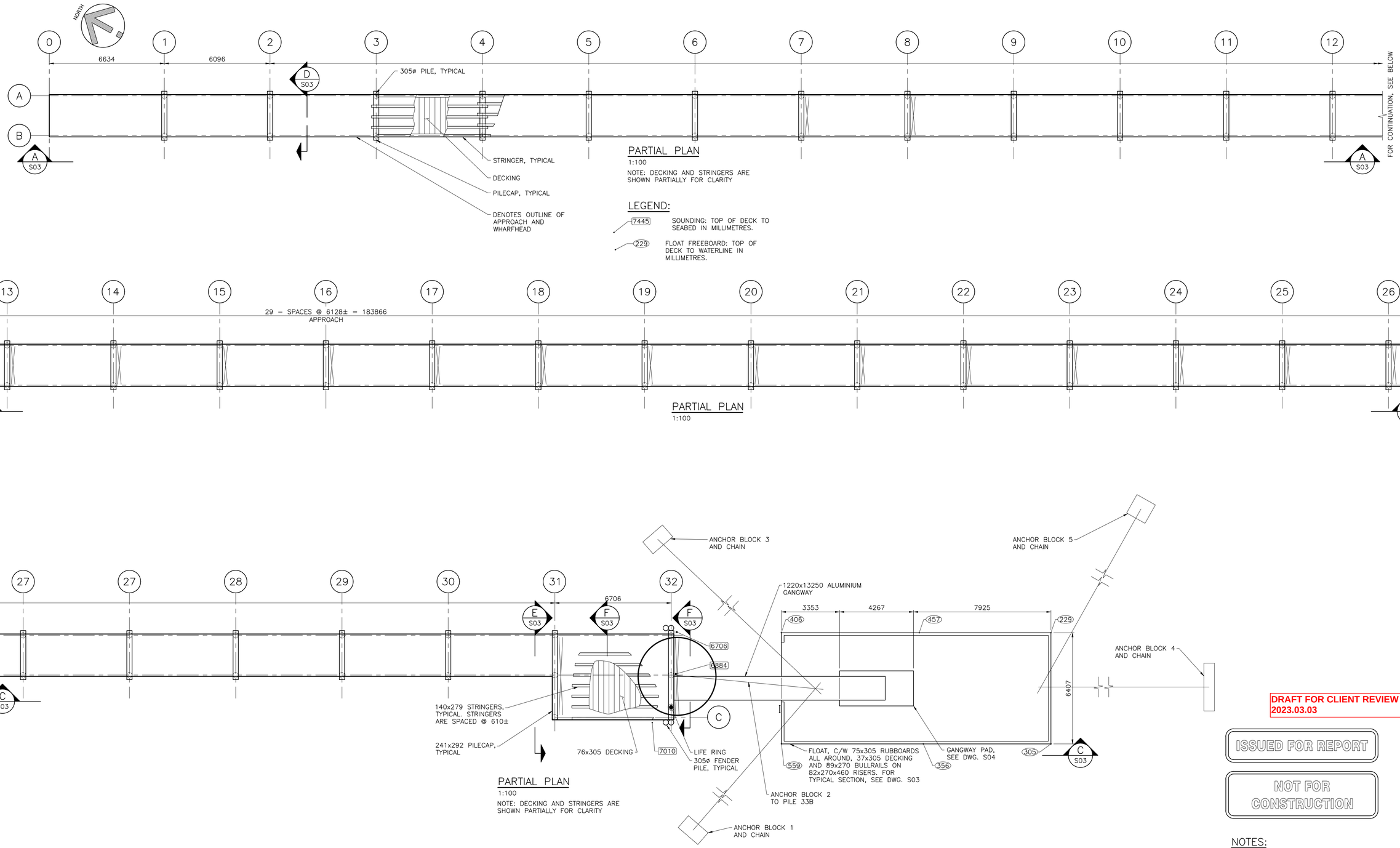
ENGINEERS SEAL

WEST BAY:
GENERAL NOTES
AND KEY PLAN

PORTS CONDITION ASSESSMENT
WEST BAY, GAMBIER ISLAND
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No. 4551-012	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S01	REVISION A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



PARTIAL PLAN
1:100

NOTE: DECKING AND STRINGERS ARE SHOWN PARTIALLY FOR CLARITY

LEGEND:

7445 — SOUNDING: TOP OF DECK TO SEABED IN MILLIMETRES.

229 — FLOAT FREEBOARD: TOP OF DECK TO WATERLINE IN MILLIMETRES.

PARTIAL PLAN
1:100

PARTIAL PLAN
1:100

NOTE: DECKING AND STRINGERS ARE SHOWN PARTIALLY FOR CLARITY

DRAFT FOR CLIENT REVIEW 2023.03.03

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES

ISSUES								
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2023.02.08	CLIENT REVIEW						

SUB CONSULTANT

DRAFTED JJMC

DRAFTING REVIEW

DESIGNED SPS

DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

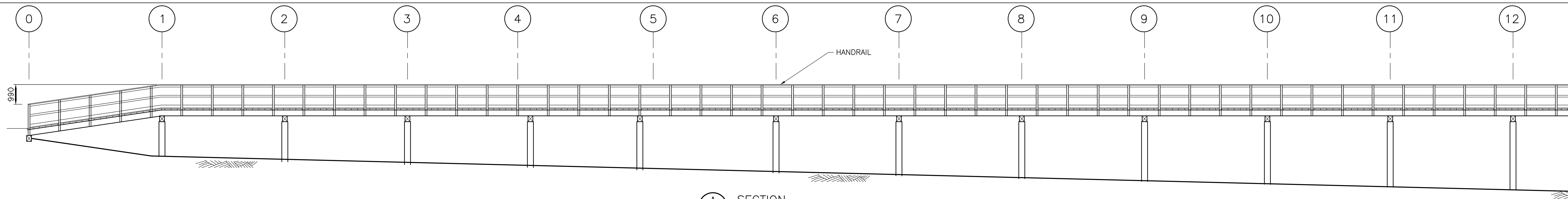
ENGINEERS SEAL

WEST BAY: GENERAL ARRANGEMENT - SHEET 1

PORTS CONDITION ASSESSMENT
WEST BAY, GAMBIER ISLAND
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

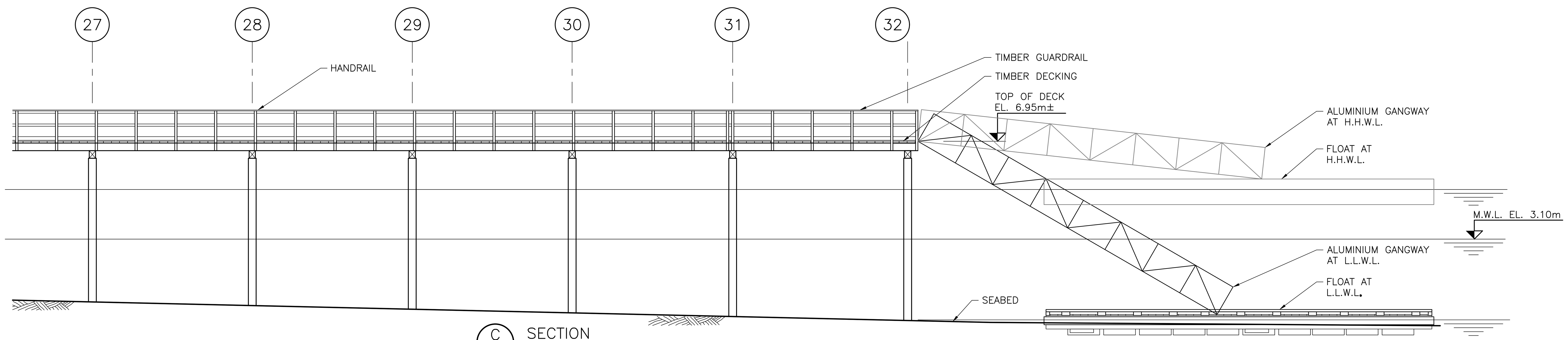
HEL PROJECT No. 4551-012	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S02	REVISION A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

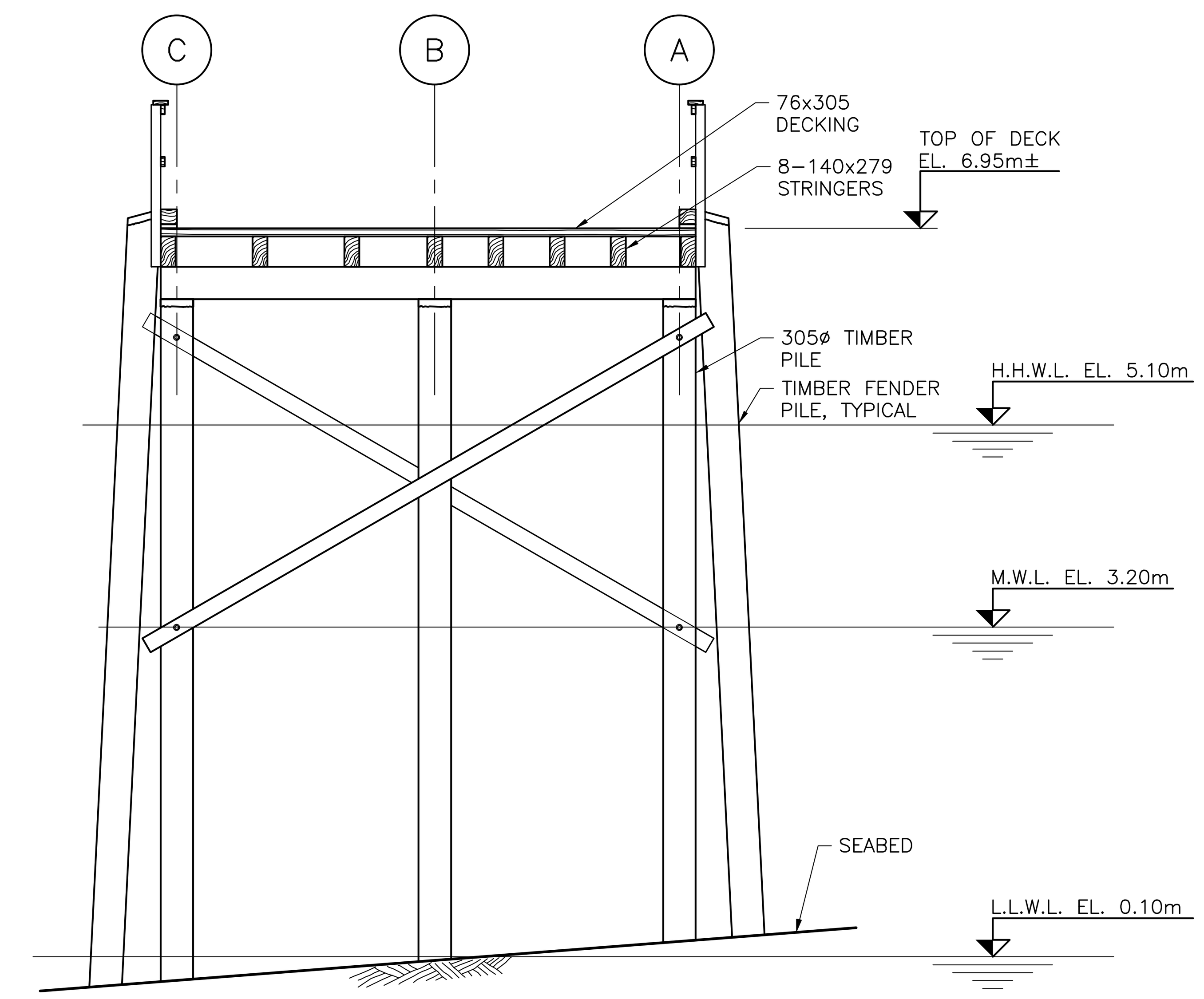


SECTION A / S02
1:100

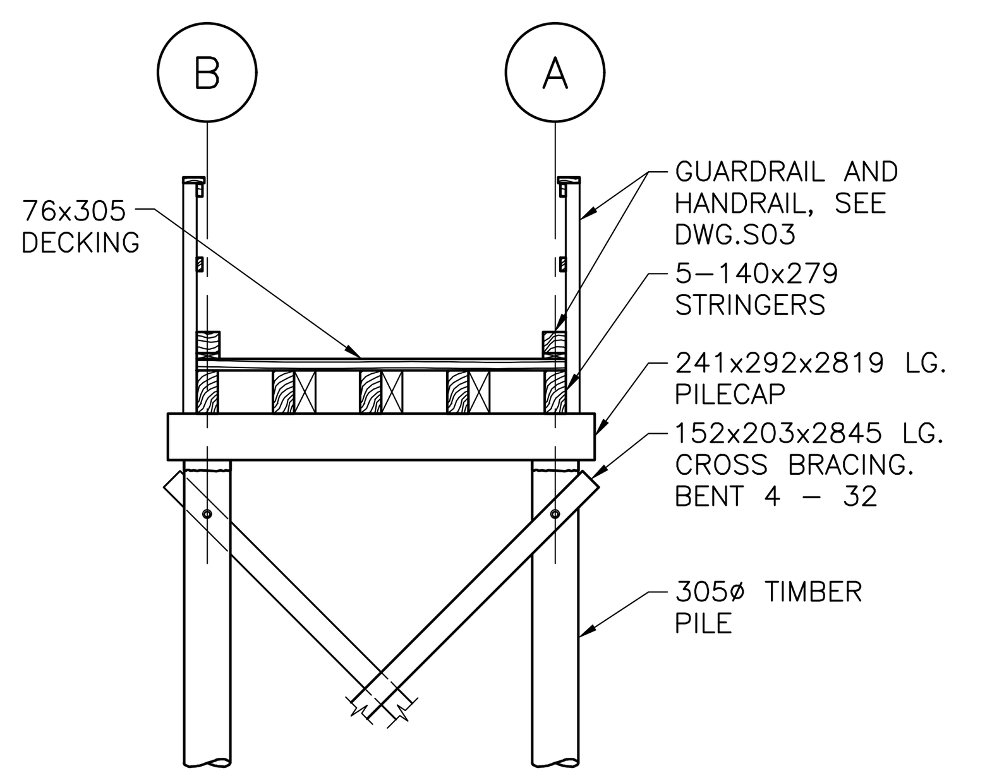
SECTION B / S02
1:100



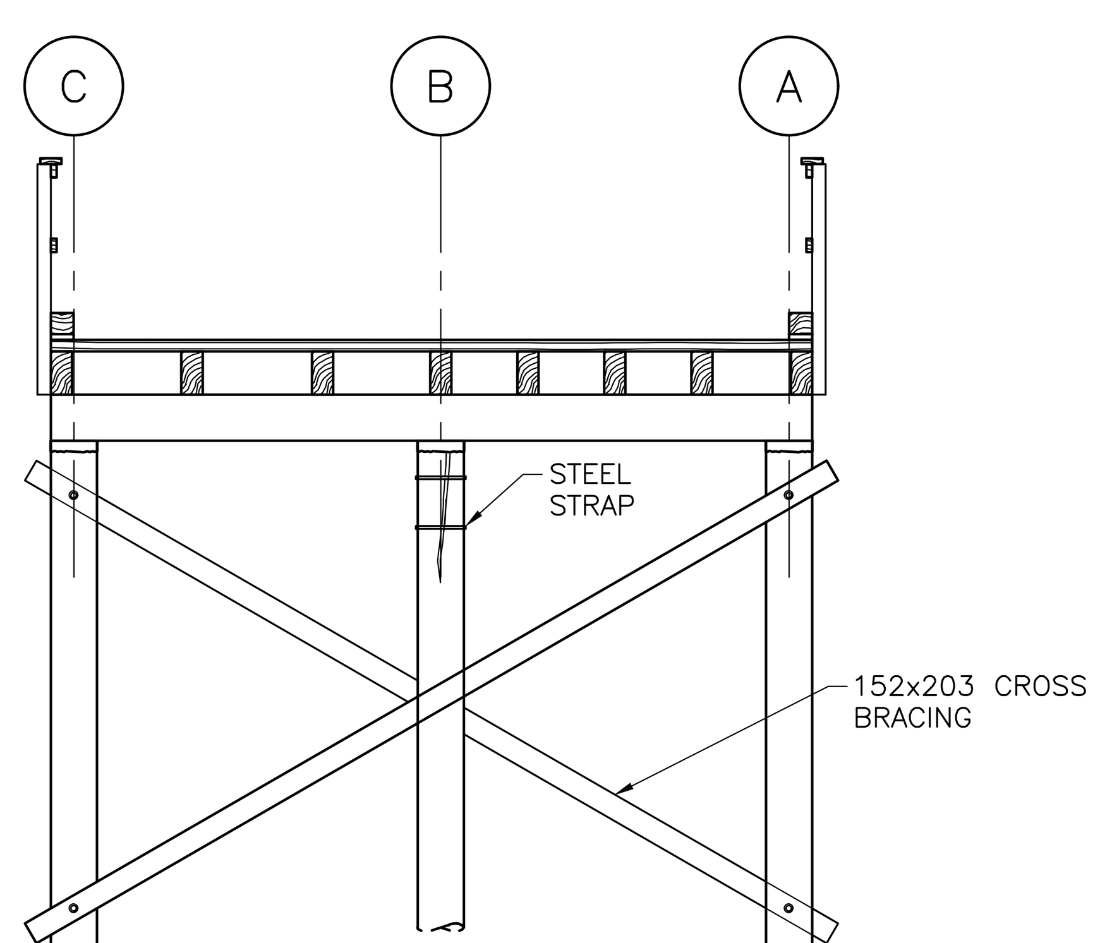
SECTION C / S02
1:100



SECTION F / S02
1:50



SECTION D / S02
1:50



SECTION E / S02
1:50

DRAFT FOR CLIENT REVIEW
2023.03.03

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2023.02.08	CLIENT REVIEW						

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED SPS
DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250–751–8558 Fax: 250–751–8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

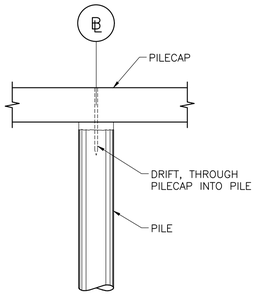
WEST BAY: GENERAL ARRANGEMENT - SHEET 2

PORTS CONDITION ASSESSMENT WEST BAY, GAMBIER ISLAND

1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

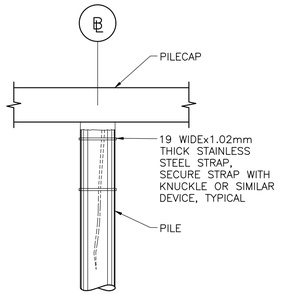
HEL PROJECT No. 4551–012
CLIENT DWG. No. N/A
SCALE AS SHOWN
PERMIT No. N/A
HEL DRAWING No. S03
REVISION A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



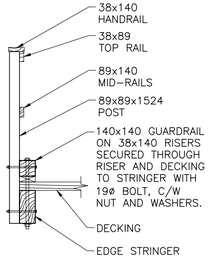
PILE TO PILECAP CONNECTION
1:25

NOTE: STRINGERS, DECKING, AND BRACING NOT SHOWN

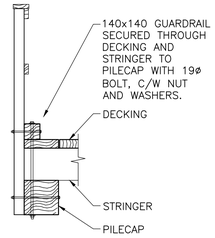


PILE STRAPPING DETAIL
1:25

NOTE: STRINGERS, DECKING, AND BRACING NOT SHOWN



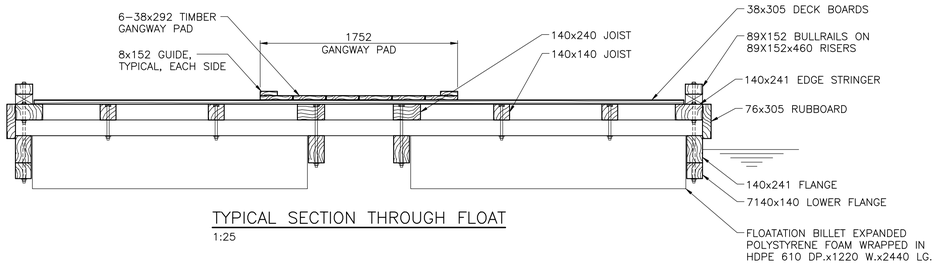
SECTION – HANDRAIL PARALLEL TO STRINGER



SECTION – HANDRAIL PARALLEL TO PILE CAP

NOTE: SIMILAR TO SECTION – HANDRAIL PARALLEL TO STRINGER, UNLESS NOTED OTHERWISE.

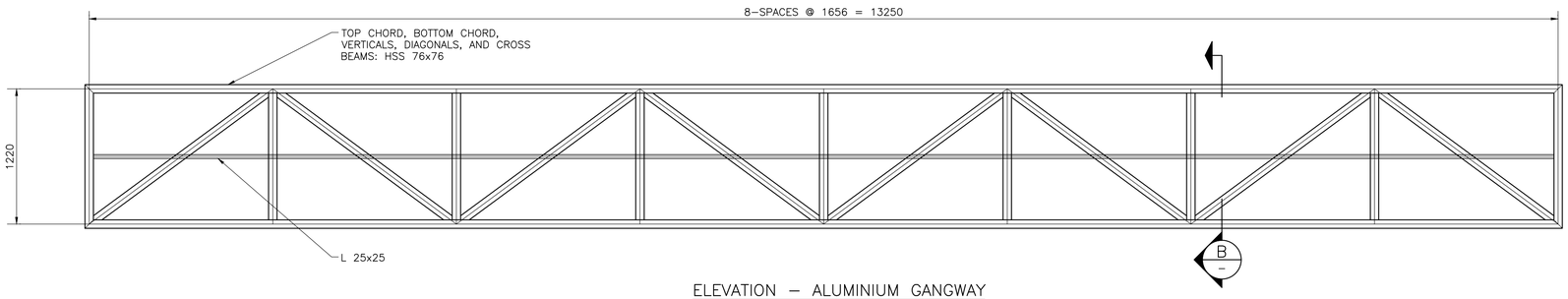
HANDRAIL AND GUARDRAIL DETAILS
1:25



TYPICAL SECTION THROUGH FLOAT
1:25

PLAN – ALUMINIUM GANGWAY
1:25

B – SECTION
1:25



ELEVATION – ALUMINIUM GANGWAY
1:25

DRAFT FOR CLIENT REVIEW
2023.03.03

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES

ISSUES								
No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR
A	2023.02.08	CLIENT REVIEW						

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED SPS
DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250–751–8558 Fax: 250–751–8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

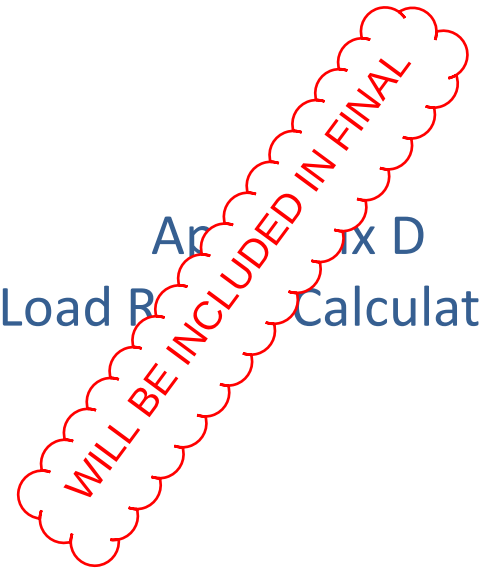
WEST BAY: DETAILS

PORTS CONDITION ASSESSMENT
WEST BAY, GAMBIER ISLAND
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551–012	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S04	REVISION: A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

Appendix D
Load Rating Calculations



Routine Thrice-yearly Inspection Report #8

West Bay
Gambier Island, BC

Date on Site: June 7th, 2022
Report Submitted: July 18, 2022

SUBMITTED TO:

Sunshine Coast Regional District
1975 Field Road
Sechelt, BC, V0N 3A1
Attention: Sam Adams
sam.adams@scrd.ca

SUBMITTED BY:

Summerhill Fine Homes Inc.
#102 – 675 Industrial Way
Gibsons, BC, V0N 1V7

Kyle Paisley – Project Manager
kyle@summerhillfinehomes.com
778-288-1696

1. INTRODUCTION

On June 7th, 2022 Summerhill Fine Homes (SFH) attended the West Bay Marine Facility located on Gambier Island, B.C. to complete a thrice-yearly inspection and maintenance visit under General Service Contract #18 354 with the Sunshine Coast Regional District (SCRD). The inspectors were Jake Stanley and Charlie Durrant. The site was visually inspected for any signs of deficiency or apparent public safety risk. The observations, actions and recommendations documented in this report are intended for the use of SCRD staff to prioritize and plan future maintenance activities and capital upgrades.

1.1. Description of Structure

The West Bay Marine Facility is located on Gambier Island, in Howe Sound, B.C.

The facility consists of a long timber approach and small wharfhead with timber decking extending in a southern direction from shore. From the southwest end of the wharfhead there is a gangway accessing a float that is retrained by anchor chains, presumably connected to concrete anchors.

1.2. Scope of Work

The scope of the inspection included conducting a visual assessment of all the structural and non-structural components of the port above the waterline at the time of inspection.

1.3. Limitations

Summerhill strives to ensure the completeness and accuracy of this report within the limitations of a visual inspection. This report is not however intended to provide assessment of the structural integrity or assurance of the public safety of the port location. Refer to engineering reports for further information regarding structural condition assessment.

2. REPORT

2.1. Approach & Wharf Head

2.1.1. Railings

The railings are comprised of dimensional un-painted treated wood railings and mid-level guards supported by painted 89x89 wood posts which are bolted through the outside stringers and curb rails.

Observations: Generally in good condition

2.1.2. Deck

The decking on the approach is comprised of 75x305 treated wood decking and large 140x279 stringers supported by 241x292 pile caps, and timber bearing piles.

Observations:

- Deck is new and with the exception of bird excrement and algae, is in good condition.

2.1.3. Curb Rails

The curb rails on the approach and wharfhead are treated 140x140 timber bolted through the timber decking installed on riser blocks. The curbrails on the wharfhead are larger 241x241

Observations: Generally in good condition.

2.1.4. Bents (Piles, Pile Caps, Cross Braces, Stringers)

Timber bearing piles and several concrete piles installed during previous repairs.
Timber piles caps 241x292 bearing above timber piles.
Timber cross braces generally bolted through the top and bottom of the timber piles in Row A & B. 2 braces per Bent in opposing directions.

Observations: Deficiencies noted below:

- **Bent 1** (From Previous Inspection, January 2021) 1B has slight damage. (Monitor)
- **Bent 3** (From Previous Inspection, January 2021) 3A has tilt to the south. (Monitor at future inspections)
- **Bent 4** (From Previous Inspection, January 2021) 4A Showing damage and wear. (Monitor at future inspections)
- **Bent 5** (From Previous Inspection, January 2021) Bent 5 has excessively long bolts, potential hazard to children playing.
    - Recommend cutting off extra bolt length
- **Bent 7** Cross brace bolt on 7A needs replacing
- **Bent 9** Pile 9A is slanted approx. 15 deg. (Monitor)
    - 9A Upper cross brace bolt is too short and rusted. Requires replacement.
- **Bent 12** Pile 12B has 2 rusty bolts, requires replacement.
- **Bent 15** (From previous inspection April 2019) Cross brace split and worn at bottom connection to pile 15A, recommend monitoring during future inspections
    - No action, continue to monitor

- **Bent 16** Pile 16A slanted 10 deg
    - (From previous inspection April 2019) Bent 20 has a noticeable lean, 10* South, 10* West. Recommend monitoring during future inspections. Continue to monitor.

- **Bent 22** Pile 22A has no washer on cross brace bolt. (Replace bolt, washer nut)
- **Bent 29** 29B cross brace not tight to pile. Recommend tightening (deferred)
- **Other Notes:** Pile Caps becoming Covered in Algae, encouraging rot. Pressure washing recommended in Calm weather, mid tide.

2.1.5. Lighting

No lighting installed at this port location

2.1.6. Life Ring

Observations: Generally in excellent condition, no deficiencies noted

2.1.7. Ladder

No ladder installed on the wharfhead at this port location, presumably because there is a continuous railing around the entire wharfhead. (very dangerous considering distance form land at high tide)

2.1.8. Derrick

No derrick crane located at this port location

2.1.9. Signage

Observations: Deficiencies noted below:

- Signage is due for replacement, SCRD to provide
- "West Bay" Sign to be made and installed.

2.2. Gangways

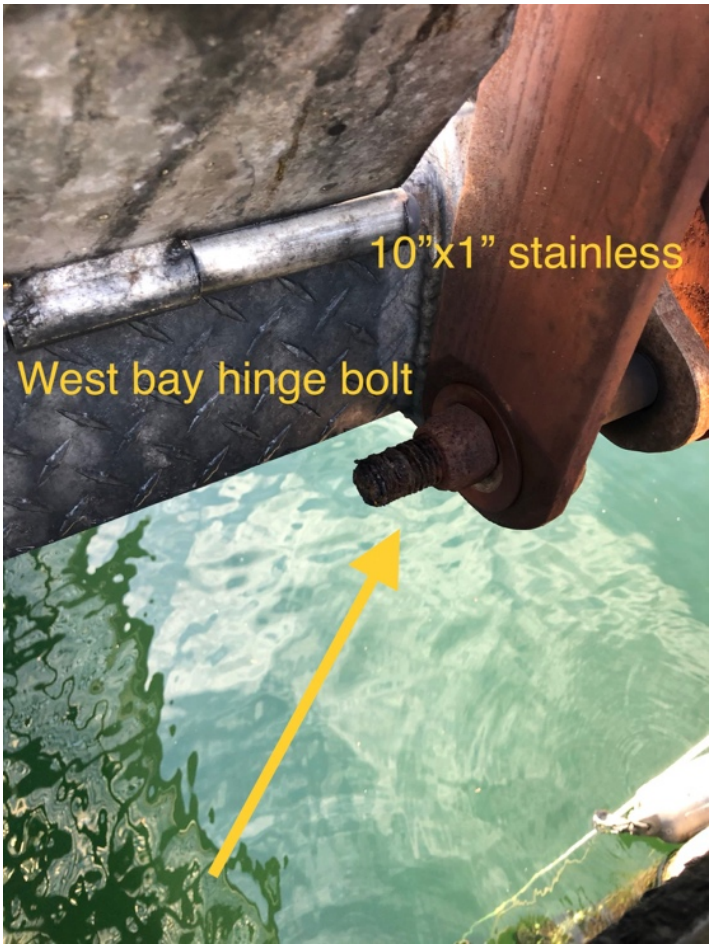
The gangway accessing the timber float is located at the southwest corner of the wharfhead and is aligned parallel to the approach.

2.2.1. Railings & Frame

The aluminum gangway railings are trusses comprised of HSS sections

Observations: Deficiencies noted below:

- From Previous Inspection, January 2021) Bolts at hinge rusting. Replacement recommended. Until replacement can be coordinated grease should be added, so slow rusting/wear. (No grease nipple)



- (From Previous Inspection May 2021) Having observed the gangways at Plumper Cove and at The BC Ferries dock, all of the SCRD gangways could be improved by having more horizontal guards

- Engineer to inspect hinge.

2.2.2. Deck

The decking is comprised of aluminum grating bolted to the aluminum frame using custom setting bolts and washers. Checkered steel plate transition installed at the top where gangway connects to the wharfhead.

Deficiencies noted below:

- (From previous inspection April 2019) Checkered steel transition plate wearing on corners due to side to side movement causing contact against the hinge flange. Not currently a safety concern, however it should be monitored at future inspections for sharp edges.

- Damage to gangway deck, tripping hazard stitches required if someone falls. 4'x12' section could be replaced

2.2.3. Hinge and Wheels

Steel hinge connection top, plastic wheels on bottom on timber float deck and retained by a 38x89 wood guide

Observations:

- (From Previous Inspection May 2021) 2x12's under gangway damaged, continue to monitor at future inspections

- Wheels appear to be warn and should be monitored for replacement.

- Gangway guides were loosening and had new fasteners installed during round 8

2.3. Floats

Float is located off the south end of the wharfhead with a timber deck, presumably retained by anchor chains fastened to concrete anchors.

- This float is in very poor condition, it was scheduled for replacement. Significant work required to keep it functional.

- Deck sinking in SE corner. Divers to inspect billets

2.3.1. Deck Condition

Deck boards are 38x305 installed on float timber framing members. Overall the deck appears to be nearing the end of its serviceable life.

Observations: Deficiencies noted below:

- Several Deck boards were replaced during Round 8

- More deck boards showing signs of rot, expect to replace more within a year

2.3.2. Bullrail and Cleats

Bullrails are 89x152 timber on risers bolted through to stringers

Observations: Deficiencies noted below.

- (From Previous Inspection January 2021) 12' 4x6 bull rail worn, will need replacing soon.
  - Deferred, still strong.

- Several lag bolts were added to bullrails during round 8.

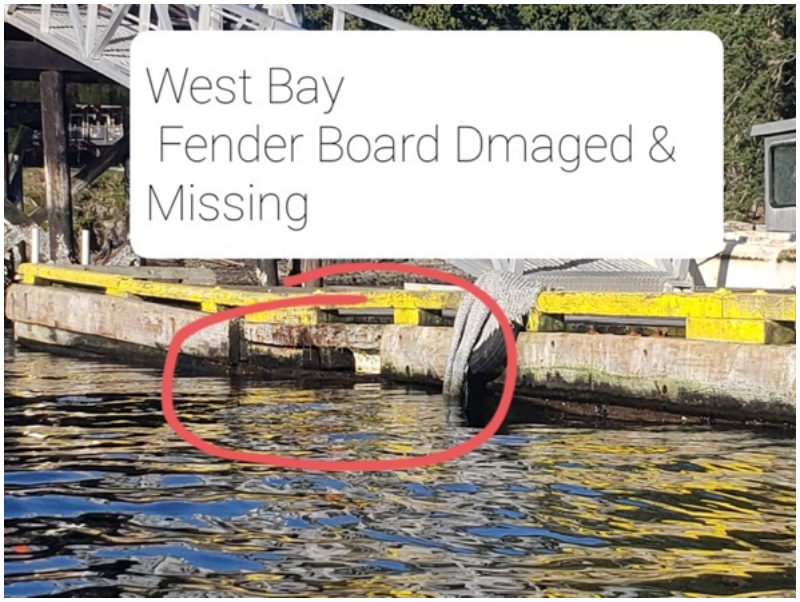
- Bullrails painted during this inspection round per contract

2.3.3. Fender/Rub Boards

Installed around perimeter of timber float, 75x305 nailed into float framing

Observations: Deficiencies noted below:

- (From previous inspection April 2019) Fender/Rub boards loose or missing around most of the float
    - (From previous inspection September 2019) Recommend float repairs including flange repairs and fender board replacement as noted by Pelagic Technologies on their dive inspection report (Report dated August 14, 2019)
    - (From Previous Inspections) 40' of fender/rub board missing, monitor at future inspections



2.3.4. Flotation

Observations: Deficiencies noted below:

- (From previous inspection April 2019) Float structure appears to be compromised. Noticeable movement in the splice location of the outside flange on west side of float. There is also a "sag" in this location, and a hinge point located where the flange splices. Fender boards are also missing in this location. Herald Engineering should review and advise.
    - (From previous inspection September 2019) Dive inspection completed August 14, 2019. SCRD/Herald Engineering to confirm if repairs to be undertaken during 2020.

2.3.5. Anti-skid

Stainless steel Get-a-grip strips installed as anti-slip

Observations: Generally in good condition.

2.3.6. Signage

Observations: Very few signs, SCRD to make a sign checklist

2.3.7. Ladder

Observations: Deficiencies noted below:

3. CONCLUSION

Based on our visual inspection, the approach and wharfhead are generally in good condition except for algae and an abundance of bird excrement. Some bolts in bents will require replacing during upcoming visits. The gangway frame and railing are in acceptable condition; There is a trip hazard on the deck and due to the design, there are gaps large enough for a small child to fall through, (See Halkett bay report 7 for suggested upgrades). The Hinge at the top should also be inspected by engineer.

Based on observations on site and Pelagic dive inspection report, the serviceable life of the float could be extended with bolt replacement and flange repairs. SCRD/Herold Engineering to confirm if float repairs to be undertaken. From the perspective of inspectors witnessing float in storm, this float needs a lot of work if it isn't going to be replaced.

3.1 Work Update per Approved Change Orders:

Work Item	*Description*	*SCRD Contract Category*	*Status*
Change Directive 01			
WB7	Bull rails refastened with extra 14" lag bolts	Minor Repairs	Completed June 2022

3.2 Additional work completed on site to be billed T&M:

Work Item	*Description*	*SCRD Contract Category*	*Status*
	Replaced 4 broken deck boards, significant safety concerns	Safety/Emergency repairs	Completed June 2022

3.3 Recommended work for future visits:

Work Item	*Description*	*SCRD Contract Category*	*Status*
WB11	Replace bolts in cross braces at Piles 7,9,12 & 22. Tighten bolts at Bent 29	Maintenance	
WB12	40' of Fender Board to be installed (does not make sense to do until after flange blocks replaced)	Maintenance	
WB13	Inspect billets to determine what is causing sag/list in float.	Maintenance	

GENERAL:

1. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS. REPORT ANY CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. NOTIFY THE ENGINEER 48 HOURS IN ADVANCE FOR INSPECTION OF STRUCTURAL CONNECTIONS BEFORE COVERING UP.
4. CONTRACTOR'S RESPONSIBILITY: THESE DRAWINGS SHOW COMPLETED STRUCTURAL COMPONENTS OF THE DOCKS. THE REQUIRED TEMPORARY BRACING AND SHORING TO PERFORM THE WORK SAFELY IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ENVIRONMENTAL WORK PROCEDURES, TIMING AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND LIMITATIONS OF THE FEDERAL DEPARTMENT OF FISHERIES AND OCEANS, AND THE PROVINCIAL MINISTRY OF WATER, LAND AND AIR PROTECTION.
6. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS OTHERWISE NOTED.
7. HORIZONTAL DATUM U.T.M. NAD 83.
8. VERTICAL DATUM (ELEVATIONS AND CONTOURS) TO CHART DATUM (C.D.).
9. TIDE ELEVATIONS AT THE SITE ARE BASED ON VALUES PUBLISHED BY THE CANADIAN HYDROGRAPHIC SERVICE (CHS) FOR BEDWELL HARBOUR, PENDER ISLAND AND ARE AS FOLLOWS:

HIGHER HIGH WATER, LARGE TIDE (H.H.W.L.T.)	5.1 METRES
HIGHER HIGH WATER, MEAN TIDE (H.H.W.M.T.)	4.6 METRES
MEAN WATER LEVEL (M.W.L.)	3.2 METRES
LOWER LOW WATER, MEAN TIDE (L.L.W.M.T.)	1.3 METRES
LOWER LOW WATER, LARGE TIDE (L.L.W.L.T.)	0.1 METRES

10. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.

DEMOLITION:

1. ALL UNSALVAGEABLE MATERIAL FROM SITE TO BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, PROVINCIAL AND FEDERAL REGULATIONS AT THE CONTRACTOR'S EXPENSE.
2. USED TIMBER PILES REMOVED FROM SITE ARE TO BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, PROVINCIAL AND FEDERAL REGULATIONS AT THE CONTRACTOR'S EXPENSE.

TIMBER:

1. ALL TIMBER SHALL BE PRESSURE TREATED NLGA NO. 1 COAST DOUGLAS FIR OR BETTER. LUMBER TO BE GRADED TO NLGA STANDARD GRADING RULES FOR CANADIAN LUMBER, 2003.
2. TIMBER PILES TO BE SUPPLIED SIZE 36
3. ALL TIMBERS SHALL BE CUT TO THE REQUIRED LENGTH PRIOR TO TREATMENT. FIELD CUT TIMBERS WILL BE REJECTED AND REPLACED AT THE CONTRACTOR'S EXPENSE, EXCLUDING CROSS BRACE DRILLING AT THE TOP CONNECTIONS.
4. TREATMENT TO BE IN ACCORDANCE WITH CSA O80:

4.1. CATEGORY 3.2 EXPOSED TO WEATHER, NOT IN GROUND CONTACT. INCLUDING BULLRAILS AND RISERS.

4.1.1. ACZA, 4.0kg/m³
4.1.2. CCA, 4.0kg/m³

4.2. CATEGORY UC 4.1 CONTACT WITH SPLASH ZONE. INCLUDING WHARF JOISTS. STRINGERS, FISH PLATES, PLYWOOD NOT COVERED UNDER UC5A, PILECAPS & BLOCKING.

4.2.1. ACZA, 6.4kg/m³
4.2.2. CCA, 6.4kg/m³
4.2.3. CREOSOTE:
4.2.3.1. 160kg/m³ IF THICKNESS LESS THAN 115MM
4.2.3.2. 120kg/m³ IF THICKNESS GREATER THAN OR EQUAL TO 115MM

4.3. USE CATEGORY UC5A, MARINE. INCLUDING WOOD PILES, PLYWOOD, CROSS BRACES, WALES.
4.3.1. ACZA, 30kg/m³ OR
4.3.2. CCA, 24kg/m³ OR
4.3.3. CREOSOTE 290kg/m³
4.3.3.1. PENETRATION IN ACCORDANCE WITH O80

4.4. AFTER CUTOFF, TREAT PILE TOPS WITH TWO COATS OF HOT CREOSOTE OIL AND ONE COAT OF APPROVED MASTIC AT LEAST 6mm THICK.

4.5. ALL FENDER PILES TO BE COVERED A SHEET OF 24 GUAGE ANNEALED CORROSION RESISTANT ALUMINUM, CUT 300mm LARGER THAN THE PILE TOP.

4.6. ALL DRILLED BOLT HOLES COMPLETED AFTER TREATMENT MUST BE FIELD TREATED WITH TWO COATS OF HOT CREOSOTE AND BOLTS/PLUGS MUST BE DIPPED IN CREOSOTE PRIOR TO INSTALLATION.

4.7. PLUG ALL UNUSED BOLT HOLES WITH TIGHT FITTING CREOSOTE TREATED BOLTS, AND NEOPRENE GASKET AND WASHER EACH END.

4.8. TIMBER HANDLING
4.8.1. ALL TREATED TIMBER AS TO NOT PUNCTURE THE TREATED LAYER. ANY MEMBERS IDENTIFIED AS BEING DAMAGED THROUGH THE TREATED LAYER EITHER PRIOR TO OR DURING INSTALLATION WILL BE REJECTED AT THE EXPENSE OF THE CONTRACTOR.

4.9. ALL SHIMS MUST BE CREOSOTE TREATED PLYWOOD AND MUST BE SECURED IN PLACE BY AT LEAST TWO (2) NAILS AT OPPOSITE CORNERS OF THE SHIM OR APPROVED EQUIVALENT

5. PROPOSED ALTERNATIVES TO THE SUPPLIED DESIGN TO BE APPROVED BY ENGINEER.

6. PILE DRIVING
6.1. PILES ARE TO BE DRIVEN TIP DOWN UNTIL A DRIVING ENERGY OF 25–30 kJ IS ACHIEVED OR TO REFUSAL (5 BLOWS / 25mm).
6.2. DRIVE TO THE FOLLOWING TOLERANCES
6.2.1. LOCATION OF PILES: 25mm ±
6.2.2. VERTICAL TOLERANCE: 2% OR 1:50

7. PILE REPLACEMENT

7.1. EXISTING PILES TO BE REPLACED SHALL BE FULLY EXTRACTED
7.2. REPLACEMENT PILES TO ACHIEVE A MINIMUM PENETRATION EQUAL TO THAT OF THE REMOVED PILE AND TO SATISFY THE PILE DRIVING CRITERIA NOTED ABOVE.

METAL FABRICATIONS:

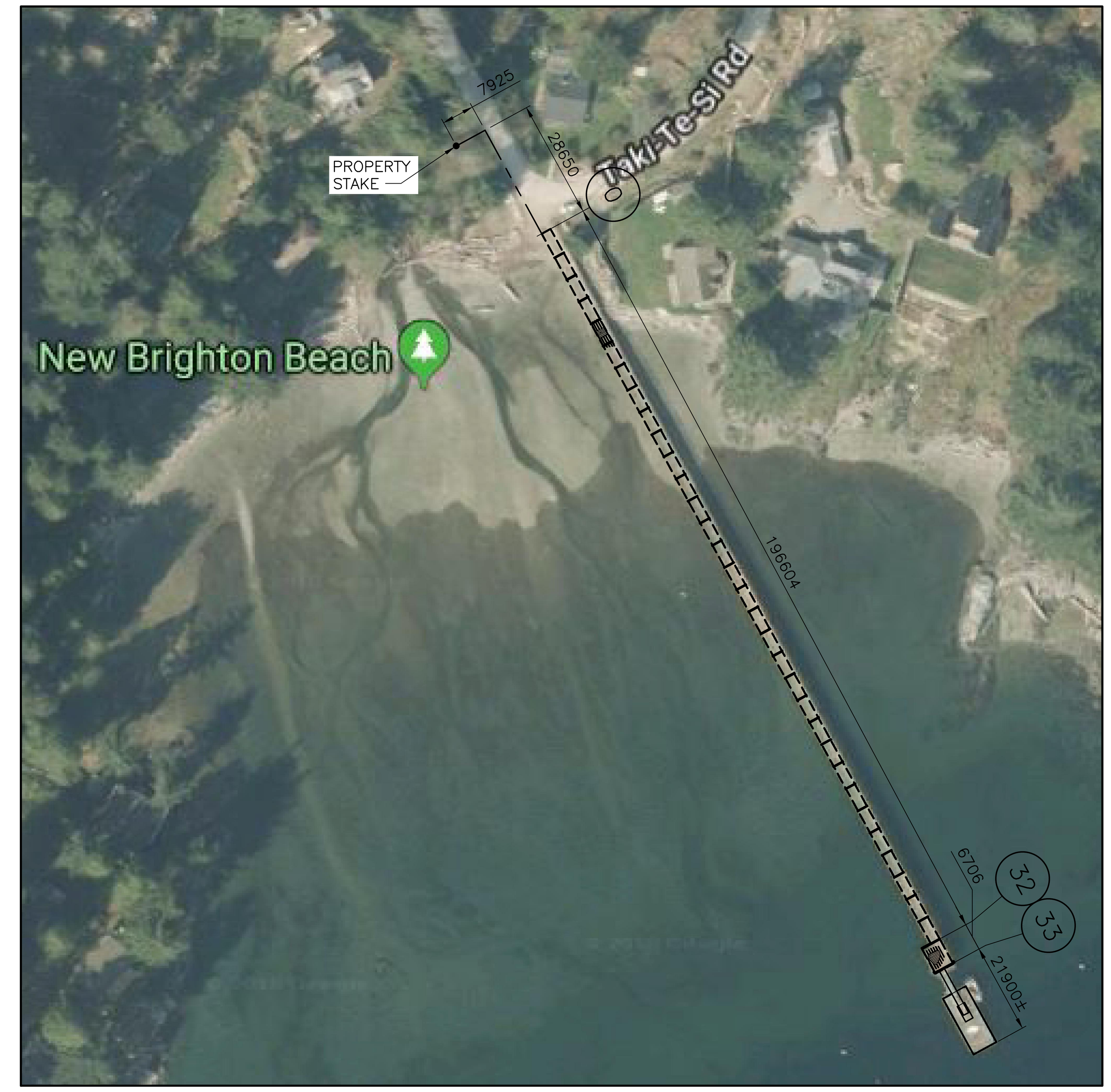
1. UNLESS NOTED OTHERWISE BY THE ENGINEER IN WRITING THE STEEL AND/OR ALUMINUM FABRICATOR SHALL SUPPLY THE ENGINEER WITH SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INDICATE ALL DETAILS, MATERIAL SPECIFICATIONS AND DESIGN LOADS.
2. A COPY OF THE FABRICATOR'S CANADIAN WELDING BUREAU CERTIFICATES SHALL BE INCLUDED WITH THE SHOP DRAWING SUBMISSION.
3. ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59-03 (R2008) AND SHALL BE PERFORMED BY FABRICATORS "FULLY APPROVED" BY THE CANADIAN WELDING BUREAU UNDER CSA W55.3-08. FABRICATING SHOP TO HAVE A MINIMUM DIVISION 2.1 CERTIFICATION BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1 (STEEL). THE FABRICATOR SHALL SUBMIT PROOF OF CERTIFICATION PRIOR TO START OF WORK.
4. DESIGN FABRICATIONS TO CSA-S16-09, LIMIT STATES DESIGN OF STEEL STRUCTURES.
5. EXCEPT PARTS OF MEMBERS TO BE EMBEDDED IN CONCRETE, GALVANIZED OR UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL STEEL WORK SHALL BE SHOP PRIMED. PRIMING SHALL BE IN ACCORDANCE WITH CISC/CPMA-1-73A "QUICK DRYING PRIMER" WHEN NO TOP COAT IS REQUIRED AND IN ACCORDANCE WITH CISC/CPMA-2-75 WHEN A TOP COAT IS SPECIFIED. IF A TOP COAT IS SPECIFIED THE PRIMER SHALL BE SELECTED ENSURING COMPATIBILITY WITH THE SPECIFIED SYSTEM. ITEMS SPECIFIED TO BE GALVANIZED SHALL BE HOT DIPPED GALVANIZED TO ASTM A-123-08, MINIMUM ZINC COATING OF 600G/SQ.M. FIELD TOUCH-UP ALL ABRASIONS, SCRATCHES, WELDS OR BOLTS
6. ISOLATE ALUMINUM FROM DISSIMILAR METALS EXCEPT STAINLESS STEEL, ZINC OR WHITE BRONZE WITH BITUMINOUS PAINT. ALL FASTENERS TO BE COMPATIBLE WITH THE MATERIALS THROUGH WHICH THEY PASS.
7. DELIVER, STORE, HANDLE AND PROTECT MATERIALS FROM DAMAGE. INSTALL PLUMB AND TRUE IN EXACT LOCATIONS, SECURELY FASTENED TO THE BUILDING STRUCTURE AS DETAILED.
8. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING DURING CONSTRUCTION. THE BRACING SHALL BE DESIGNED, INSTALLED AND MAINTAINED BY THE CONTRACTOR. THE BRACING SHALL BE REMOVED ONLY AFTER THE INSTALLATION IS COMPLETE.
9. ALL WELDS TO CONTINUOUS SEAL WELDS.
10. ALL STEELWORK SHALL BE COATED PRIOR TO DELIVERY TO THE SITE WHERE POSSIBLE. ONLY FIELD TOUCH-UP SHOULD BE REQUIRED. IF IT IS NECESSARY TO FIELD PAINT, CONTAINMENT MEASURES SATISFACTORY TO THE ENGINEER SHALL BE IN PLACE BEFORE PREPARATION AND PAINTING COMMENCE

ENVIRONMENTAL CONSTRUCTION REQUIREMENTS:

1. ENVIRONMENTAL WORK PROCEDURES, TIMING AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF FISHERIES AND OCEANS CANADA AND THE PROVINCIAL MINISTRY OF ENVIRONMENT.
2. CONTRACTOR TO FOLLOW THE REQUIREMENTS OF THE "BEST MANAGEMENT PRACTICES FOR CONSTRUCTING DOCKS AND FLOAT IN THE SOUTH COAST AREA (SUNSHINE COAST – VANCOUVER ISLAND), FISHERIES AND OCEANS CANADA", AND "BEST MANAGEMENT PRACTICES FOR PILE DRIVING AND RELATED OPERATIONS – BC MARINE PILE DRIVING CONTRACTOR'S ASSOCIATION, NOVEMBER 2003", FOR ALL WORK ON THIS PROJECT.
3. SECTION 9 NOTIFICATION AND DFO APPROVAL REQUIRED.
4. CONDITIONS OF MELP AND DFO APPROVALS TO BE FOLLOWED.
5. CONTRACTOR MUST EMPLOY METHODS TO MITIGATE HARM TO FISH AND USE DEBRIS CONTROL DEVICES WHEN DRILLING OR WORKING OVER WATER.
6. ALL DEBRIS, SAWDUST AND SHAVINGS FALLING INTO THE WATER CAUSED BY THE WORK SHALL BE CONTAINED AND PROMPTLY CLEANED UP AND PROPERLY DISPOSED OF.
7. CONTRACTOR MUST HAVE EMERGENCY SPILL EQUIPMENT AVAILABLE WHENEVER WORKING ON OR NEAR THE WATER.
8. WHEN GRINDING OR CORING CURED CONCRETE, THE DUST AND FINES ENTERING THE WATER MUST NOT EXCEED THE ALLOWABLE LIMIT FOR SUSPENDED SOLIDS. WHEN GRINDING GREEN OR INCOMPLETELY CURED CONCRETE AND THE DUST OR FINES ARE ENTERING THE WATER, pH MONITORING SHALL BE CONDUCTED TO ENSURE ALLOWABLE RANGES ARE MAINTAINED. IN THE EVENT THAT THE LEVELS ARE OUTSIDE THE ACCEPTABLE RANGES, PREVENTATIVE MEASURES SHALL BE INTRODUCED. THIS MAY INCLUDE INTRODUCING SILT CURTAINS TO CONTAIN THE SOLIDS AND PREVENT FISH FROM ENTERING A CONTAMINATED AREA OR CONSTRUCTING CATCH BASINS TO COVER THE RUN OFF AND NEUTRALIZING IT PRIOR TO DISPOSAL.
9. SPILLS: WHEN PATCHING CONCRETE, ALL SPILLS MUST BE CONTAINED AND PREVENTED FROM ENTERING THE WATER.
10. WHENEVER THERE IS THE POSSIBILITY OF CONTAMINANTS ENTERING THE WATER, THE CONTRACTOR WILL MONITOR pH LEVELS TO ENSURE ACCEPTABLE LEVELS.
11.

ABBREVIATIONS

CL.	–	CLEAR
C	–	CENTRELINE
CP.	–	COMPLETE PENETRATION
C/W	–	COMPLETE WITH
DWG.	–	DRAWING
EL.	–	ELEVATION
I.D.	–	INSIDE DIAMETER
LLH	–	LONG LEG HORIZONTAL
LLV	–	LONG LEG VERTICAL
MAX.	–	MAXIMUM
MIN.	–	MINIMUM
N.T.S.	–	NOT TO SCALE
OPP.	–	OPPOSITE
PL	–	PLATE
R	–	RADIUS
SIM.	–	SIMILAR
S.S.	–	STAINLESS STEEL
T.O.	–	TOP OF
TYP.	–	TYPICAL
U/S	–	UNDERSIDE
U.N.O.	–	UNLESS NOTED OTHERWISE
WP	–	WORK POINT



KEY PLAN
1:1000

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2018.12.17	CLIENT REVIEW						
B	2019.02.15	REPORT						

SUB CONSULTANT

DRAFTED: PHU
DRAFTING REVIEW
DESIGNED: SPS
DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

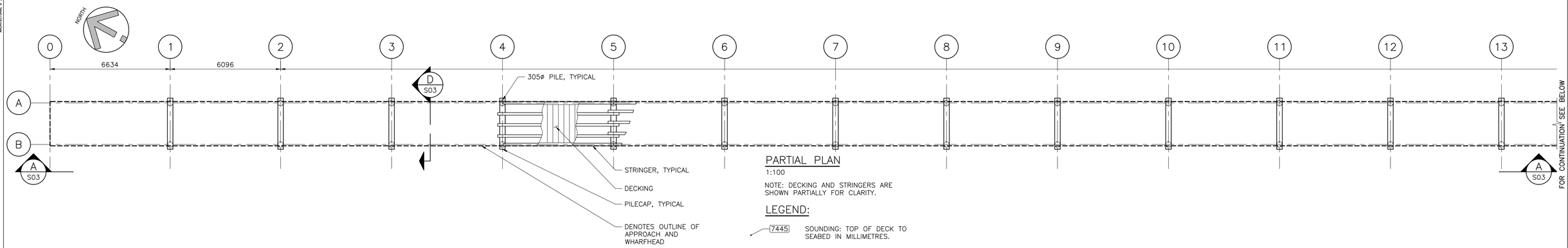
ENGINEERS SEAL

WEST BAY: GENERAL NOTES AND KEY PLAN

SCRD PORT FACILITIES - LOAD LIMIT SAFETY
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.: 4551-002
CLIENT DWG. No.: N/A
SCALE: AS SHOWN
PERMIT No.: N/A
HEL DRAWING No.: S01
REVISION: B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

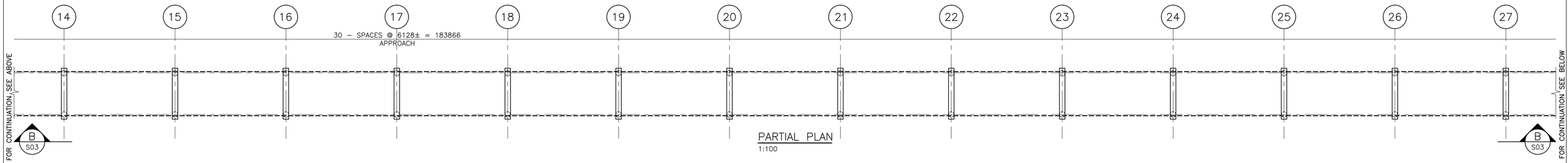


PARTIAL PLAN
1:100

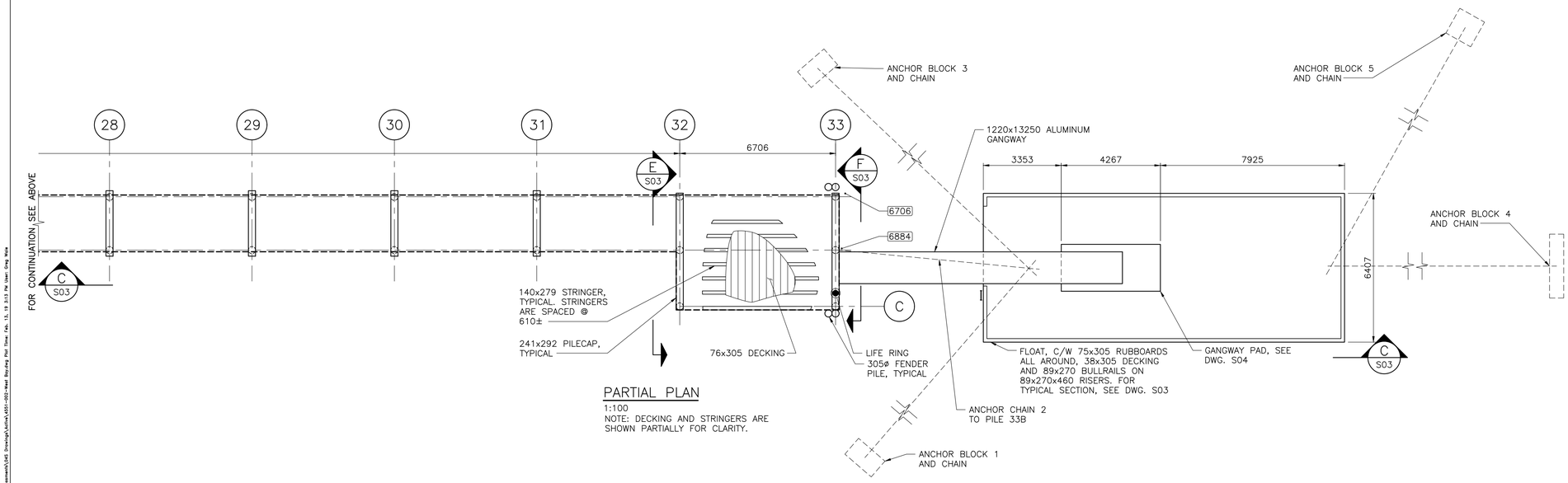
NOTE: DECKING AND STRINGERS ARE SHOWN PARTIALLY FOR CLARITY.

LEGEND:

7445 — SOUNDING: TOP OF DECK TO SEABED IN MILLIMETRES.



PARTIAL PLAN
1:100



PARTIAL PLAN
1:100

NOTE: DECKING AND STRINGERS ARE SHOWN PARTIALLY FOR CLARITY.

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES.

ISSUES								
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2018.12.17	CLIENT REVIEW						
B	2019.02.15	REPORT						

SUB CONSULTANT

DRAFTED PHU

DRAFTING REVIEW

DESIGNED SPS

DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

WEST BAY: GENERAL ARRANGEMENT - SHEET 1

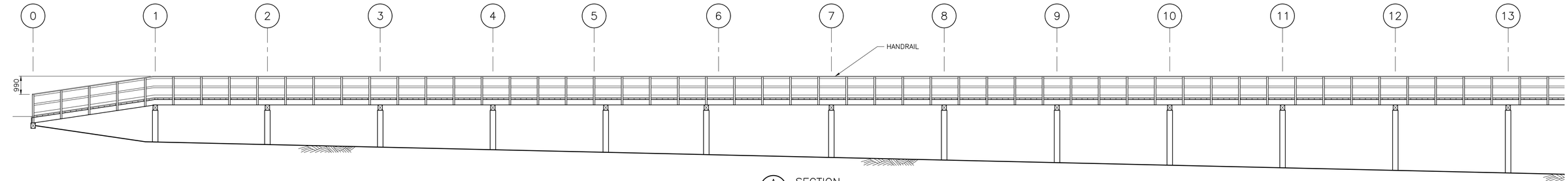
SCRD PORT FACILITIES - LOAD LIMIT SAFETY

1975 FIELD ROAD SECHELT BC V0N 3A1

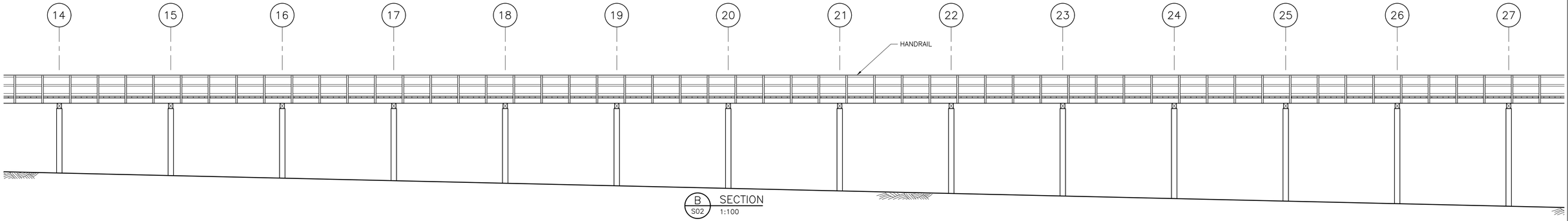
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No. 4551-002	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S02	REVISION B

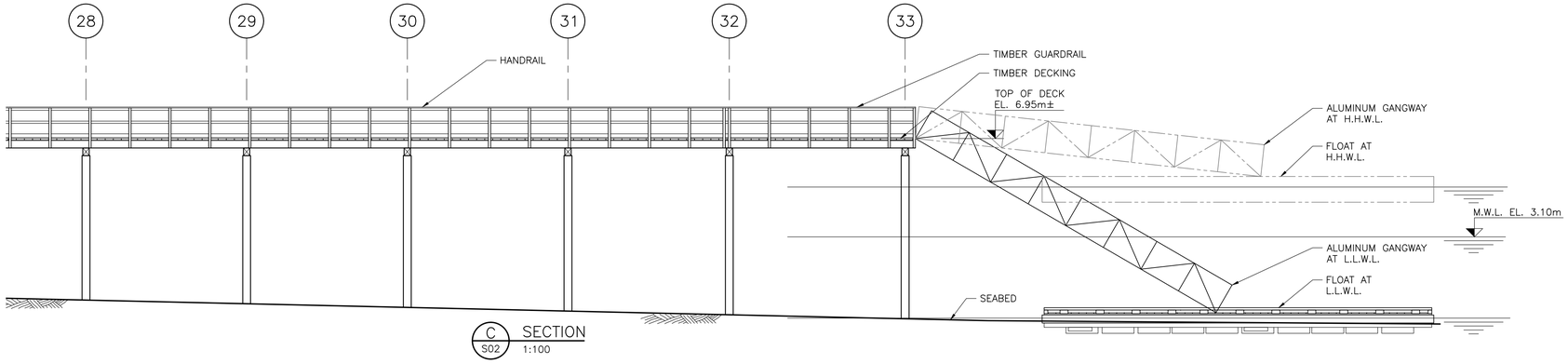
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



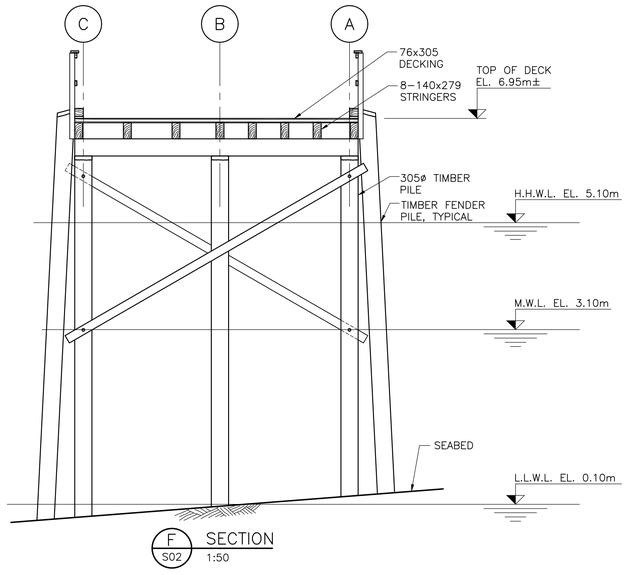
A S02 SECTION 1:100



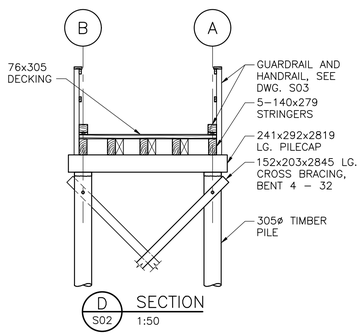
B S02 SECTION 1:100



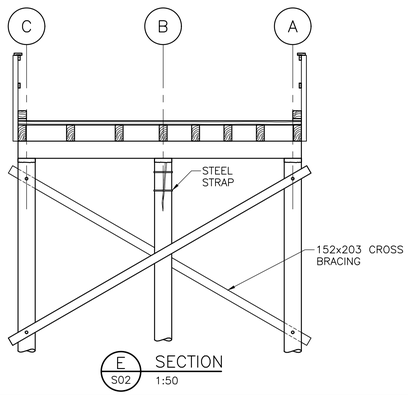
C S02 SECTION 1:100



F S02 SECTION 1:50



D S02 SECTION 1:50



E S02 SECTION 1:50

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES.

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR
A	2018.12.17	CLIENT REVIEW
B	2019.02.15	REPORT

SUB CONSULTANT

DRAFTED PHU

DRAFTING REVIEW

DESIGNED SPS

DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

WEST BAY: GENERAL ARRANGEMENT - SHEET 2

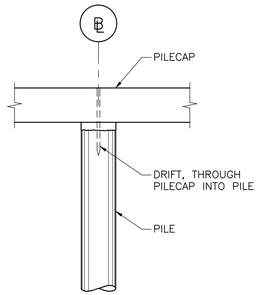
SCRD PORT FACILITIES - LOAD LIMIT SAFETY

1975 FIELD ROAD SECHELT BC V0N 3A1

SUNSHINE COAST REGIONAL DISTRICT

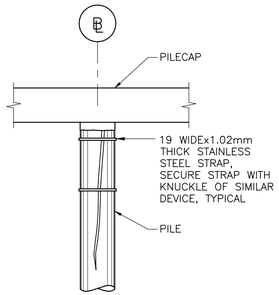
HEL PROJECT No.	CLIENT DWG. No.
4551-002	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S03	REVISION: B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



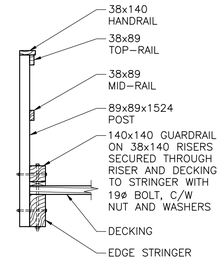
PILE TO PILECAP CONNECTION
1:25

NOTE: STRINGERS, DECKING AND BRACING NOT SHOWN.

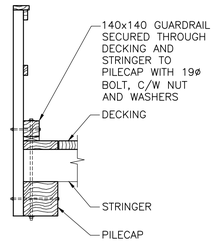


PILE STRAPPING DETAIL
1:25

NOTE: STRINGERS, DECKING AND BRACING NOT SHOWN.



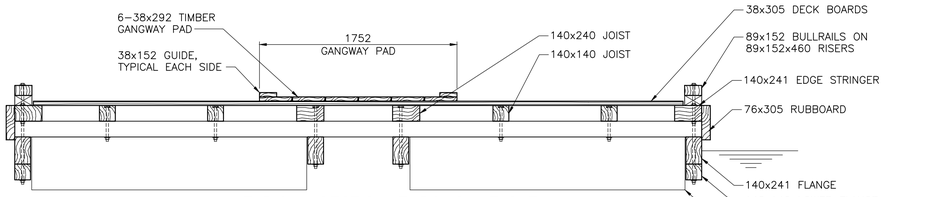
SECTION – HANDRAIL PARALLEL TO STRINGER



SECTION – HANDRAIL PARALLEL TO PILE CAP

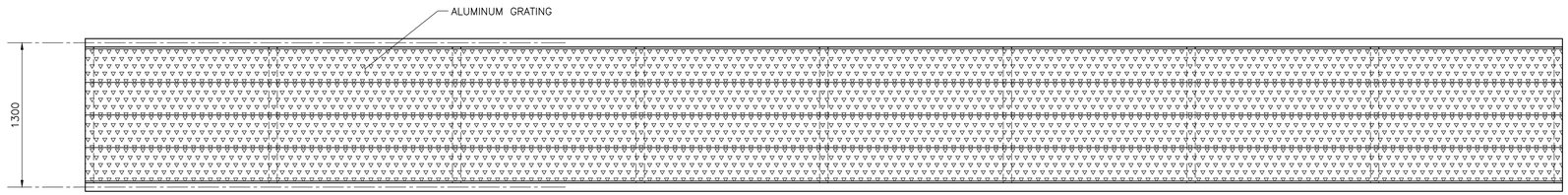
NOTE: SIMILAR TO SECTION – HANDRAIL PARALLEL TO STRINGER, UNLESS NOTED OTHERWISE.

HANDRAIL AND GUARDRAIL DETAILS
1:25

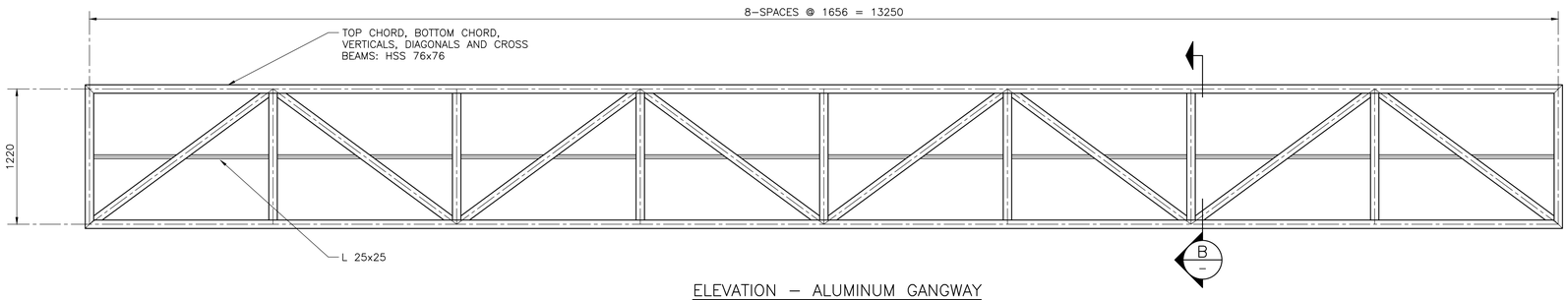


TYPICAL SECTION THROUGH FLOAT
1:25

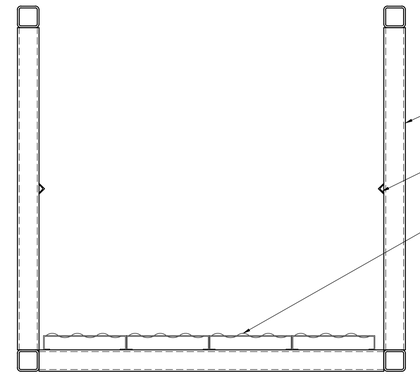
FLOAT DETAILS BELOW WATERLINE AND DECK NOT CONFIRMED AS THEY ARE OUTSIDE OF PROJECT SCOPE. ITEMS BELOW WATERLINE SUCH AS STRINGERS, FLANGES, ETC. ARE SHOWN MERELY FOR CONVENIENCE.



PLAN – ALUMINUM GANGWAY
1:25



ELEVATION – ALUMINUM GANGWAY
1:25



B – SECTION
1:10

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES.

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR
A	2018.12.17	CLIENT REVIEW
B	2019.02.15	REPORT

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED SPS
DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

WEST BAY: DETAILS

SCRD PORT FACILITIES
- LOAD LIMIT SAFETY
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No. 4551-002
CLIENT DWG. No. N/A
SCALE AS SHOWN
PERMIT No. N/A
HEL DRAWING No. S04
REVISION B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION