September 24, 2020 FOI No: 2020-39

VIA E-MAIL – Redacted

Redacted

Dear Redacted

Re: Request for Records
Freedom of Information and Protection of Privacy Act

The City of White Rock has reviewed your request for access to the following information pursuant to the Freedom of Information and Protection of Privacy Act (the "Act"):

- *the funding application(s) the City of White Rock submitted for the Pier upgrades and rebuild. Please include any other funding applications for any other aspect of the Pier or Boating Wharfs.*
- *any correspondence between the City and the applicable government departments as well between staff and council regarding the application.*

Access to most of these records is available. Please find copies attached.

Please contact our office if you have any questions or concerns.

Sincerely,

Ken Overton
Manager, Property, Risk Management, and FOI
604-541-2104

Att.

Corporate Administration
P: 604.541.2212 | F: 604.541.9348
City of White Rock
15322 Buena Vista Avenue, White Rock BC, Canada V4B 1Y6

If you believe that the City of White Rock has been unreasonable in its handling of your request, you may ask the Information and Privacy Commissioner to review our response. You have 30 days from receipt of this notice to request a review by writing to:

Office of the Information and Privacy Commissioner
3rd Floor, 756 Fort Street
Victoria BC V8W 1H2

Should you decide to request a review, please provide the Commissioner's office with:

1. your name, address and telephone number;
2. a copy of this letter;
3. a copy of your original request sent to the City of White Rock; and
4. the reasons or grounds upon which you are requesting the review.

From:	Jim Gordon
To:	Ken Overton
Cc:	Rosaline Choy; Marla Boos
Subject:	FW: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Date:	Tuesday, August 25, 2020 9:52:27 AM
Attachments:	image003.png image004.png image005.jpg image001.jpg image007.jpg image002.jpg

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Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From: Dan Bottrill <DBottrill@whiterockcity.ca>
Sent: August 27, 2019 2:44 PM
To: Jim Gordon <JGordon@whiterockcity.ca>; Sandra Kurylo <skurylo@whiterockcity.ca>; Tracey Arthur <TArthur@whiterockcity.ca>; Chris Magnus <CMagnus@whiterockcity.ca>
Subject: FW: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

For your information – email sent to Council.

DAN BOTTRILL
Chief Administrative Officer, City of White Rock
15322 Buena Vista Avenue, White Rock, BC V4B 1Y6
Tel: 604.541.2133 | www.whiterockcity.ca

From: Dan Bottrill
Sent: August 26, 2019 2:37 PM
To: Mayor and Council <MayorandCouncil@whiterockcity.ca>
Subject: FW: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Mayor and Council,

Further to the email sent to Council from Chris Magnus last Friday on behalf of Mayor Walker, we have received some feedback from Annie Geoffroy who is the Director, Disaster Mitigation and Adaptation Fund (see emails below).

The feedback indicates that our project for the grant program does not look promising.

Dan.

DAN BOTTRILL
Chief Administrative Officer, City of White Rock
15322 Buena Vista Avenue, White Rock, BC V4B 1Y6
Tel: 604.541.2133 | www.whiterockcity.ca

From: Jim Gordon
Sent: Monday, August 26, 2019 11:37 AM
To: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Cc: Cote2, Guillaume (INFC) <guillaume.cote2@canada.ca>; Paquet, Michael <Michael.Paquet@dfo-mpo.gc.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>
Subject: RE: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Hello Annie:

Thank you for your detailed response.

I will forward the information to my Chief Administrative Officer and our elected officials so we can discuss our next steps.

Best Regards

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Sent: Monday, August 26, 2019 10:48 AM
To: Jim Gordon <JGordon@whiterockcity.ca>
Cc: Cote2, Guillaume (INFC) <guillaume.cote2@canada.ca>; Paquet, Michael <Michael.Paquet@dfo-mpo.gc.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>
Subject: RE: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Jim,

We have done a quick review of both the Expression of Interest (EOI) and Full Application forms and we have the following comments:

Expression of Interest (EOI) – Project eligibility under the DMAF

The objective of the EOI is to determine project eligibility under the program. The EOI form that was submitted indicates that the project includes work to be performed on 2 assets: (1) repairs on the West Beach Shoreline, as well as (2) repairs to the pier structure and the replacement of the wharf.

It should be noted that Eligible investments under DMAF must be aimed at reducing the socio-economic, environmental and cultural impacts triggered by natural hazards and extreme weather events (ie. flooding, erosion, drought, earthquakes, etc..), as indicated in the DMAF Applicant's Guide, investments must be aimed at increasing communities' resilience. DMAF investments can be for the new construction of public infrastructure, or the modification or reinforcement including rehabilitation and expansion of existing public infrastructure. DMAF does not fund repairs and maintenance of public infrastructure.

Given this, the project as submitted is not eligible under the program, for the following reasons:

- Asset #1 – Repairs to the shoreline as a result of the December 2018 storm are not eligible. In order to be eligible, the project will have to demonstrate that it is either new or rehabilitation of a public infrastructure and how the new design for the shoreline will directly increase the community's resilience (supported by appropriate data sources in the full application, see below). The application as submitted does not demonstrate this.
- Asset #2 - Repairs and hardening of the pier and wharf structures are not eligible, as there is no rationale that this asset is reducing the impacts of a natural disaster on the community, thereby increasing the community's resilience across the 4 DMAF indicators (expected number of lives lost; expected percentage of people affected including displaced, ill and injured; expected percentage of local economic loss; and expected percentage of population without essential services).

I would also like to note that to be eligible under DMAF, the project must have a minimum of $20

million dollars in total eligible costs, by removing at minimum the pier from the project submission, there is a risk that the threshold may not be met.

Full Application – Merit assessment

The objective of the Full Application is to assess the merit of the project against the DMAF merit criteria. The following observations are noted:

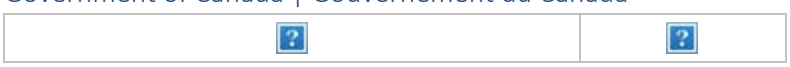
- Section D.2.c – Other Share: $8.8M from the *Investing in Canada Infrastructure Program* – note that the **cost-sharing and stacking limits** are for all sources of federal funding, including ICIP funding. Therefore the maximum federal share (including from ICIP) is 40% for municipal assets.
- Section D – Financials has been left blank. As indicated in the DMAF Applicant's Guide, one of the merit criteria is the **Return on Investment (ROI).** In order to be properly assessed, an ROI must be provided, and supported by a formulae including detailed calculation.
- Section H.1. – Data Type and Sources. As indicated in the DMAF Applicant's Guide, applicants are required to confirm the **data source** and type for hazard risk indicators as per section H.1. For the main hazard in an affected area, Applicants must provide two risk assessments (Current Risk Assessment, and Future Risk Assessment to demonstrate the improvement in resilience after project completion). Data sources must be included in the following format: Author-Creator/Title/Publication Date/Identifier or Web link – for each of the Hazard Risk Assessment indicators.

In addition, projects considered outside of DMAF's competitive intake process must address urgent/emergent situations related to the impacts of natural disasters on the community. If you decide to submit revised EOI and Full Application forms to address the above-mentioned comments, you will also need to provide a rationale to support the urgent nature of the project.

Do not hesitate to contact me if you have any questions.

Thank you,

Annie Geoffroy
Director, Disaster Mitigation and Adaptation Fund | Directrice, Fonds d'atténuation et d'adaptation en matière de catastrophes
Program Operations | Opérations des programmes
Infrastructure Canada | www.infrastructure.gc.ca
180 Kent St. Suite 1100, Ottawa, ON K1P 0B6 | 180 rue Kent, Suite 1100, Ottawa, ON K1P 0B6
annie.geoffroy@canada.ca
Telephone | Téléphone 613-948-9308
Cell 613-894-9564
Government of Canada | Gouvernement du Canada



From: Jim Gordon [mailto:JGordon@whiterockcity.ca]
Sent: August 23, 2019 2:25 PM
To: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Cc: Richardson, Galen (INFC) <galen.richardson@canada.ca>
Subject: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Importance: High

Hello Annie:

Further to our conversation earlier today, attached is the Expression of Interest (EOI) and Full Application for the **White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project.**

I did my best to fully address the requirements in the forms; however, more detail will require further technical work by our Engineering Consultants. Please let me know of any further information you require and I will get it for you.

Thanks again for being receptive to our application.

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From:	Jim Gordon
To:	Ken Overton
Cc:	Rosaline Choy; Marla Boos
Subject:	FW: Resubmission White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Date:	Tuesday, August 25, 2020 9:54:10 AM
Attachments:	image001.jpg image002.jpg image003.jpg

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From: Dan Bottrill <DBottrill@whiterockcity.ca>
Sent: August 30, 2019 9:54 AM
To: Jim Gordon <JGordon@whiterockcity.ca>
Subject: RE: Resubmission White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Hi Jim,

As discussed, please submit the revised application. Dan.

DAN BOTTRILL
Chief Administrative Officer, City of White Rock
15322 Buena Vista Avenue, White Rock, BC V4B 1Y6
Tel: 604.541.2133 | www.whiterockcity.ca

From: Jim Gordon <JGordon@whiterockcity.ca>
Sent: August 30, 2019 9:40 AM
To: Dan Bottrill <DBottrill@whiterockcity.ca>
Cc: Chris Magnus <CMagnus@whiterockcity.ca>
Subject: Resubmission White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Importance: High

Hi Dan:

Attached is what I propose as a resubmission. If you are ok with it, I can send it in.

The MP's office wants copies so they can work the political side.

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From:	Jim Gordon
To:	Ken Overton
Cc:	Rosaline Choy; Marla Boos
Subject:	FW: Resubmission - White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Date:	Tuesday, August 25, 2020 9:51:47 AM
Attachments:	DMAF_EOI_FORM-EOI-2.pdf DMAF_Form2_Full_Application_May_3-jsg.pdf image002.jpg

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From: Jim Gordon
Sent: August 30, 2019 10:06 AM
To: gordie.hogg.a2@parl.gc.ca
Cc: Mayor and Council <MayorandCouncil@whiterockcity.ca>; Dan Bottrill <DBottrill@whiterockcity.ca>
Subject: Resubmission - White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Hello MP Hogg:

Attached are the two resubmissions we sent to Annie Geoffroy, Director, Disaster Mitigation and Adaptation Fund earlier this morning.

Best Regards

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

Ken Overton

From: Jim Gordon
Sent: Tuesday, August 25, 2020 9:51 AM
To: Ken Overton
Cc: Marla Boos; Rosaline Choy
Subject: FOI request FW: Resubmission: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Attachments: DMAF_EOI_FORM-EOI-2.pdf; DMAF_Form2_Full_Application_May_3-jsg.pdf

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From: Jim Gordon
Sent: May 21, 2020 3:39 PM
To: Guillermo Ferrero <GFerrero@whiterockcity.ca>
Cc: Chris Magnus <CMagnus@whiterockcity.ca>
Subject: FW: Resubmission: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Hello G:

Our Liberal MP was working hard to have this Pier grant application from the Disaster Mitigation and Climate Adaptation Program approved. It was a last minute initiative he was working on with his contacts in Ottawa before the Fall 2019 election. You can see we were not initially accepted for the Program and we resubmitted our application – the fact that our MP was replaced with a conservative MP did not help in the reconsideration.

Our Pier project doesn't really meet the goals of this program. It was a bit of a stretch, but we tried given the political support.

I will send by separate email our ICIP application.

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

From: Jim Gordon
Sent: Friday, August 30, 2019 10:01 AM
To: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Cc: Cote2, Guillaume (INFC) <guillaume.cote2@canada.ca>; Paquet, Michael (INFC) <michael.paquet@canada.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>; Dan Bottrill <DBottrill@whiterockcity.ca>
Subject: RE: Resubmission: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Hello Annie:

I was advised that there was an opportunity to resubmit our Application before 3 pm EST today. Accordingly, the resubmission of both the EOI and Full Application is attached.

I did my best to address your detailed feedback; however, some of the technical information such as ROI is difficult to determine on such short notice.

Thanks again for your feedback and for providing us the opportunity to resubmit the application.

Best Regards

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

The information transmitted, including attachments, is intended only for the individual(s) or entity(ies) to which it is addressed and may contain information that is confidential and/or privileged or exempt from disclosure under applicable law. Any copying, review, retransmission, dissemination or other use of, or taking of any action in reliance upon this information by individual(s) or entities other than the intended recipient is strictly prohibited. If you have received this information in error, please notify the City of White Rock and destroy any copies of this information. Thank you.

From: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Sent: Friday, August 30, 2019 6:00 AM
To: Jim Gordon <JGordon@whiterockcity.ca>
Cc: Cote2, Guillaume (INFC) <guillaume.cote2@canada.ca>; Paquet, Michael (INFC) <michael.paquet@canada.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>; Dan Bottrill <DBottrill@whiterockcity.ca>
Subject: RE: Clarification: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Jim,

Thank you, well received.

Annie

From: Jim Gordon [mailto:JGordon@whiterockcity.ca]
Sent: August 29, 2019 12:46 PM
To: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Cc: Cote2, Guillaume (INFC) <guillaume.cote2@canada.ca>; Paquet, Michael <Michael.Paquet@dfo-mpo.gc.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>; Dan Bottrill <DBottrill@whiterockcity.ca>
Subject: Clarification: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Importance: High

Hello Annie:

Thanks again for your detailed response on August 26th to our submission. This is further to my phone message earlier today.

We would like to be clear that this is **not a repair project**. We completed repairs to the broken section of Pier and to East Beach – we made these repairs to new resilient design standards. We are not asking for grant funding for these completed projects.

Our problem is the old, unimproved section of the Pier and West Beach are extremely vulnerable to sea level rise, earthquakes and climate change storms. We applied, not to repair, but to rebuild these facilities to standards resilient to climate change.

Given time we can address the other technical issues you raise; however, we strongly believe that both components meet the four criteria:

- in terms of lives lost – over 20 people were quickly rescued as the Pier collapsed beneath them. They (and potentially more next time) could easily have perished in the turbulent waters if the RCMP hadn't been so proactive in removing them from the Pier as it collapsed.
- Percentage of people affected (we can do calculations), but if West Beach is breached we will have 500 plus people flooded and displaced as well as contamination of the bay with all the raw sewage from 20,000 people flowing into the bay. More people would need to be evacuated as cleanup continues due to health reasons
- The Pier is a key economic driver for White Rock. Businesses suffered greatly when it was closed.
- If West Beach is breached, 20,000 people would be without sewer services for some time. Electrical and water service for the City of 20,000 would also be affected.

Again, thank you for considering our application.

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

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To: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Cc: Cote2, Guillaume (INFC) <guillaume.cote2@canada.ca>; Paquet, Michael <Michael.Paquet@dfo-mpo.gc.ca>; La Rue, Jean-François (INFC) <jean-francois.larue@canada.ca>
Subject: RE: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

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Best Regards

Jim

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Sent: Monday, August 26, 2019 10:48 AM
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Subject: RE: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

Jim,

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Expression of Interest (EOI) – Project eligibility under the DMAF

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Given this, the project as submitted is not eligible under the program, for the following reasons:

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Full Application – Merit assessment

The objective of the Full Application is to assess the merit of the project against the DMAF merit criteria. The following observations are noted:

- Section D.2.c – Other Share: $8.8M from the *Investing in Canada Infrastructure Program* – note that the **cost-sharing and stacking limits** are for all sources of federal funding, including ICIP funding. Therefore the maximum federal share (including from ICIP) is 40% for municipal assets.
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forms to address the above-mentioned comments, you will also need to provide a rationale to support the urgent nature of the project.

Do not hesitate to contact me if you have any questions.

Thank you,

Annie Geoffroy
Director, Disaster Mitigation and Adaptation Fund | Directrice, Fonds d'atténuation et d'adaptation en matière de catastrophes
Program Operations | Opérations des programmes
Infrastructure Canada | www.infrastructure.gc.ca
180 Kent St. Suite 1100, Ottawa, ON K1P 0B6 | 180 rue Kent, Suite 1100, Ottawa, ON K1P 0B6
annie.geoffroy@canada.ca
Telephone | Téléphone 613-948-9308
Cell 613-894-9564
Government of Canada | Gouvernement du Canada

Infrastructure Canada Canada

From: Jim Gordon [mailto:JGordon@whiterockcity.ca]
Sent: August 23, 2019 2:25 PM
To: Geoffroy, Annie (INFC) <annie.geoffroy@canada.ca>
Cc: Richardson, Galen (INFC) <galen.richardson@canada.ca>
Subject: White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project
Importance: High

Hello Annie:

Further to our conversation earlier today, attached is the Expression of Interest (EOI) and Full Application for the **White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project.**

I did my best to fully address the requirements in the forms; however, more detail will require further technical work by our Engineering Consultants. Please let me know of any further information you require and I will get it for you.

Thanks again for being receptive to our application.

Jim

Jim Gordon P.Eng.
Director of Engineering and Municipal Operations,
City of White Rock
877 Keil Street, White Rock, BC V4B 4V6
Tel: 604.541.2181 | www.whiterockcity.ca

WHITE ROCK My City by the Sea!

Infrastructure Canada

DISASTER MITIGATION & ADAPTATION FUND

PROJECT APPLICATION FORM

EXPRESSION OF INTEREST (STEP 1)

INTAKE # (Entered by INFC) #

A. RECIPIENT IDENTIFICATION

A.1. Lead Applicant Organization	**A.1.a.** Legal Name	**A.1.b.** Mail Address	
	City of White Rock	15322 Buena Vista Drive V4B 1Y6	
A.1.c. Lead Applicant mandate, role, rationale why it is the best suited to lead the project.	The infrastructure vulnerable to climate change is in the City of White Rock and/or belongs to the City of White Rock		
A.2. Applicant's Contact Information (name, title, mail address, email, tel., fax)	**A.2.a.** Primary Contact Coordinates	**A.2.b.** Secondary Contact Coordinates	**A.2.c.** Environmental Assessment and Duty to Consult Contacts' Coordinates If different from A.2.a and A.2.b
	Jim Gordon, P.Eng. 877 Keil Street, White Rock, BC V4B 4V6 jgordon@whiterockcity.ca 604-818-3389		

A.3. Lead Applicant Type

- ☒ Municipal
- ☐ Provincial
- ☐ Indigenous Community
- ☐ For-Profit Organization
- ☐ Regional
- ☐ Territorial
- ☐ Post-Secondary Institution
- ☐ Not-for-Profit Organization

A.4. Type of Required Collaboration (applies to for-Profit and Post-Secondary Institutions, and Not-for-Profit organizations whose central mandate is to improve indigenous outcomes only)

- ☐ Municipal/Regional
- ☐ Provincial
- ☐ Territorial
- ☐ Indigenous Entities
- ☐ Not-for-Profit
- ☐ N/A

A.6. Project Type

- ◉ Single
- ○ Bundled

B. PROJECT IDENTIFICATION

B.1. Project Identifier	
B.2. Project Title	White Rock Waterfront and Pier - Disaster Mitigation and Climate Adaptation Project

B.3. Project Description	This project is for the reconstruction of the White Rock Pier and Wharf using concrete and steel and for the reconstruction of the shoreline to the West of the Pier with heavy rip rap; both to be resilient to; sea level rise, increased storm frequencies & magnitudes due to climate change, and earthquakes. Although now repaired and reconstructed to a modern standard, a small section of the Pier (20%) and much of the shoreline east and west of the Pier was extensively damaged during a storm December 20, 2019. This damage illustrates the vulnerability of the unreconstructed sections of the Pier and West Beach to similar storms and more intense and frequent storms due to Climate Change. These unreconstructed elements are also vulnerable to earthquakes. This project is urgent as we are extremely vulnerable to the now routine climate change storms and lives, the environment, archaeological sites and the local economy are at an increased risk. We are also at risk from earthquakes as none of the existing structures are designed to earthquake standards.
B.4. Project Objectives	The objective is to harden and make the shoreline and Pier infrastructure more resilient to climate change outcomes such as sea level rise, more frequent and intense storms and earthquakes.
B.5. Province(s) and/or Territory (ies)	☐ Alberta ☐ Newfoundland & Labrador ☐ Ontario ☐ Yukon ☒ British Columbia ☐ Northwest Territories ☐ Prince Edward Island ☐ Manitoba ☐ Nova Scotia ☐ Quebec ☐ New Brunswick ☐ Nunavut ☐ Saskatchewan
B.6. Region, Municipality(ies), County(ies),Other(s)	City of White Rock
B.7.a. Project Civic Address (Please include a Postal Code)	15322 Buena Vista Drive V4B 1Y6
B.7.b. GPS Location (Geo-coordinates i.e 45° 25'04.9"N 75°42'05.5"W)	49.02392"N, -122.79679"E

C. PROJECT DETAILS

C.1. Nature of the Project	☒ New Construction		☒ Rehabilitation		☐ Expansion	
C.2. Project Schedule	**C.2.a.** Site Preparation Start Date	23-Sep-2019	**C.2.b.** Construction Start Date	06-Jan-2020	**C.2.c.** Construction End Date	29-Jan-2021
C.3. Project Results						
C.4. Key Milestones Schedule	Completion of Pier, Foreshore and Public Wharf design components by October 15, 2019 Tender the construction of this Waterfront Disaster Mitigation and Climate Adaption Project by November 15th Award of Contract December 16th Construction Start Jan 6, 2020 Construction End Jan 29, 2021					
C.5.a. Project National Significance	☒ Reduce impacts on critical infrastructure including interruptions in essential services ☐ Reduce the amount of critical infrastructure that is at risk ☐ Reduce impacts on health and safety of Canadians ☐ Reduce significant disruptions in economic activity ☐ Reduce costs of recovery and replacement ☐ Reduce impact on Canada's vulnerable regions (Indigenous, northern, coastal, and remote communities) ☐ None of the above					

C.5.b. Please provide a detailed justification	Breaching of the shoreline protection would expose White Rock to flooding from the sea and damage from flooded sewage pump stations. Residents would be displaced. Destruction of the Pier results in loss of Canada Customs on Pier, loss of critical cell tower 91, potential fatalities, economic loss.
Number of Assets	2

C.6. Asset Identification	West Beach Shoreli				Remove Asset
C.7. Asset Type	☒ Structural ☐ Natural	**C.8.** Asset Lifespan (Number of Years)	75	**C.9.** Is the asset considered critical infrastructure?	◉ Yes ○ No
C.10. Essential Service(s) Provided by the Asset	☐ Transportation systems ☐ Power Systems ☐ Water Systems ☐ Other ☒ Stormwater Systems ☐ Safety ☐ Wastewater Systems				
C.11.a. Asset Ownership, Use or Benefit	Public				
C.6. Asset Identification	White Rock Pier				Remove Asset
C.7. Asset Type	☒ Structural ☐ Natural	**C.8.** Asset Lifespan (Number of Years)	75	**C.9.** Is the asset considered critical infrastructure?	◉ Yes ○ No
C.10. Essential Service(s) Provided by the Asset	☒ Transportation systems ☐ Power Systems ☐ Water Systems ☐ Other ☐ Stormwater Systems ☒ Safety ☐ Wastewater Systems				
C.11.a. Asset Ownership, Use or Benefit	Public				

C.12. Project alignment with strategic adaption and mitigation planning Please upload any necessary plans, strategies or frameworks as per section K.5 of the Applicant's Guide	☐ Legislation/ Regulations ☐ Strategies ☒ Guidelines ☒ Other ☐ Frameworks ☐ Land-use Plans ☐ Asset Management Plans				
(Guidelines) **C.12.a.** Type of Support	Aligns	**(Guidelines)** **C.12.b.** Order of Government	Federal	+	-
(Guidelines) **C.12.c.** Title of Document					
(Guidelines) **C.12.d.** Web link(s) if Available					
(Other) **C.12.a.** Type of Support		**(Other)** **C.12.b.** Order of Government		+	-
(Other) **C.12.c.** Title of Document					
(Other) **C.12.d.** Web link(s) if Available					

C.13. Public Engagement/Support	**C.13.a.1.** Have you engaged or are you planning to engage with relevant stakeholders such as provinces and territories, affected municipalities, indigenous communities and general public (if applicable)? Please upload the Indigenous concern tracking table as per section K.3. of the Applicant's Guide	◉ Yes ○ No
C.13.a.2. Details on the stakeholders and engagement activities	Meetings and consultation with Semiahmoo First Nations and five other adjacent First Nations Semiahmoo First Nations has been engaged and meetings continue as design concepts are discussed. Tsawwassen First Nation, Katzie First Nation and Stolo have been regular participants and observers.	

C.13.b. Which Indigenous groups have been notified? Please upload a sample of the Indigenous communications log as per section K.4. of the Applicant's Guide	Semiahmoo First Nations has been engaged and meetings continue as design concepts are discussed. Tsawwassen First Nation, Katzie First Nation and Stolo have been regular participants and observers of other projects in the same area on the foreshore. Advisement on the potential for the Pier component	
C.13.c. Indigenous Groups Interests	**C.13.c.1.** Are there Indigenous communities that could have interest in the positive and/or negative effects of the project or have expressed concerns?	(•) Yes ( ) No
C.13.c.2. If there are concerns or information gaps please provide details	These are not concerns, but Semiahmoo First Nations wants to continue to be involved in the design process. We work closely with them to understand and accommodate their desire for improved environmental benefits (new Pier gets rid of creosote piles), the desire to improve the indigenous shellfish	
C.13.d. Concerns or Information Gaps Addressed	**C.13.d.1.** Have all concerns or information gaps expressed by Indigenous groups been addressed?	( ) Yes (•) No
C.13.d.2. If concerns have not been addressed, please provide rationale	This project is still under development; although there aren't any outstanding concerns, the participation of Semiahmoo First Nations as we move forward with designs and eventually construction is necessary. Designs can be modified as we work together to refine details.	
C.14. Has the Applicant considered a revenue model for this project?	( ) Yes (•) No	

D. PROJECT FINANCIALS

D.1. Total Eligible Cost	$24,500,000.00				
D.2. Project Cost Share					
D.2.a. Federal Share of Eligible Cost	$9,800,000.00	**D.2.b.** Applicant's Share	$5,900,000.00	**D.2.c.** Other	$8,800,000.00
D.3. Federal Cash Flow	2018-19	2019-20	2020-21	2021-22	2022-23
	$0.00	$8,000,000.00	$1,800,000.00	$0.00	$0.00
	2023-24	2024-25	2025-26	2026-27	2027-28
	$0.00	$0.00	$0.00	$0.00	$0.00
D.4.a. Class Estimates	Class D	**D.4.b.** Contingency			

Important Note: Information provided under the EOI Application will be maintained for the Full Application.

Attestation:

☒ On August 30, 2019, I Jim Gordon as an authorized official for City of White Rock, hereby declare that the above responses are true and accurate. I certify that this project will adhere to all applicable legislation

Disclaimer INFC is not responsible for any losses which may result from a project that does not meet the program eligibility requirements.

DISASTER MITIGATION & ADAPTATION FUND

PROJECT FULL APPLICATION FORM

Full Application # (To be completed by INFC)	

EXPRESSION OF INTEREST APPLICATION UPDATE

Note: Due to the competitive nature of this program, a limited number of fields from the Expression of Interest (EOI) can change at the Full Application. Please provide details for those sections that require updating.

C.2.a. Site Preparation Start Date	23-Sep-2019
C.2.b. Construction Start Date	06-Jan-2020
C.2.c. Construction End Date	29-Jan-2021
C.4. Key Milestone Schedule	Completion of Pier, Foreshore and Public Wharf design components by October 15, 2019 Tender the construction of this Waterfront Disaster Mitigation and Climate Adaption Project by November 15th Award of Contract December 16th this is subject to approval of the City's Investing in Canada Infrastructure Program (Community, Culture and Recreation Program) Grant Application, No. ICO132, "White Rock Pier" and confirmation of anticipated fundraising proceeds Construction Start Jan 6, 2020 Construction End Jan 29, 2021
C.13.a.2. Details on the stakeholders and engagement activities	White Rock residents, Surrey residents and residents of the lower mainland frequently visit the Pier and the adjoining foreshore. Engagement is through Council meeting information, potential forums and website. First Nations engagement has started with Council to Council and staff meetings.
C.13.b. Which Indigenous groups have been notified?	Semiahmoo First Nations has been engaged and meetings continue as design concepts are discussed. Tsawwassen First Nation, Katzie First Nation and Stolo have been regular participants and observers of other projects in the same area on the foreshore. Advisement on the potential for the Pier component of the project has been sent to all of the above first nations plus Tsleil-Waututh First Nation
C.13.c.1. Are there Indigenous groups that could have an interest in the positive and/or negative effects of, or have expressed concerns about the project?	(●) Yes ( ) No
C.13.c.2. If there are concerns, please provide details	These are not concerns, but Semiahmoo First Nations wants to continue to be involved in the design process. We work closely with them to understand and accommodate their desire for improved environmental benefits (new Pier gets rid of creosote piles), the desire to improve the indigenous shellfish resource, and climate adaptation. We have a good working relationship and consider them partners in enhancing the environmental aspects of the foreshore, respecting archaeological sites and adapting to climate change. We recently joined them in a stakeholder meeting on climate change at the Semiahmoo First Nations Hall.
C.13.d.1. Have all concerns or information gaps expressed by Indigenous groups been addressed?	( ) Yes (●) No
C.13.d.2. If concerns have not been addressed, please provide the rationale	This project is still under development; although there aren't any outstanding concerns, the participation of Semiahmoo First Nations as we move forward with designs and eventually construction is necessary. Designs can be modified as we work together to refine details. Similarly, First Nations presence during construction is key to ensure any potential archaeological finds are handled properly.
D.1. Total Eligible Cost	$24,500,000.00

D.2.a. Federal Share of Eligible Cost	$9,800,000.00	Please provide other sources and amounts for each share	Anticipated Investing in Canada Infrastructure Program (Community, Culture and
D.2.b. Applicants' Share	$5,900,000.00		
D.2.c. Other Share	$8,800,000.00		

D.3. Federal Cash Flow					
	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028

D.4.a. Class Estimates	Class D	D.4.b. Contingency	20%

For projects involving assets owned by Indigenous communities, please specify if federal funding (other than DMAF) is included in total federal funding. If so, please indicate the federal program	Assets are not owned by indigenous community, but are adjacent to Semiahmoo First Nations Reserve.
For projects involving multiple eligible recipients, please specify the federal share to be allocated to each recipient	
Please confirm if all sources of funding have been secured (other than DMAF).	○ Yes ◉ No
If 'No', please provide the rationale and planned steps to secure this funding	Anticipated Investing in Canada Infrastructure Program (Community, Culture and Recreation Program) Grant Application, No. ICO132, "White Rock Pier" grant (application has been submitted, but is not yet approved) - $8.8M (assumed to be 73.33% of $12M)

FULL APPLICATION (STEP 2)

D. FINANCIALS

D.5.a. Expected Return on Investment Ratio	:	D.5.b. Formula including a detailed calculation	

E. PROJECT PLANNING

E.1. Project rationale	This project for the reconstruction of the White Rock Pier and Wharf using concrete and steel and for the reconstruction of the shoreline to the West of the Pier with heavy rip rap is intended to provide resiliency to; sea level rise, increased storm frequencies & magnitudes due to climate change, and earthquakes. White Rock residents and visitors are vulnerable to

	flooding and displacement along the shoreline and personal injury or death should the Pier collapse again during a climate change storm. Also extensive economic and environmental damage in both situations. Archaeological sites on the shoreline are vulnerable to storm damage.
E.2.a. Innovation (if applicable)	☒ Design ☒ Functionality ☒ Process ☐ Other ☐ None
E.2.b. Innovation details	The Pier is designed to look like the historic Pier with identical pile spacings and a wooden walking surface, yet the piles are steel, the pile caps are precast concrete and the structural deck is precast concrete. The deck is designed to be raised to accommodate sea level rise. Same look, yet resistant to climate change and earthquakes. The proposed West Wharf design is meant to be resilient but also to accommodate those with disabilities with a gently sloping ramp as well as a hoist to assist those with disabilities who may wish to enjoy sailing or other boating activities The shoreline work was carefully designed to allow for any archaeological presence such as buried middens and also in accordance with environmental best practices. The design process incorporated First Nations, environmental and technical input. Ramps to the beach are designed for those with disabilities.
E.3. Is the proposed asset included in an Asset Management Plan?	◉ Yes ○ No
E.4.a. Does the project require land acquisition?	○ Yes ◉ No
E.4.c.1. Land Ownership	☐ Federal ☒ Provincial / Territorial ☐ Municipal ☒ Private ☐ Other
E.4.c.2. In case of federal lands, please specify the land administrator	☐ Indian Reserve Lands - INAC ☐ Federal Airport Lands - Airport Authority ☐ Indian Reserve Lands - First Nations ☐ Federal Port Lands - Port Authority ☐ National Park or Protected Area - Parks Canada ☐ Other ☐ Federal Agriculture Lands - Prairie Farm Rehabilitation Administration
E.4.c.3. If 'Other' please provide the name of the organization	

E.4.d. Please confirm if land acquisition is the sole project component	○ Yes ◉ No
E.5. Project Benefits	☐ Co-benefits ☒ Multi-hazard solution ☒ GHG Reduction and Environmental Value ☒ Cultural Value ☒ Employment Benefits
Rationale	Multi-hazard Solution - As per the above the project will provide infrastructure resilient to; sea level rise, increased storm intensities due to climate change, earthquakes and also provide environmental benefits due to the removal of creosote piles and ensure continuity of emergency 911 cell tower service. Environmental Value - Removal of creosote piles and protection of the shoreline from environmental damage and erosion during increasingly intense storms. Removal of contaminated sand in the vicinity of the west wharf will be beneficial to the shellfish resource so valued by the First Nations community. Will also benefit those that fish off the Pier. Cultural Value -Erosion of the shoreline could expose and damage archaeological sites. This project will provide protection. Also, replacement of the wharf will restore the space for docking the Semiahmoo First Nations crab boat. Employment Benefits - Local firms and workers would benefit from providing the labour and materials for the Project. Protection of residents from displacement due to flooding or personal injury or death if the Pier collapses. Also protects economic interests for either event.

F. PROJECT MANAGEMENT

F.1. Project risk transfer management to be adopted during the design and implementation of the proposed project. Please refer to any strategies, guidelines, and/or measures	The project is designed by a Vancouver Marine Engineering firm. They would consult with the project partners to finalize the design and then post the Project Tender on BC Bid. Concurrently, the City would hire a Project Manager through a competitive process. Once the bids are received, the City would award the contract. The designer would be responsible for inspecting the works and ensuring that the workmanship and materials meets the design. The Project Manager would manage all aspect of the Project and report to the City Engineer. Both the Project Designer and Project Manager would be Professional Engineering firms with a Professional obligation as well as liability insurance to ensure that the project is completed in accordance with the design. The contractor would sign and abide by a national standard CCDC contract.
F.2.a. Sole Source Contract(s) (If Applicable)	○ Yes ◉ No
F.3.a. Project risks	1.Potential shortage of qualified marine construction firms 2.Environmental delays 3.First Nations concerns 4.Material shortages 5.Storms

F.3.b. Project risk mitigation measures	Building upon experience with the replacement of one section of the Pier and the successful reconstruction of the East Beach shoreline, we have a head start with the environmental and First Nations processes. We have done ground work in both of these processes and continue to do so for this proposed Project. We have in effect completed two pilot projects which will form the basis of procedures for the main project. We propose to tender the Project late the year to ensure availability of marine construction firms for next year. We had a very positive and successful experience with the firm that constructed the replacement section of the Pier. They are very interested to bid again. We will source materials in advance and may even procure separately from the construction contract if shortages or long timelines are anticipated. We are aware of storms and will ensure that construction sites and equipment is appropriately hardened.

G. LEGAL, REGULATORY AND OTHER REQUIREMENTS

G.1. Legal, regulatory and other requirements that apply to the project	We have had extensive and successful experience in this regard with our recent two major marine projects discussed above. We need to: -Address any First Nations concerns and involve them in the proces -Work with the Province as the Pier is on their lands (FLNRO) and also Provincial environmental agencies. -Department of Fisheries and Oceans -Burlington Northern and Sante Fe railway (BNSF) as the shoreline is adjacent to and also on lands we lease from them on a long term basis

G.2.a. Is the project subject to Environmental Assessment requirements under a Modern Treaty / Northern Regime?	○ Yes ◉ No ○ Unknown	G.2.b. Is the project designated according to the Canadian Environmental Assessment Act 2012 Regulations?	○ Yes ○ No ◉ Unknown
G.2.c. If G.2.b is 'Yes', have you provided the Canadian Environmental Assessment Agency (CEAA) with a project description?	○ Yes ○ No		
G.3.a. Does the project involve vegetation clearing?	○ Yes ◉ No		
G.3.b. If 'Yes', Please check all that apply	☐ Along a roadside ☒ Developed area	☐ Forested area ☐ Undeveloped area	☒ Wetland
G.3.b.2. Please provide details	The Project is located in Semiahmoo Bay which is part of the Salish Sea. The Pier extends through the intertidal area to a breakwater on the open ocean. The shoreline protection is adjacent to where the Pier meets land. The City of White Rock is adjacent to the Project and vulnerable to flooding from sea level rise and increasingly severe storms and storm surges due to climate change.		
G.3.c. If the project has works involving water, please check all that apply	☒ In water ☐ That could cause impacts to water	☒ In a wetland ☐ Within 30m of a water body	☒ Over/under water ☐ N/A

G.4.a. Is the project expected to have other environmental impacts?	○ Yes ◉ No
G.4.b. If 'Yes', provide details	The intention is to mitigate environmental impacts and also protect against the environmental damage and impacts from severe storms.
G.5.a. Is the project located in whole or in part on land potentially contaminated by previous activities?	◉ Yes ○ No ○ Unknown
G.5.b. If 'Yes', which type of environmental assessment has been undertaken?	☐ Phase I ☐ Phase II ☐ Phase III ☒ N/A
G.6.a. Does the project require a Provincial Environmental Assessment?	○ Yes ◉ No
G.6.b. Has another federal, provincial, or territorial entity indicated that Aboriginal consultation is required for the project?	◉ Yes ○ No
G.7.a. Please list all provincial or territorial environmental permits that could be required for the project. (Separated by a ";")	BC Wildlife Act permit for activities inside a Wildlife Management Area; BC Heritage Conservation Act – Heritage Investigation/Inspection Permit; Alteration Permit
G.7.b. Please indicate all other federal departments or agencies that may require an environmental permit, authorization or license requirement (Separated by a ";")	Environment and Climate Change Canada – Disposal at Sea permit; Transport Canada – Navigation Protection Act approval; Fisheries and Oceans Canada – Fisheries Act;
G.7.c. Status of the construction permit required for this project	○ Approved ○ In the approval process ◉ Pre-Approval
G.8. Description of the standards or best practices to address the main hazard (Separated by a ";")	Reconstruction of the remaining sections of the Pier, west wharf and west foreshore will all be to modern earthquake standards and also designed for projected sea level rise and increased intensity of storms due climate change. They will be designed to the National and Provincial building codes (excepting the foreshore for which the codes do not apply). The main Hazard itself is the destruction of these three pieces of infrastructure during a storm or earthquake and the danger of death of the people on or adjacent to them during destruction. For earthquakes in particular, there could be over 500 people on the Pier during an occurrence. Fewer people exposed during a storm but still, human life at risk as well as environmental and archaeological damage.

G.9. Net increase or net reduction in GHG emissions after the project completion (if available)	○ Increasing >20% ○ Increasing ≥ 10% and < 20% ○ Increasing ≥ 0% and <10% ○ Reducing > 0% and < 10% ○ Reducing ≥ 10% and < 20% ○ Reducing ≥ 20% ◉ Not available at this time
G.10.a. Accessibility Standards	☒ Federal/National ☒ Provincial-Territorial ☒ Municipal ☐ Other ☐ None
G.10.b. Please provide the title of the accessibility standards (Separated by a ";")	• CAN/CSA-B651, Accessible Design for the Built Environment, 2010; • British Columbia Building Code 2018; • WorkSafeBC; • Accessible Boating Facilities, United States Access Board, 2003; • PIANC Disability Access Guidelines for Recreational Boating Facilities, 2004; and • ADA Standards for Accessible Design, 2010.
G.11.a. Energy Efficiency Requirements	☐ Pan Canadian Framework Actions ☐ Energy Efficiency Regulations ☐ Energy Code ☐ National Building Code ☐ Provincial or Territorial Building Codes ☐ Other ☒ None
G.11.b. If 'Other', please provide details	
G.12.a. Concerns related to public or media perception	○ Yes ◉ No
G.12.b. If "Yes", please provide details	The BC Lower Mainland community is very positive about this project as evidenced by the support for the reconstruction on East Beach and the replacement of the missing section of Pier. Concerns are mainly if we don't do the work.
G.13.a. Community Employment Benefits target groups	☐ Apprentices ☒ Indigenous Peoples ☒ Women ☐ Persons with disabilities ☐ Veterans ☐ Youth ☒ Recent Immigrants ☒ Small, Medium and Social Enterprises

G.13.b. Please provide the total number of employees targeted in these groups (If available)

Indigenous People	5
Women	10
Recent Immigrants	10
Small, Medium and Social Enterprises	5

H. MAIN HAZARD

H.1. Data type and sources	Hazard risk assessment indicators	H.1.a. Data type and sources (details in guide)	H.1.b. Data time	Data type
	Likelihood	Storm causes flooding erosion and destruction of West Beach shoreline protection leading to failure of railway and incursion of water into the homes and businesses in West White Rock. Potential train derailments exposing population to hazardous chemicals and also flooding of sewage pump stations exposing population to hazardous waste.	Both	Both
	Loss of lives and missing people	In the event of a subsequent train derailment this could be significant otherwise, minimal loss of life from flooding	Projected	Qualitative
	Directly affected people	5000	Projected	Qualitative
	Local economic loss	1000000	Projected	Qualitative
	Population without essential services	20000 without sewage, electrical and other key services	Projected	Qualitative
H.2. Main Hazard	Storm			
H.3. Hazard details (context, type,magnitude, intensity and speed of onset and duration)	Intense record breaking storms seem to be an annual occurrence. Also, there seems to be more log and other debris in the water during these storms. These storms can occur suddenly as evidenced by the December 20, 2018 storm. Quick thinking RCMP escorted about 20 people off the Pier as it collapsed beneath them. One person was trapped on the Pier and needed to be airlifted to safety. It could have been much worse. The shoreline is vulnerable to destruction of the minimal present protection which could allow breaching of this protection, destruction of the railway and water incursion into populated areas of White Rock.			
H.4.a. Total area exposed	0.1			
H.4.b. Unit of Measurement	○ Square meters ◉ Square kilometres ○ Hectares			
H.5. Name(s) of community (ies) at risk (Separated by a ";")	All BC Lower Mainland residents accessing the shoreline and Pier. Includes indigenous persons living nearby.			
H.6. Total population at risk	1,000,000			
H.7. Affected area-geographical boundaries	Shown on attachment. White Rock Pier and waterfront.			

H.8.a. Asset(s)' vulnerabilities related to the risk of the natural hazard? (for existing assets)	☒ Location ☒ Structural ☒ Materials ☒ Age ☐ Dependencies ☐ Interdependencies ☐ Poor Performance ☒ Accessibility Issues ☐ Lack of Monitoring Capacity ☒ Lack of Compliance with a Specific Hazard Related Codes and Regulations ☐ Other
H.8.b. If 'other', Please provide details	
H.9.a. Risk management capacity	☒ Emergency and evacuation plans ☐ Built-in redundancies and lifelines back-up ☒ Insurance ☐ Effective response capacity ☐ Operational efficiencies such as sewer backups, drainage systems, alternative power source ☐ Warning systems and risk communication plans ☐ Secured storage Location ☐ Business continuity plans ☐ Ability to relocate if necessary ☐ Other ☐ Collaboration and assistance capacity
H.9.b. If 'Other', please provide details	
H.10. Measures that will be adopted to improve the asset resilience capacity	Reconstruction with steel, concrete and rock materials designed for strength to resist storms and earthquakes. Designs will incorporate elevations to assist with resiliency and also grades to assist with accessibility. Similar design parameters for the shoreline protection.

I. LIKELIHOOD

I.1. Likelihood of occurence	Once in less than 10 years

J. IMPACTS (BEFORE AND AFTER THE PROJECT)

	Before the Project	After the Project
J.1. Loss of lives and missing population	< 10	< 10
J.2. Percentage of people directly affected	> 15%	< 5%

J.3. Percentage of local economic loss (if available)	> 5%	< 2%
J.4. Percentage of population without essential services	< 2%	< 2%

K. REQUIRED DOCUMENTS

Please attach the following documents:
K.1. Environmental assessment reports in pdf format - If applicable
K.2. Project location map in kml format (mandatory for all projects)
K.3. Consultation records that involve provinces or territories, and Indigenous communities and affected communities in pdf format - If applicable
K.4. Sample of a notification letter to Indigenous groups - If applicable
K.5. In case a web link is not available for relevant adaptation and mitigation related plans, strategies and frameworks, legislation, regulations and policies, Applicants could provide the pdf files if available
K.6. Not for Profit organization whose mandate is to improve Indigenous outcomes and for-profit applicants must provide a letter of support from another eligible recipient
K.7. Land acquisition attestation - If applicable

Attestation:

☒ On August 30, 2019 , I Jim Gordon as an authorized official for White Rock , hereby declare that the above responses are accurate and based on reliable data and best available science, the information provided complies with the general guidance provided under the DMAF Applicant's Guide and all applicable legislation.

Disclaimer:

INFC is not responsible for any losses which may result from a project that does not meet the program eligibility and merit requirements.

Please save the form in its original PDF format, and please attach the completed form to your email (infc.dmaf-faac.infc@canada.ca) to submit your application.

Investing in Canada Infrastructure Program

Instructions

Program Information

- For detailed program information, including application closing date, please visit the Ministry's Investing in Canada Infrastructure Program website and review the Program Guide.
- For further information, please email the Ministry at Infra@gov.bc.ca or phone 250-387-4060.

Important Notes

- The system will automatically time-out after 15 minutes when there has been no activity – please repeatedly save work, otherwise it will be lost.
- An Application does not have to be completed in one session.
- Once an Application is submitted, it will be locked and you will not be able to make changes online. If changes need to be made after an Application has been submitted, please use the contact information above.
- **Applicants should be aware that information collected is subject to provincial freedom of information legislation.**

Submitting an Application

- All fields are required, unless otherwise indicated.
- Please ensure you have uploaded all required documents.

Applicant Information

Applicant Name and Project Number

White Rock IC0132

Primary Contact

Contact must be from the applicant organization as this will be the person the Ministry will contact regarding this application.

Primary Contact First Name

Rosaline

Primary Contact Last Name

Choy

Title of Primary Contact

Manager of Engineering

Telephone Number

604-541-2188

Telephone Extension

Email Address

rchoy@whiterockcity.ca

Secondary Contact

Secondary Contact First Name

Jim

Secondary Contact Last Name

Gordon

Title of Secondary Contact

Director of Engineering and Municipal Operations

Telephone Number

604-541-2184

Telephone Extension

Email Address

jgordon@whiterockcity.ca

Project Information

Project Title

White Rock Pier

Project Description and Rationale

Brief Project Description

On December 20, 2018, a 91 km/h wind storm combined with heavy rain and a king tide destroyed approximately one third of the historic White Rock Pier and a section of the western wharf and floats. Typical damage includes displacement of piles, fracturing of piles at connection to pile cap and failure of cross bracing. A section of the Pier has failed completely and most piles and all superstructure at this location are missing. The Pier is founded on soils that will likely liquefy under both a 1 in 475 year and a 1 in 2,475 year return period seismic event. The existing pier is likely not designed to withstand the liquefaction of surrounding soil. This project involves reconstruction of White Rock Pier to be resistant to future seismic events, storm events and the effects of sea level rise and climate change.

Detailed List of Project Works

- Removal of the creosote treated timber piles - Installation of timber compaction piles to address soil liquefaction during seismic events - Reconstruction of the 470m long White Rock Pier with steel piles, concrete pile caps, concrete deck panels, timber planks, timber guardrails, archway and lighting - Reconstruction of the floats - Installation of conduits for telecommunications, electrical, and third-party utilities - Construction of an accessible gangway - Rehabilitation of the Pier archway lights.

Describe why the project is needed and how need was assessed

On December 20, 2018, a 91 km/h wind storm combined with heavy rain and a king tide destroyed approximately one third of the historic White Rock Pier and a section of the western wharf and floats. Significant reconstruction of damaged sections is required to restore the pier to a serviceable condition. Several rows of piles along the pier have sustained impact damage likely from floating debris and/or loose vessels. Typical damage includes displacement of piles, fracturing of piles at connection to pile cap and failure of cross bracing. A section of the Pier has failed completely and most piles and all superstructure at this location are missing. Utilities and power lines at this location have been dislodged from their installed position and have been strewn on the East side. Because there is a cell tower at the end of the Pier, the damage to this utility corridor has impacted telecommunications coverage for E-Comm 9-1-1. Additionally, the Pier's east float is a CBSA facility; visitors entering Canada by vessel cannot obtain CBSA services until the Pier is repaired. Following the storm event, the City retained a Marine Structural Engineer to assess the Pier. The consultant determined that the Pier is founded on soils that will likely liquefy under both a 1 in 475 year and a 1 in 2,475 year return period seismic event and is likely not designed to withstand the liquefaction of surrounding soil. If only the damaged sections of Pier were repaired to the original design, the Pier will remain vulnerable to seismic events and sea level rise. Reconstruction of the Pier to current standards will enable it to be resistant to future seismic events, storm events, and the effects of sea level rise and climate change.

Federal Outcome

Projects must meet the federal outcome associated with the program to be eligible.

The project will improve access to and/or increased quality of cultural, recreational and/or community infrastructure for Canadians, including Indigenous peoples and vulnerable populations

Specifically explain how the project will meet this federal outcome.

The historic White Rock Pier is an important community and recreational amenity. This iconic Pier is well used by residents for gathering, strolling, bird watching, fishing, crabbing, and special events such as "Picnic on the Pier". The reconstructed Pier will meet current seismic requirements, be storm resistant and have provisions that enables increasing its elevation to accommodate future sea level rise. This project will ensure this popular community facility can be enjoyed by future generations.

Project Type

Project Type

Community

Project Location

Project Physical Address (and/or start and end points)

The White Rock Municipal Pier is located on the north side of Semiahmoo Bay along the White Rock Beach Promenade and Marine Drive at Martin Street.

Project Submission History

Has this project (or related components/phases) been the subject of another infrastructure grant application?

NO

Project Works

Nature of the project works

Are the project works?

Indicate % for each relevant type

New

0

Rehabilitation

100

Expansion

0

Other

0

Total

100

Will the completed works be used by the general public?

YES

Projects that are used by the general public must meet or exceed the requirement of the highest published accessibility standard in a jurisdiction, in addition to applicable provincial codes and local government bylaws. Accessibility Standards are as defined in the Canadian Standards Association Technical Standard Accessible Design for the Built Environment CAN/CSA B651-12)

Will the completed works meet accessibility standards?

YES

Please confirm how accessibility standards will be addressed in the design and construction

The new gangway to the west float will be constructed to meet accessibility requirements.

How will the design meet or exceed energy efficiency standards?

The Pier archway lights will be LED.

Please list the energy efficient features that will be included in the project

- LED lighting for the Pier archway

What regulatory authorities must be contacted (engaged) to complete the project and what permits will be required for the project?

FLNRO permits or lease amendment Confirmation from DFO that the work can be completed under self-assessment Archaeology permits

Please upload permits or licenses that have been obtained

Eligibility

Is the Project Eligible

Projects that are eligible under the Community, Culture, and Recreation stream must be public infrastructure (capital assets) owned by a Local Government, Indigenous Applicants, or Not-For-Profit organization.

Do you have a Council/Board/Band Council or other appropriate governing body resolution authorizing the project to proceed and committing your share of project funding?

NO

When do you expect to submit the Council/Board/Band Council resolution?

2019-01-23

The Council/Board/Band Council resolution is required to be received within one month of the application closing date.

Has the project started? Projects that have started (construction tender awarded) are ineligible.

NO

What is the percentage of project design that has been completed as of application submission date?

Up to 25%

Estimated project start date

2019-01-28

Estimated project completion date

2021-03-31

Estimated construction start date

2019-02-04

Estimated construction completion date

2021-02-26

What is the population that will be directly served by this project?

19,399

Does the project benefit more than one community?

YES

List the communities that will use the infrastructure and their corresponding populations.

This popular community asset benefits residents of White Rock plus the adjacent populations of Surrey and Delta estimated in excess of 50,000. Additionally, the Semiahmoo First Nations's crab boat uses the Pier. The Pier's east float is a CBSA entry point for visitors traveling by vessel into Canada.

Will the applicant own and operate the completed project?

YES

Mandatory Documents

Please attach each of the following mandatory documents (15 MB limit per document).

In all cases, relevant information should be included within the completed application form itself, as this will form the basis of the assessment. Please make specific reference within the application to sections of attached documents that you wish to be included in the review. Attachments should be clearly labelled, organized and succinct.

Mandatory Documents for Local Governments

Project location KML file

LG_PROJECT_KML_Pier - Project Area.kml

See instructions for KML files on the Program website .

Detailed Cost Estimate

LG_DETAILED_COST_ESTIMATE_WRPier-ccr-detailed-cost-estimate-template.xlsx

The Detailed Cost Estimate template on the Program website must be used.

Site Plan

LG_SITE_PLAN_White Rock Pier Reconstruction - Site Plan.pdf

Project Study or Plan (see program guide for details)

LG_FEASIBILITY_STUDY_1180031_Structural_system_study_for_reconstruction_of_white_roc

Please attach other supporting documents you wish to be considered (optional, see the Program Guide for guidance)

Additional documentation is optional and may be uploaded here to support your application. Refer to program guide for additional information. Supporting document examples: Partnership/MOU agreement; Cost/Benefit Analysis or Other Study; Design Drawings; Letters of Support; Community Energy Plan; Water Conservation Plan; Food Security Plan; Asset Management Plan; Options Assessment.

Additional Document

LG_ADDITIONAL_1_118001_Order_of_Magnitude_Cost_Estimate_final.pdf

Additional Document

LG_ADDITIONAL_2_1180031_Drawings_Rev0.pdf

Additional Document

LG_ADDITIONAL_3_DSC19536.JPG

Additional Document

LG_ADDITIONAL_4_Appendix - White Rock Pier - Impact on Community and Tourism.pdf

Project Costs and Project Delivery

Total Gross Project Costs

$15,900,000

Total Ineligible Project Costs

$50,000

Total Eligible Project Costs [Total Gross Project Costs less Total Ineligible Project Costs]

$15,850,000

Other Funding Sources (Do not include internal sources)

Please note: Other federal and/or provincial grants may affect the total grant requested as per stacking rules. See the Program Guide for information on stacking rules.

Gas Tax - Strategic Priorities Fund

$0

Gas Tax - Community Works Fund

$0

New Building Canada Fund - Small Communities Fund

$0

Clean Water and Wastewater Fund

$0

Other

$0

Total Other Funding Sources

$0

Net Eligible Costs [Total Eligible Project Costs less Total Other Funding Sources]

$15,850,000

Maximum Grant Amount (Estimated)

$11,622,805

Are you requesting less than the maximum grant amount?

NO

If your detailed cost estimates do not directly correspond with these amounts, clarify the variance between the costs.

Fiscal Year Breakdown

Please fill in the costs below. The costs to be entered will represent how much money you expect to spend on eligible costs for the project each year.

Fiscal Year

Forecasted Eligible Costs (April 1 to March 31)

2019 - 2020

$5,750,000

2020 - 2021

$10,100,000

2021 - 2022

$0

2022 - 2023

$0

2023 - 2024

$0

Total

$15,850,000

Difference from Net Eligible Costs

$0

**Fiscal Year Breakdown Totals must equal Net Eligible Costs*

Funding Details

Is this project a phase or component of a larger project?

NO

Can the project, as submitted, be broken into smaller phases if full funding is not available?

NO

Please explain why it can't be phased.

The City of White Rock is working with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development to amend the existing Lease with the City of White Rock to include all improvements of the Pier within a 2 year temporary license term. Therefore works must be completed within the 2 year term. The project schedule is yet to be determined by City Council. If possible, a major percentage of the work will be completed in 2019, bringing all costs forward one year.

Do you intend to use your own workforce and/or equipment?

NO

At this stage, do you intend to directly award contracts (sole sourced contracts) during procurement for any aspect of the project?

YES

The expectation is that project contracts are to be tendered. Projects that utilize directly awarded contracts (sole sourced) of over $25,000 may need a Federal Treasury Board submission for project approval. Identify the estimated amount of the directly awarded contract, who will be conducting the work, the nature of the work and explain why sole source contracting will be used.

The initial emergency design was sole sourced. Construction and material supply contracts will be awarded on a competitive basis. The City intends to sole source the marine engineering consultant responsible for providing design services. In 2018, the City tendered a consultancy contract to review the environmental, archaeological and regulatory requirements for all potential east beach infrastructure projects; Westmar Advisors was the successful proponent. Westmar was retained to provide emergency inspection services of the Pier following the storm event. The City intends to continue with Westmar Advisors for the reconstruction of the Pier. All other work will be awarded through a competitive tendering process.

Is the employment of apprentices; Indigenous peoples; women; persons with disabilities; veterans; youth; recent immigrants; and small-sized, medium-sized and social enterprises to be considered during project procurement/construction?

YES

Please describe.

The City will explore opportunities with the neighbouring Semiahmoo First Nations such as services for environmental monitoring, archaeological monitoring and site security.

Funding/Planning

Applicants should have their share of the capital costs secured prior to application to the program.

Project Financing

Will the Local Government portion of the project come from borrowing?

NO

Are all the funds readily accessible?

NO

What is the anticipated source of funds?

If the City receives the maximum grant funding (73.33% of eligible), the City would be responsible for $4.28M of the project costs (26.67% of $15.85M plus $50,000 ineligible costs). Insurance will cover the City's portion of costs (subject to policy limits) to bring the pier back to the condition it was in before the event, incorporating applicable updated codes. The Pier is insured for approximately $7M and depending on the details of the policy and cost components, it is understood that more or less than that may be recoverable through the policy. More information will be available once the City's insurers complete their review of the documentation. The amount not covered by insurance is expected to be financed by other funding sources such as the Disaster Financial Assistance funding and capital reserves. The determination of eligible and ineligible costs are based on the assumption that the decision regarding this application will be expedited. If this does not occur, amendments will be made to the eligible and ineligible cost amounts.

Is the project included in the 5-year financial plan bylaw?

NO

Indicate when the project will be included in the 5-year financial plan bylaw and why it has not yet been included.

The project was the result of an unanticipated storm event and was not included in the financial plan. It is expected to be added to the Financial Plan in February / March 2019.

If there are cost overruns, what plans are in place, beyond contingencies to fund the unforeseen cost increases?

Capital contingency funded from internal reserves.

ICIP does not provide additional funds to cover cost overruns. Also note stacking rules in the Program Guide.

Project Consultation Considerations

How does this project align with the long-term plans of your organization?

In the City of White Rock's Official Community Plan ("Imagine White Rock 2045"), it is the City's long term goal to enhance and promote its beautiful Waterfront and historic pier as a memory-making estination where people can shop, dine, gather, play, and connect with nature. Reconstruction of the Pier to current seismic requirements, and storm resistant standards is an integral part of achieving this goal.

What affected or interested groups or stakeholders have been consulted or will be consulted regarding the project? Please list.

Semiahmoo First Nations, White Rock Business Improvement Association (BIA), White Rock Museum, and Marine Drive businesses

What were the results of these discussions?

The City has discussed the project with the Semiahmoo First Nations. Marine Drive businesses have expressed concerns about disruption from construction activities and the BIA supports the early completion of the project.

Is any part of the project located on federal lands?

NO

Is the project subject to a federal environmental assessment?

NO

Federal Checklist

The following elements are of interest to Infrastructure Canada.

Select “Yes” for risks that are applicable to your project, and provide a brief description of the risk and mitigation strategies undertaken or planned.

Select “No” for risks that are not relevant to your project.

For example: Describe risk and its probability (low/medium/high), impact and the mitigation response (will the risk be avoided, mitigated, transferred or accepted). Describe the planned actions and what the residual risk will be.

Project Complexity

Remote geographical location

NO

Unpredictable weather

NO

Untested or unproven technologies

NO

Highly technical or complex project

NO

Interdependencies between phases

NO

Other

NO

Project Readiness

Project site hasn't been finalized

NO

Land hasn't been acquired

NO

Potential issues with permits or authorizations (federal, provincial, territorial and municipal)

NO

Industry supply may not be able to meet demand

NO

Funding is not secured for the entire project cost (assuming a grant is received through this program)

YES

Insurance will cover the cost (subject to policy limits) of bringing the pier back to the condition it was in before the event, incorporating applicable updated codes. The Pier is insured for approximately $7M and depending on the details of the policy and cost components, it is understood that more or less than that may be recoverable through the policy. More information will be available once the City's insurers complete their review of the documentation. The amount not covered by insurance is expected to be financed by other funding sources such as the Disaster Financial Assistance funding and capital reserves. The determination of eligible and ineligible costs are based on the assumption that the decision regarding this application will be expedited. If this does not occur, amendments will be made to the eligible and ineligible cost amounts.

Other

YES

The eligible costs included in the application are based on an assumption of early approval of a grant. They also do not include approximately $50,000 in spent consultant fees.

Project Sensitivity

The project has received positive media attention

NO

The project has received negative media attention

NO

Certain stakeholders have been vocal about the project

NO

Other

NO

Identify other potential risks that are not included in the federal checklist. If there are no other potential risks, please type N/A.

n/a

What was the total number of visits to the Community, Culture, or Recreation facility that is the subject of this application?

The City does not have visitor counts for the Pier. The City has the following statistics for parking revenue and special events activities at the Pier and waterfront (refer to attached Appendix): • Annual revenues from waterfront parking is more than $2 million dollars a year. • Canada Day by the Bay (July 1): approximately 35,000 people / year • TD Concerts by the Pier – approximately 2000 per concert. Have 6 a summer, so a total of 12,000 attendees • White Rock Sea Festival and Semiahmoo Days - approximately 35,000 people / year • Tour de White Rock – approximate number of attendees 5000 people

Does this project provide benefit to an official language minority community (OLMC)? This is in a community whose maternal or chosen official language is not the majority language in the province.

YES

What is the anticipated level of participation?

Yes, many new Canadians, especially South Asian Canadians, enjoy family outings on the Pier.

Does this project provide benefit to Indigenous Peoples?

YES

What is the anticipated level of participation on-reserve?

The Semiahmoo First Nations access their crab boat via the Pier. The City does not have statistics on the level of participation on-reserve.

What is the anticipated level of participation off-reserve?

The Semiahmoo First Nations access their crab boat via the Pier. The City does not have statistics on the level of participation off-reserve.

Does this project provide benefit to vulnerable populations?

NO

Will this project result in an increased energy efficient building?

NO

Were gender issues taken into consideration during the design and/or construction phases?

NO

Does the public facing built asset incorporate universal design?

YES

The project is community-oriented, non-commercial in nature and open for use to the public.

YES

This project includes dedicated spaces for tourism infrastructure; provincial or municipal services; for-profit uses; daycare facilities; places of assembly for religious purposes; healthcare facilities or education facilities.

YES

The project is for semi-professional or professional sports teams.

NO

This project includes dedicated spacing for housing; early learning and childcare facilities, highways and trade corridor infrastructure, resource development infrastructure, healthcare facilities or education facilities.

NO

The project advances reconciliation with Indigenous communities.

YES

Management & Planning

Management & Planning

Questions relate to sustainable management and planning of infrastructure. Additional resources on infrastructure asset management can be found on the Asset Management BC website: **www.assetmanagementbc.ca** .

For the infrastructure applied for in this application:

How will the assets associated with the completed project be managed and maintained over their life?

The City's facilities staff will conduct weekly inspections and minor maintenance. The City will retain a marine structural engineer to perform a comprehensive inspection every 5 years as part of its ongoing maintenance program.

How will ongoing operating and maintenance costs be funded?

The design consultant will provide a maintenance plan and budget for annual maintenance. As this is an existing facility, ongoing maintenance costs are funded from the operating budget.

How does the project design support reduced operation, maintenance and related costs over the lifecycle of the infrastructure?

The new Pier will be constructed using durable materials: steel piles and concrete deck panels with timber deck planks on top.

Where the infrastructure will serve an ongoing need for the community, what activities will be carried out to ensure that the funds to replace the asset at the end of its life will be available?

The Pier will be included in the City's Facilities Master Plan which will outline the cost and timeline for asset replacement.

Note: proponents are expected to manage the completed project in a financially sustainable manner, including planning for the eventual renewal of the infrastructure without grant support.

For all infrastructure that your organization manages:

How do you keep track of the infrastructure assets you manage, including their condition and performance?

The City conducts condition assessment reviews and infrastructure master plan updates on a periodic basis. In 2019, the City will be renewing its Facilities Master Plan. The City retains a consultant to conduct a comprehensive inspection of the Pier every 5 years. The last inspection was completed in 2012 and repairs were completed in 2013. This inspection program will continue for the new Pier.

What do you do to ensure that the service provided by infrastructure remains cost effective/cost efficient?

The City tracks the operating costs of all assets. If operating costs unexpected increase, the City will determine if additional maintenance or adjustments to special events programming is necessary.

Describe long-term planning activities that are currently used to manage infrastructure.

The City will be retaining a consultant to prepare a comprehensive Facilities Master Plan. This master plan will outline the long-term maintenance costs and management requirements for all civic facilities.

What are your ongoing revenue sources and what planning is carried out to ensure that costs to maintain, operate, and replace infrastructure assets can be met over the long-term?

Ongoing revenue sources include property taxes, user fees, and contributions to reserves. City will be retaining a consultant to prepare a comprehensive Facilities Master Plan. This master plan will outline the long-term maintenance costs and replacement program for the Pier.

Climate Change and Environmental Considerations

How is your project design considering potential impacts from climate change?

The steel pile and precast concrete deck design is flexible and allows modifications to the pier elevation to cater to future sea level rise.

Will the project achieve a reduction in greenhouse gas emissions?

NO

Was the consumption of natural resources considered for this project during planning, design and construction? (eg. reduced energy usage, reduction in or use of local materials, water conservation, or emissions production).

YES

Please describe.

Whenever possible, local materials such as concrete or locally sourced timber decking will be used.

Outcome Specific Questions

Community: The project will improve access to or increase the quality of a community space

Program Targets & Community Benefits

What steps were completed to identify the need for the project in the community?

The Pier was damaged by an unexpected storm event. Emergency repairs and reconstruction of the Pier to current seismic requirements are necessary. Without reconstructing the Pier, this asset will remain vulnerable to future storm events and seismic events.

How does this project improve quality of life in your community?

Our residents and visitors experience an extraordinary quality of life due to White Rock's temperate climate,safe and healthy neighbourhoods, and accessible ocean waterfront including the historic White Rock Pier. The Pier enhances and promotes White Rock's beautiful waterfront as a memory-making destination where people can shop, dine, gather, play, and connect with nature. Residents can enjoy passive recreational activities such as strolling, bird watching, fishing and crabbing. Refer to attached Appendix PDF.

Who is the intended target user group for this project?

Residents and visitors of all ages and abilities.

Will there be a cost to access the new infrastructure?

NO

Does this project provide new capacity or increase quality of existing infrastructure?

YES

Describe how.

The Pier superstructure will be constructed from steel piles and precast concrete deck panels. Timber deck planks will be cladded on top. Timber compaction piles driven under and over a prescribed width on either side of the pier will be required to address soil liquefaction during seismic events. The new Pier will be resilient to seismic events and storm events.

How does this project improve community attractiveness to attract and retain residents/business?

The new Pier enhances and promotes White Rock's beautiful waterfront as a memory-making destination where people can shop, dine, gather, play, and connect with nature. Residents can enjoy passive recreational activities such as strolling, bird watching, fishing and crabbing.

What other benefits does this project have for your community?

The new Pier enhances and promotes White Rock's beautiful waterfront as a memory-making destination where people can shop, dine, gather, play, and connect with nature. Residents can enjoy passive recreational activities such as strolling, bird watching, fishing and crabbing. The facility supports a cellular tower at the of the Pier; this tower provides critical telecommunications coverage for emergency services (E-Comm 9-1-1). Additionally, the east dock is used by the Canadian Border Services Agency for visitors entering Canada by vessel.

Please fill out the table below for Federal reporting

Include only assets that will be receiving investment

Community

Before Investment

After Investment

Type of assets receiving investment

Quantity / Length before investment

Physical Condition before investment

Quantity / Length after investment

Physical Condition after investment

Community Centre

Presentation space

Community facility

470m

Poor

470m

Very Good

Other

Other Description

Submission

Applicants should be aware that information collected is subject to the Freedom of Information and Protection of Privacy Act.

On behalf of

City of White Rock

I Jim Gordon

certify that the information contained in this Application form is to the best of my/our knowledge, correct and complete and has been submitted with Council/Board/Band Council concurrence, as authorized by a resolution dated (or that is anticipated on):

2019-01-23

This will certify the following authorities have reviewed and approved this application:

Sandra Kurylo

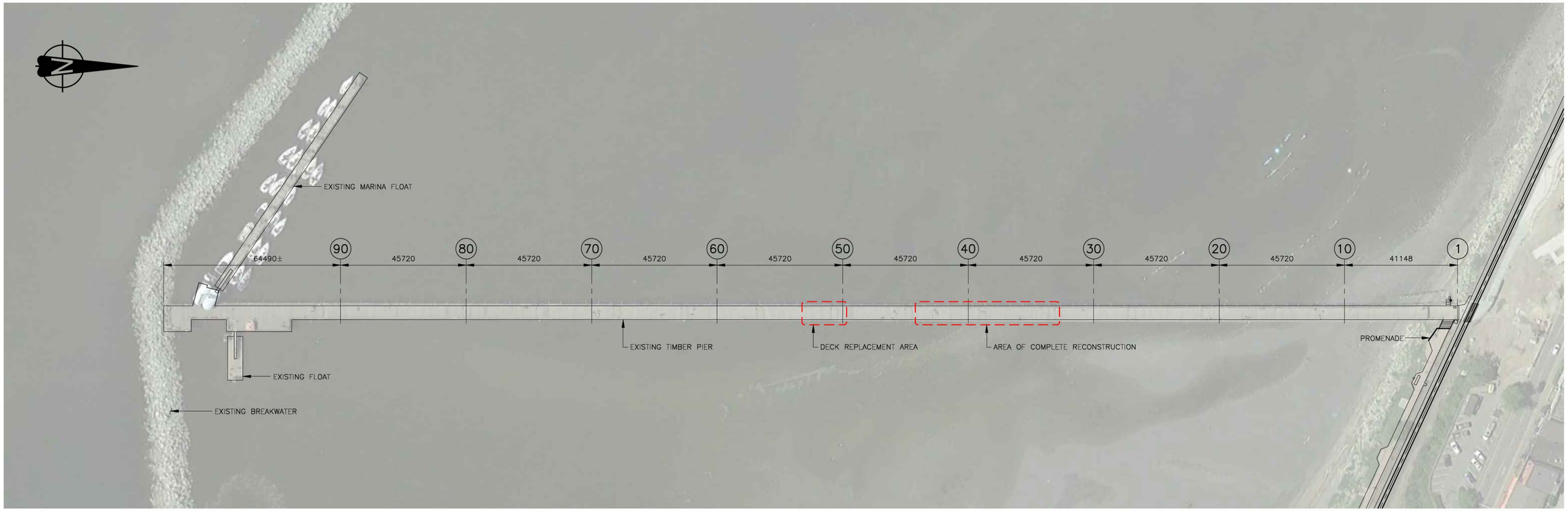
Director of Finance

Financial Approver

Jim Gordon, P.Eng.

Director of Engineering and Municipal Operations

Engineer or Project Manager Approver



SITE PLAN
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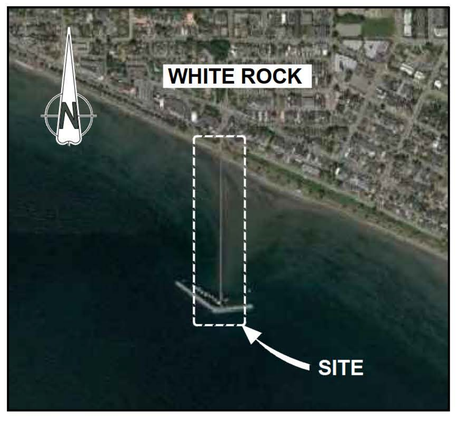

KEY PLAN

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PRELIMINARY
DO NOT USE FOR CONSTRUCTION
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No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P2	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL
P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: EXISTING SITE PLAN

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1180031	SK–100	P2

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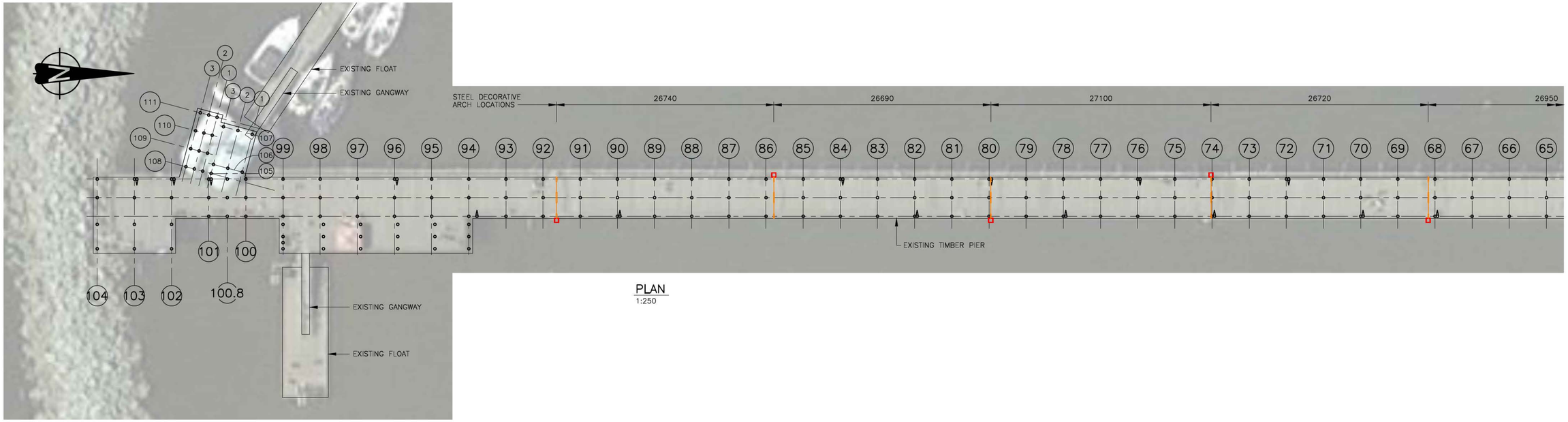
Last Saved: Jan. 13/19 6:40pm Plotted: Jan. 13/19



PLAN
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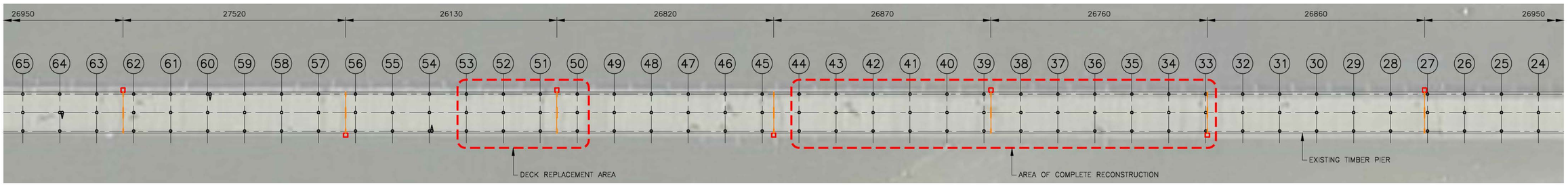

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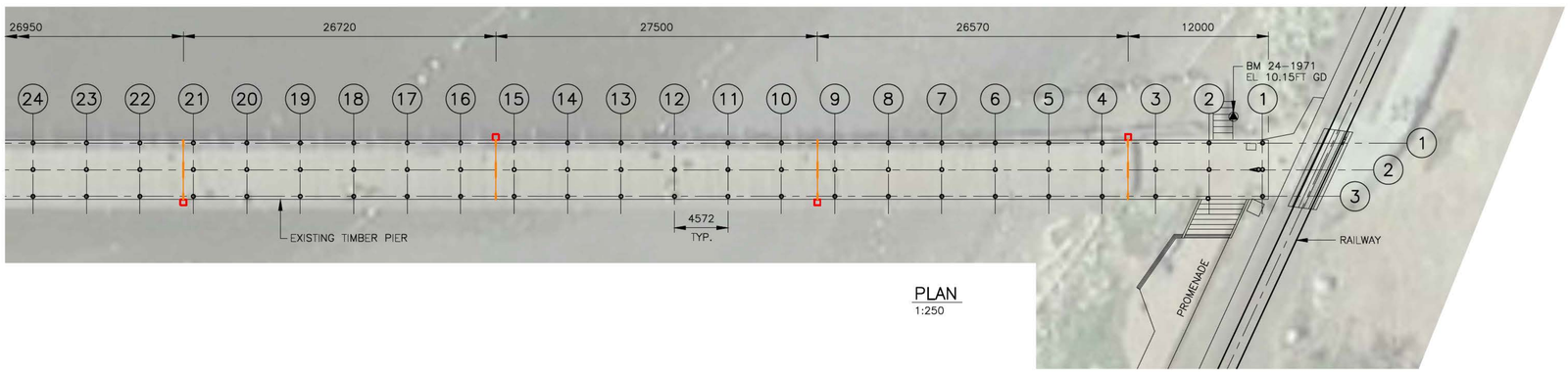

PLAN
1:250

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PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

LEGEND:
- ELECTRICAL J-BOX
- STEEL DECORATIVE ARCH

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P2	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL
P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT PLAN

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
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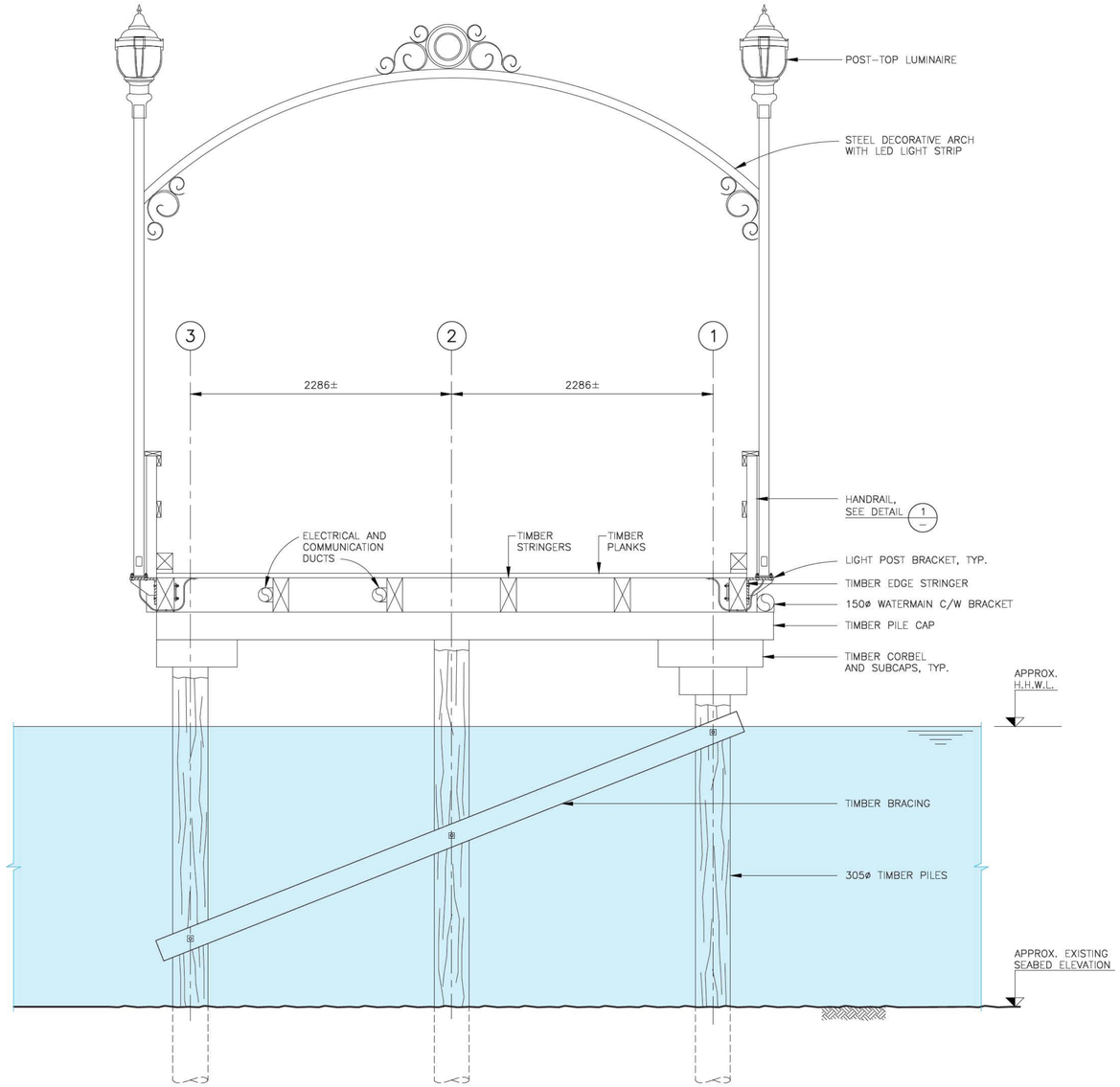
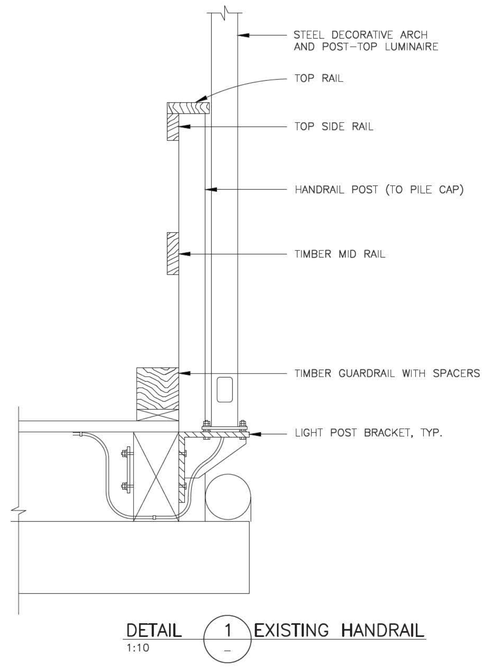


EXISTING CROSS SECTION – LOOKING SOUTH
1:25



DETAIL 1 EXISTING HANDRAIL
1:10

EXISTING PIER HANDRAIL

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P2	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL
P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT
TIMBER STRUCTURAL SYSTEM

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
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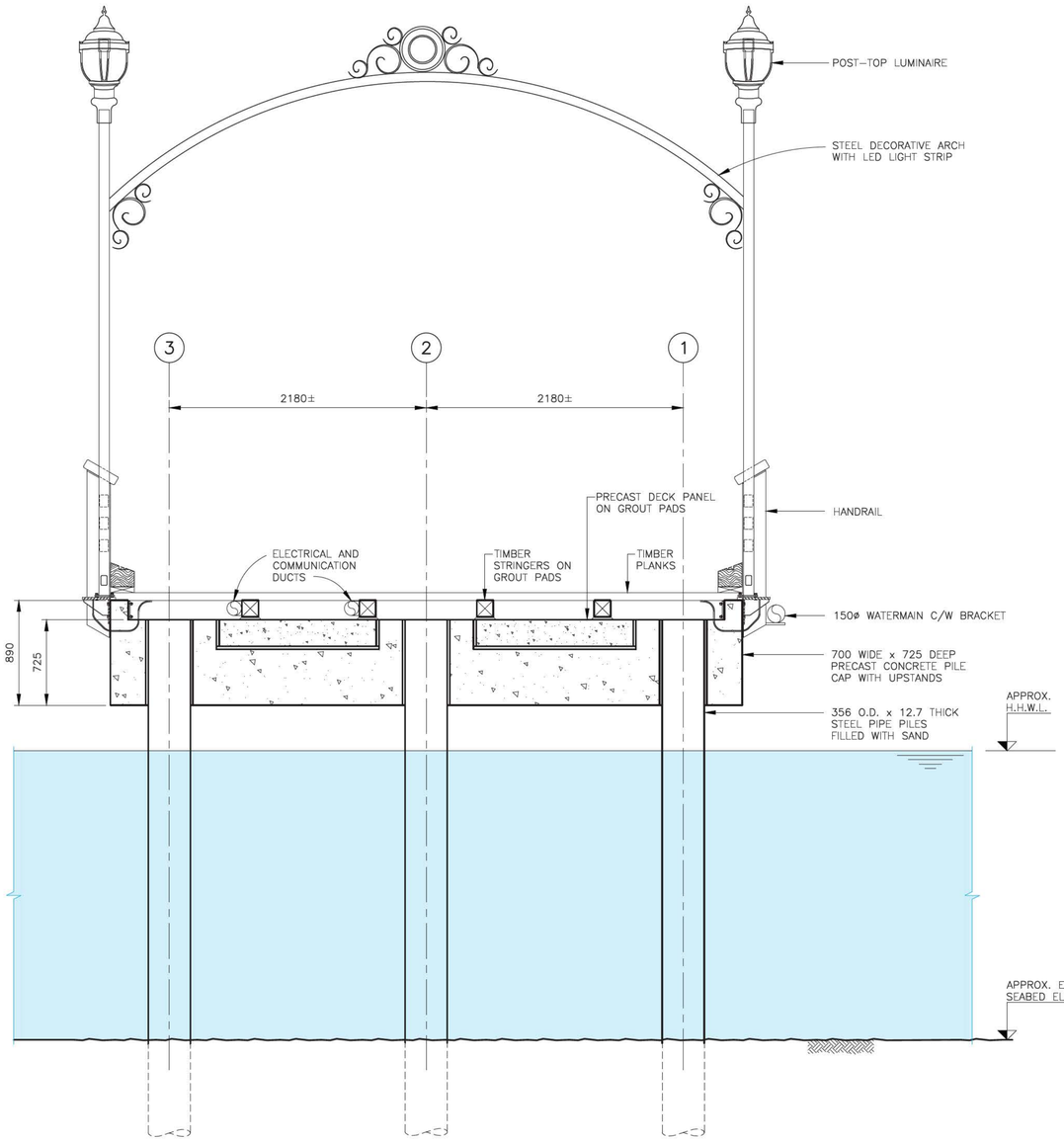
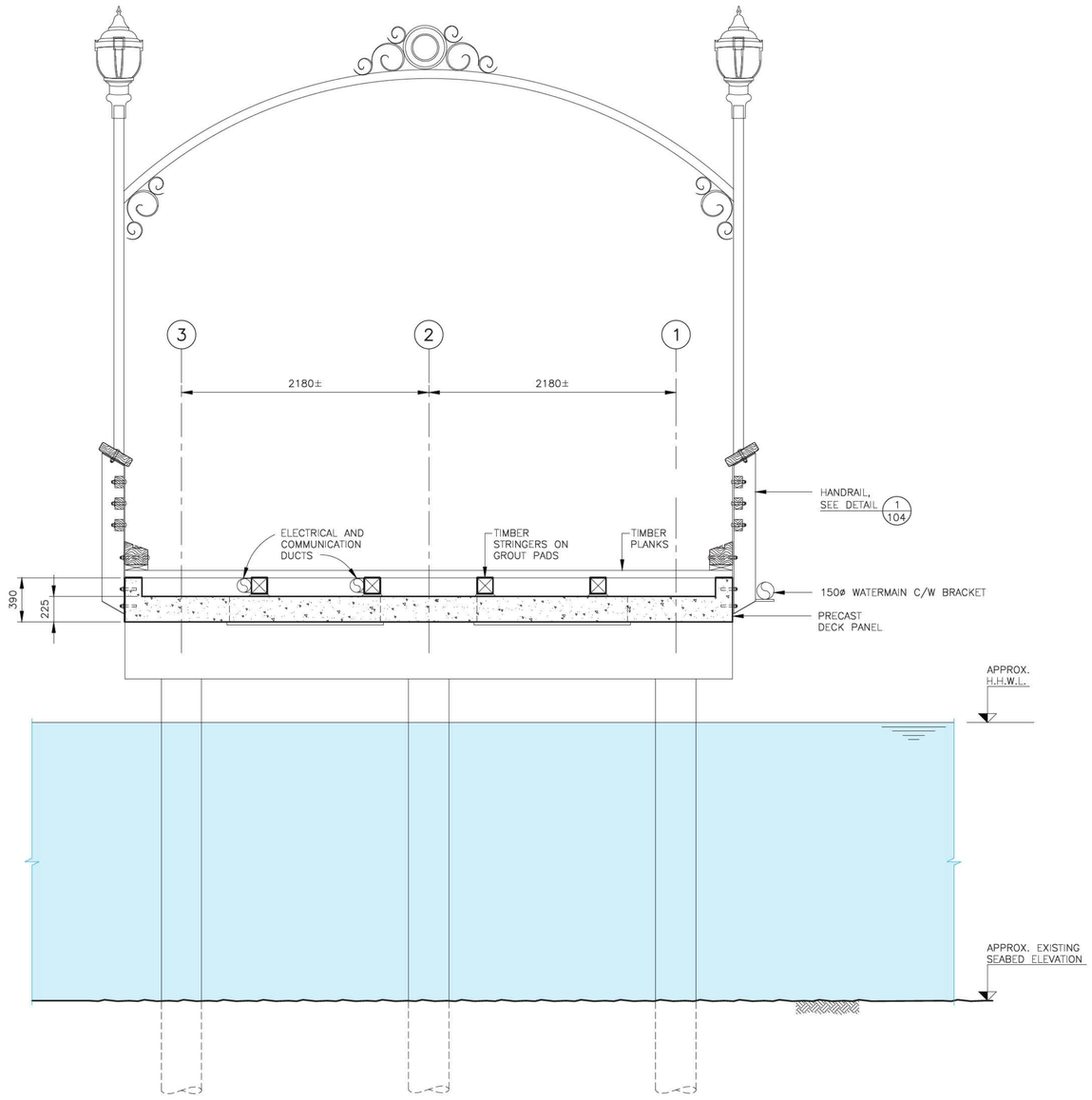


PROPOSED CROSS SECTION AT PILE CAP – LOOKING SOUTH
1:25



PROPOSED CROSS SECTION AT MID–SPAN – LOOKING SOUTH
1:25

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P2	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL
P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT STEEL PILE STRUCTURAL SYSTEM SECTIONS

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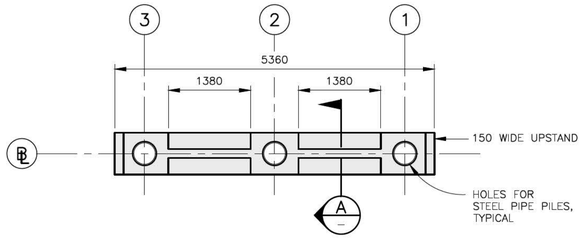
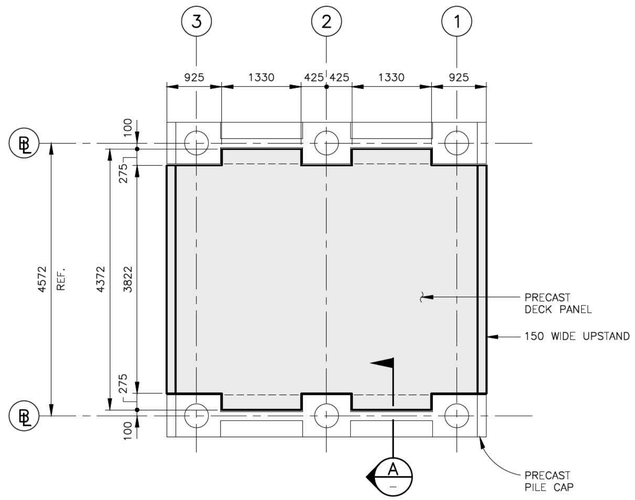
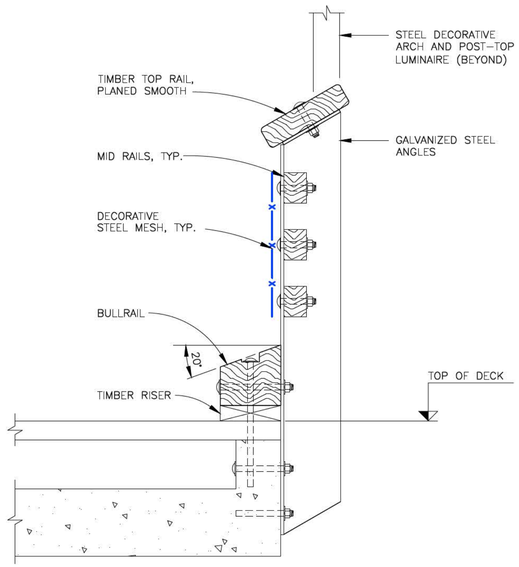


PLAN – PRECAST PILE CAP
1:50

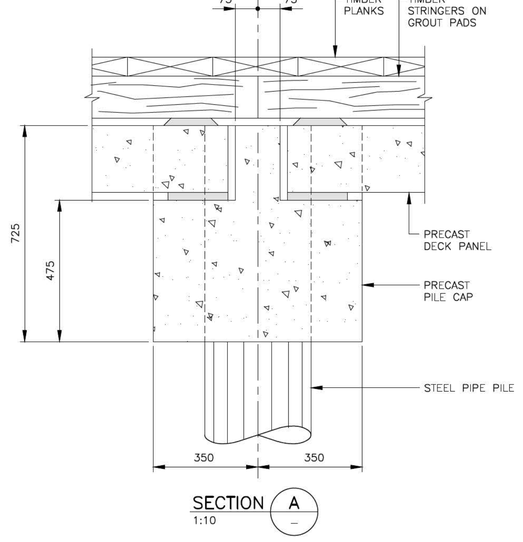


PLAN – PRECAST DECK PANEL
1:50



DETAIL 1/103 HANDRAIL
1:10

PROPOSED PIER HANDRAIL



SECTION A/–
1:10

PRELIMINARY
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Last Saved: Jan. 13/19 6:40pm

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P2	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL
P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

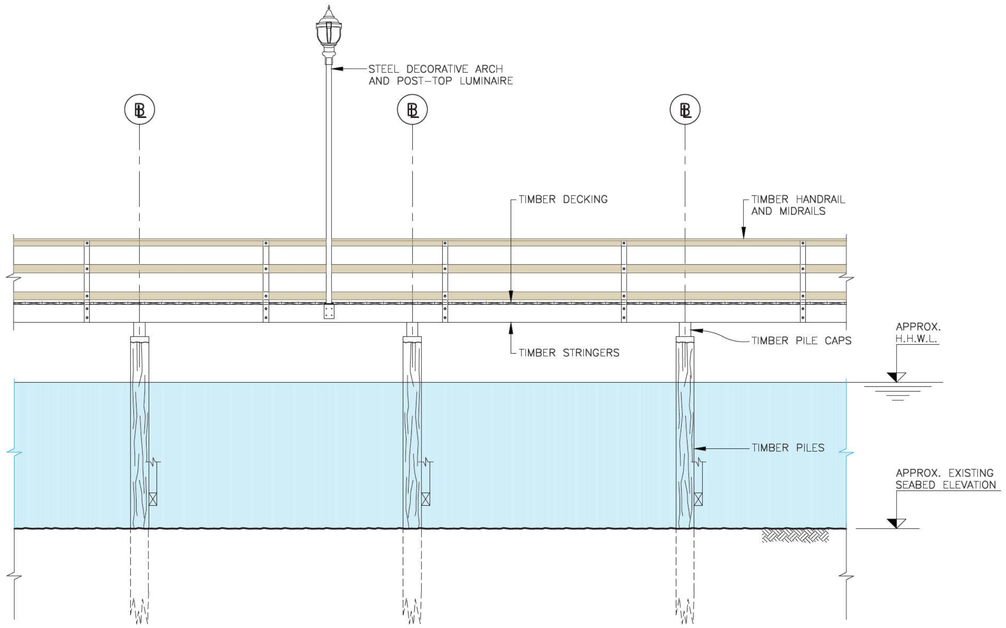
CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

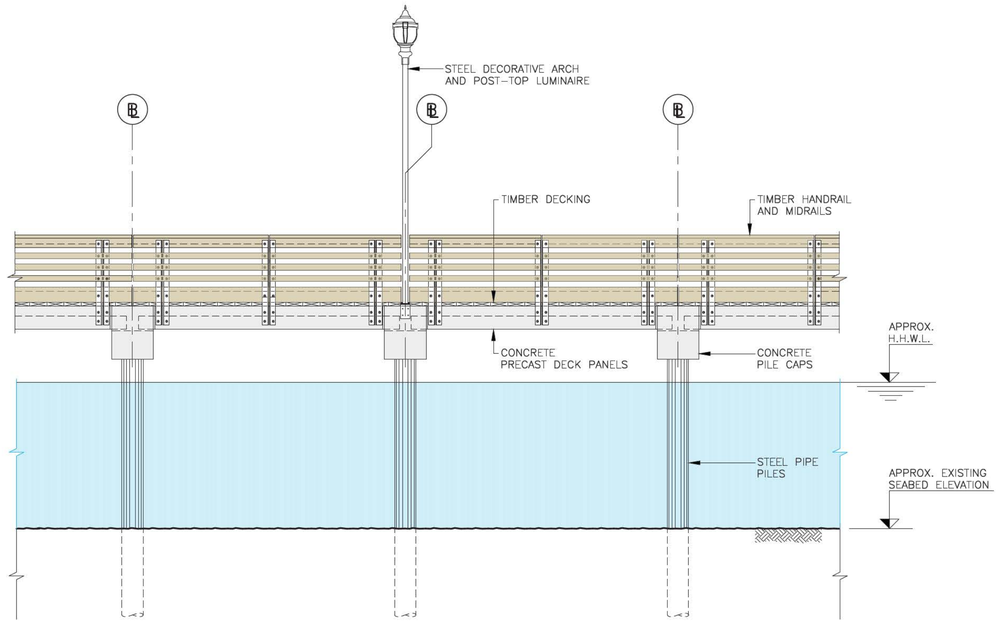
WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT STEEL PILE STRUCTURAL SYSTEM DETAILS

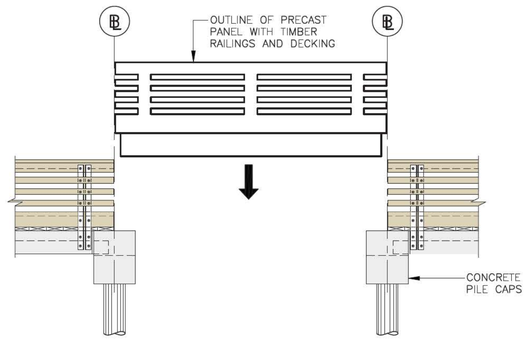
DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1180031	SK–104	P2



TYPICAL ELEVATION LOOKING WEST – EXISTING TIMBER PIER
1:50



TYPICAL ELEVATION LOOKING WEST – CONCRETE AND STEEL RECONSTRUCTION PIER
1:50



INSTALLATION OF PRECAST PANEL
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PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P1	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: EXISTING AND PROPOSED ELEVATIONS

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1180031	SK–105	P1

WESTMAR ADVISORS

WHITE ROCK City by the Sea!

Structural System Study for Reconstruction of White Rock Pier

Doc No. 1180031-REP-001 Rev. 0

14 January 2019

Structural System Study for Reconstruction of White Rock Pier

Doc. No. 1180031-REP-001 Rev. 0
14 January 2019

SIGNATURES

NAME		SIGNATURE	DATE
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Reviewed by:	Colleen Ackermann, P.Eng.	[Original Signed]	14 January 2018
Approved by:	Daniel Leonard, MASc, P.Eng.	[Original Signed]	14 January 2018

VERSION HISTORY

REVISION	DESCRIPTION	DATE
A	Issued for client review	10 January 2018
0	Issue for Use	14 January 2018

Executive Summary

Westmar Advisors Inc (Westmar) was retained by the City of White Rock (CoWR) to assess the damage caused to the White Rock Pier by a storm event on December 20, 2018. Findings from Westmar's assessment along with recommendations to repair damaged sections were presented in a memorandum dated December 21, 2018. Prior to detailed design, the CoWR has requested Westmar to carry out a study to investigate alternative structural systems for reconstruction of damaged sections of the pier.

The CoWR would like to restore the pier back to a serviceable condition by August 31, 2019. While the CoWR is considering replacement of the entire pier in the coming years, a complete replacement, within the current desired time frame, may not be feasible. Therefore, it is proposed that only damaged sections of the pier be reconstructed at this time. However, the proposed design should be such that it may be replicated along the remaining sections of the pier in the future.

Key considerations when developing a design for reconstruction of the damaged sections of the pier include seismic performance, sea level rise and design deck elevation, permitting considerations, insurance requirements, durability, constructability and schedule. It is believed that the soil at the project site is prone to liquefaction under design seismic events and the design should incorporate necessary ground improvement to achieve acceptable seismic performance. The design should be flexible enough to allow modifications to the pier elevation to cater to future sea level rise. Placement of construction equipment along the beach should be minimized and the DFO windows for in water works should be adhered to. The design should consider any insurance requirements related to material of construction and extent of upgrades. In view of the CoWR's desired completion timeline and the increased activity in the local marine construction industry, the design should incorporate construction methods that are common place to British Columbia.

Five structural systems were evaluated for reconstruction of the damaged section of the pier; timber pile and deck, steel pile and timber deck, micro pile and concrete deck, steel pile and concrete deck and concrete pile and deck. A traffic light system was used to evaluate the performance of these structural systems as related to the key considerations. In evaluating the structural systems, the key considerations were weighted based on their relative importance to achieve the project objective of completion by the end of August 2019 while complying with code and regulatory requirements. Based on the evaluation, reconstruction of damaged sections of the pier using a steel pile and concrete deck system is preferred.

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1 Introduction

On December 20, 2018, the White Rock Pier sustained damage from a storm event. Upon request from the City of White Rock (CoWR), Westmar Advisors Inc. (Westmar) inspected the White Rock Pier on the same day to assess damage caused by the storm event. Findings from the inspection were presented in Westmar's memorandum "White Rock Pier – Emergency Inspection December 20, 2018" (included in Appendix 1). As part of the memorandum, Westmar provided recommendations to restore the pier to a serviceable condition. An order of magnitude cost estimate to implement the recommended actions was also presented.

The CoWR has now requested Westmar to develop an engineered design to reconstruct sections of the White Rock Pier that were damaged by the storm event of December 20, 2018. As a first step to the design process, various structural systems for reconstruction of the pier have been investigated. These systems are presented in this report along with their advantages and disadvantages as they relate to site conditions at the White Rock Pier.

1.1 Scope of Study

The scope of this study includes the following tasks:

- Review available reference information related to the White Rock Pier.
- Identify key considerations to be addressed in selection of a preferred structural system for reconstruction of damaged sections of the pier.
- Compare various structural systems and present their advantages and disadvantages as they relate to the key design considerations.
- Identify key next steps for reconstruction of the pier including regulatory, permit, tenant and/or procurement requirements.
- Prepare a report summarizing the findings from the structural system study including recommended actions.

1.2 Reference Information

The following reference material was made available to Westmar by the CoWR:

- WorleyParsons Report No. 307071-00353-00-MA-REP-0005_Rev 0 - White Rock Pier Load Rating and Light Pole Analysis dated December 16, 2011.
- Public Works Canada Drawing No. 010913 - White Rock BC Wharf Repairs - Plan and Details dated February 1977
- PWL Partnership and WorleyParsons Report - White Rock Pier Feasibility Study - dated July 2015
- WSP Report No. 161-13031-00/161-13055-00 – Memorial Park Upgrades – Geotechnical Assessment Report dated October 7, 2016.

2 Description of Existing Structure

2.1 Description

The White Rock Pier is located on the north side of Semiahmoo Bay along the White Rock Beach Promenade and Marine Drive. The timber pier is approximately 470 m long and extends, in the north to south direction, from the shore out into the bay. A breakwater and mooring float facilities are located at the southern end of the pier. General arrangement of the site is presented in Sketches 1180031-SK-100 and SK-101 in Appendix 2.

The pier, originally constructed in 1914/1915, underwent a significant repair and restoration program in 1977. Minor repairs and timber replacement have been implemented since then as part of CoWR's ongoing inspection and maintenance program.

2.2 Geometry

The pier structure is of timber construction and consists of piles, pile caps, stringers and decking. Member geometry as indicated on the reference documents is summarized below:

- Deck Planks: 38 mm by 285 mm
- Stringers: 100 mm by 300 mm
- Edge Stringers: 150 mm by 300 mm
- Pile Caps: 200 mm by 250 mm
- Piles: 305 mm butt diameter

2.3 Permissible Loads

A load evaluation of the White Rock Pier was undertaken in 2011 and the following live loads are considered permissible on the pier:

- Uniformly Distributed: 4.5 kPa
- Axle load of 450 kg with a proposed increase to up to 1750 kg by laying down additional timber planks in a longitudinal direction.

3 Key Design Considerations

In developing structural systems for reconstruction of damaged sections of the White Rock Pier, it is critical that the following key items are given due consideration:

- Seismic performance criteria
- Design deck elevation
- Permitting considerations
- Geotechnical conditions
- Insurance requirements
- Durability and maintenance
- Construction and procurement schedule
- Live loads on pier

In addition to the above, a design service life of 50 years is proposed for the reconstructed structure.

3.1 Seismic Performance Criteria

The White Rock Pier is founded on soils that will likely liquefy under both a 1 in 475 year and a 1 in 2,475 year return period seismic event. The existing pier is likely not designed to withstand kinematic loads and soil flow loads due to liquefaction of surrounding soil.

Based on Westmar's assessment of the damage caused by the December 20, 2018 storm event, it is estimated that about 15 to 20% of the existing pier will require reconstruction. When constructing new structures to current seismic code requirements around existing structures that were not designed for seismic loads or were designed to previous seismic codes, it is possible that the existing structures may fail during an event that is of lower magnitude than the design seismic event. The failure of the existing structures could endanger the new structure.

Given that the usage of the structure is not being altered, it could be argued that the reconstructed sections of the pier need not be upgraded to current seismic requirements. This will require discussion and confirmation with the regulatory Authority Having Jurisdiction (AHJ). However, if the CoWR replaces the entire White Rock Pier, the new replacement structure would be designed to meet applicable seismic requirements.

To avoid future modifications and/or upgrades to damaged sections of the pier that are currently being considered for reconstruction, it would be prudent to design these sections to current seismic requirements.

When subject to design seismic events, the performance objective of codes and standards is focused on life safety with the understanding that structures may sustain irreparable damage but will not collapse. For reconstruction of the White Rock Pier, the design event will be an earthquake with a probability of exceedance of 2% during the life of the structure (return period of 1 in 2,475 years).

To achieve the code performance objective of no collapse under the design seismic event it is likely that ground improvement will be required. It may be possible to design the structural system to resist the seismic forces imparted without the need for ground improvement. However, given the short duration of the project and the limited available geotechnical data, it is assumed that ground improvement will be required.

3.2 Design deck elevation

The White Rock Pier was designed in the early 1900s and as evident from the current elevation of the pier, the original design did not consider global warming and sea level rise. Conservatively, the BC Ministry of Transportation recommends an annual seal level rise allowance of 10 mm starting from the year 2000. In designing a replacement structure for the White Rock Pier, it is likely that this or a less conservative allowance for sea level rise may be adopted.

Regardless of the sea level rise allowance that is adopted in future for replacement of the White Rock Pier, the current design for reconstruction of the damaged sections of the White Rock Pier must meet the following requirements:

- Match the elevation of the exiting undamaged structures to allow unobstructed travel for both pedestrians and light vehicles;
- Incorporate provisions such that the elevation of the reconstructed sections may be easily adjusted to match future elevation changes when other sections of the pier are designed considering sea level rise.

The conceptual design of reconstruction alternatives will allow for the addition of pile cap sections in the future to increase deck elevation and the piles will be designed to accommodate the increased loads.

3.3 Permitting Considerations

Several sections of the pier that sustained damage from the December 20, 2018 storm event are located closer to the shore end of the pier. The shallow water depths at these locations precludes construction using floating marine rigs. Placement of construction equipment along the beach including grounding of barges will likely be required. It is Westmar's understanding that this construction methodology has been adopted during past rehabilitation works at the site.

Installation of micropiles from the deck of the pier using small sized equipment could be considered to avoid placing conventional equipment on the beach. However, this methodology does not address ground improvement requirements. Currently, it is envisioned that ground improvement using timber compaction piles driven under and over a prescribed width on either side of the pier will be required to address soil liquefaction during seismic events.

Based on discussions with Hatfield Consultants Partnership (Hatfield), Westmar understands that the area of the beach under and immediately adjacent to the pier may not be considered high value habitat. Furthermore, it could be argued that the proposed disturbance to this area; installation of compaction piles and pier support piles, is a single occurrence event which will not result in permanent destruction of habitat. It is possible that the works for reconstruction of the damaged sections of the pier could be carried out using a Self-Assessment Letter prepared by a Registered Professional Biologist. This requires confirmation from the Department of Fisheries and Oceans (DFO).

For the protection of Fish and Fish Habitat, DFO requires that all in water works be completed within the Fisheries window which closes on February 28, 2019. While above water works such as construction of the superstructure can be executed outside the fisheries window, in water works including pile installation and ground improvement will generally have be completed prior to the closure. This is a key consideration and will drive procurement activities for the project especially since construction material such as timber and steel piles have considerable lead time. Given that the proposed work is related to emergency reconstruction following a storm event, it is possible that DFO may permit carrying out in works outside the Fisheries window.

Subsequent to identifying a preferred design option, Hatfield will coordinate with DFO to confirm both Self-assessment requirements as well as discuss the possibility of working outside fisheries windows.

3.4 Geotechnical Conditions

There is limited information available on the geotechnical conditions at the White Rock Pier. Based on previous reference information provided by the CoWR, Westmar understands that additional geotechnical data may be available. Specifically, the following information would assist with the design of the new structure:

- Sediment samples testing completed by Stantec for the marina maintenance dredging project. Westmar has requested Stantec for this data.

To determine the true liquefaction potential of the project site, it may be required to carryout Cone Penetration Testing at the location of the Pier. EXP is currently working with contractors to identify equipment availability and cost for carrying out the CPT tests. This will be provided to the CoWR as soon as the information is available.

3.5 Insurance requirements

It is Westmar's understanding that the CoWR intends to rely at least partially on its insurance policy to cover the cost of reconstruction of the damaged sections of the White Rock Pier. It has been Westmar's experience that insurance policies can be very prescriptive in defining the extent and aspects of coverage. Specifically, it is important to understand if the CoWR's insurance policy has any clauses limiting the materials of construction that should be used for reconstruction of the damaged sections and if the insurance covers the cost of upgrading the structure to current codes.

3.6 Durability and maintenance

The existing White Rock Pier is of timber construction and repair and replacement of deteriorated timber elements is undertaken on a periodic basis. The last maintenance repair program was carried out in 2014. Structural systems that are more durable and require less maintenance are likely to incur less life cycle cost over the design service life of 50 years and would be preferred over systems that require frequent maintenance.

3.7 Construction and procurement schedule

It is Westmar's understanding that the CoWR would like to restore the White Rock Pier to a serviceable condition by August 31, 2019. To achieve this goal, the following constraints will have to be addressed:

- As discussed in Section 3.3, the DFO requires all in water works to be completed prior to the closure of fisheries window on February 28, 2019. Accordingly, all pile driving and ground improvement activities will have to be completed by this date. Given the emergency nature of the reconstruction work, the CoWR will need approval for an extension to the fisheries window from DFO.
- Regardless of the structural system that is chosen for the reconstruction of the pier, long lead items such as timber piles for ground improvement and steel or timber piles for the pier will have to be procured well in advance of the start of construction.
- The marine construction industry in Vancouver is seeing a period of increased activity and contractor availability is limited. It would be prudent to identify a contractor for the reconstruction work as early as possible. Early contractor engagement will also allow incorporation of materials of construction that the contactor has readily available thereby alleviating some need to procure long lead items.

A tentative schedule for reconstruction of damaged sections of the pier is presented in Appendix 3.

3.8 Live Loads

In designing the replacement of the Pier, the following live loads will be considered:

- Uniformly Distributed: 4.8 kPa
- Wheel loads from an ambulance.

4 Structural systems

The White Rock Pier is a relatively lightly loaded structure that primarily resists live loads from pedestrians and light vehicles. Barring seismic and environmental loads, the White Rock Pier is not required to resist vessel induced lateral loads which is usually a key consideration in the design of typical marine structures. The damaged sections of the White Rock Pier can be reconstructed using one of several structural systems.

A pile and deck structural system is preferred over gravity retaining systems for the following reasons:

- It is believed that soil stratigraphy at the project site consists of glacial till at deep depths with overlaying soil that is prone to liquefaction. Adopting a gravity retaining system would require substantial dredging of in situ soil and ground improvement.
- The location at which reconstruction is required, close to the shoreline at low water depths, limits the size of construction equipment that can be used. Installation of gravity structural systems typically requires large equipment which will likely not be able to easily access the damaged locations.
- Some gravity systems such as caissons require construction in the dry and substantially long lead time. Given the February 28, 2019 fisheries window and the August 31, 2019 completion timeline, adopting these structural systems will not align with the project schedule.
- Gravity structural systems typically have large footprints including requirements for rock mattresses to control settlement and will have a larger impact on the marine habitat in the location when compared to pile and deck systems.
- The installation of a gravity system at this location would also act as a groin perpendicular to the beach potentially affecting sediment transport leading to infill and/or erosion at beach locations on either side.

For the purpose of this study, the following types of pile and deck structural systems have been considered:

- Timber pile and deck
- Steel pile and timber deck
- Micropile and concrete deck
- Steel pile and concrete deck
- Concrete pile and deck

A brief description of each of the above structural systems is presented below. Advantages and disadvantages of the structural systems as they relate to the key design considerations are presented in Section 5.

4.1 Timber Pile and Deck

The timber pile and deck structural system is similar to the existing pier and consists of timber deck planks supported on timber stringers, pile caps and piles. Sizing and spacing of timber elements will be based on the design loads and will be in accordance with current design codes and standards. In reviewing the damage caused to the existing structures by the storm event, it was observed that a number of the existing pile to pile cap connections consisting of a single drift pin had failed resulting in failure of the piles and sometimes entire pile bents. In line with modern design codes, the new design would include steel bands around the top of piles to prevent splitting of piles when subject to lateral loads.

A typical timber pile and deck structural system is schematically shown in Sketch 1180031-SK-102 in Appendix 2.

4.2 Steel pile and timber deck

The steel pile and timber deck structural system consists of timber planks supported on timber stringers, steel pilecaps and piles. Alternatively, the system could be designed such that timber deck planks are supported on steel stringers, pilecaps and piles. Due the large number of connections between the steel and timber elements, durability is a concern for this alternative. Corrosion of steel elements in the intertidal and splash zones is also a limitation of this structural system.

4.3 Micropile and Concrete Deck

The micropile and concrete deck structural system consists of drilled micropiles supporting a concrete pilecap and deck. Micropiles are steel tubular casings up to 300 mm in diameter that are installed using drilling techniques and filled with reinforcement and grout. Micropiles can be installed using smaller drilling equipment from above deck. Depending upon pile length, micropiles can develop high axial and lateral load capacities. Moment connection between the micropile and the concrete deck is achieved by embedding the micropile into the pilecap and using external shear rings.

Figure 1 presents equipment required for the installation of Micropiles and Figure 2 illustrates schematically the installation of micropiles.

Figure 1 – Equipment for installation of micropiles
(https://www.haywardbaker.com/uploads/solutions-techniques/micropiles/)

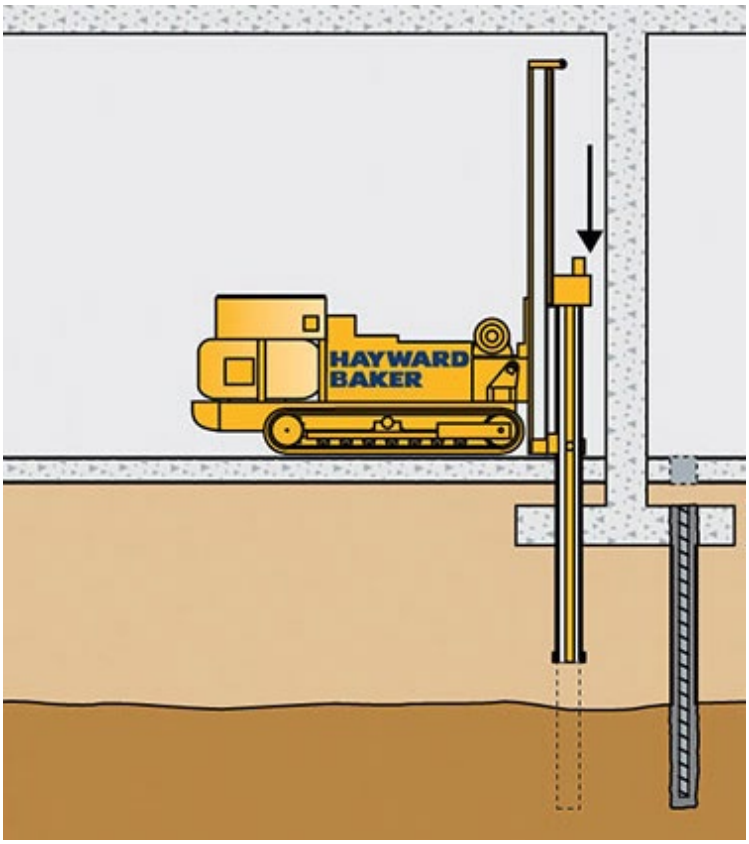

Figure 2 - Micropile Installation

(https://www.haywardbaker.com/uploads/solutions-techniques/micropiles/)

4.4 Steel pile and Concrete Deck

Conventional steel pile and concrete deck structural systems consist of steel tubular pipe piles supporting a concrete deck. The deck is typically a combination of cast-in-situ and precast concrete elements. The steel pipe pile is partially embedded into the concrete pile cap and moment connection between pile and pile cap is achieved through the development of reinforcing bars from the pile plug into the pilecap. Internal steel rings are installed near the pile tops to allow transfer of shear. Alternatively, the steel pipe pile could be fully embedded into the pilecap with external shear rings and the anulus between the pile and pilecap could be grouted. A schematic representation of the steel pile and concrete deck that would be used for reconstruction of the White Rock Pier is shown in Sketch 1180031-SK-103 in Appendix 2.

4.5 Concrete pile and deck

Concrete pile and deck structural systems are similar to steel pile and concrete deck structural systems with the exception that the piles are of concrete construction. The use of concrete piles is particularly advantageous when a large number of piles are required and pile lengths are reasonably uniform. While this structural system is proposed for comparison, it is noted that the use of concrete piles has not been common practice in Vancouver in the recent past.

Figure 3 presents a typical concrete pile and deck structural system.

Figure 3 - Concrete Pile and Deck Structural System

(https://i.pinimg.com/736x/d2/aa/e0/d2aae0d3e88a9d2868cac6907ecf78f3--precast-concrete-piles.jpg)

5 Evaluation of Structural Systems

A traffic light evaluation of the structural systems is presented in Table A. A brief discussion on the evaluation is presented following the table.

Table A - Traffic Light Evaluation of Structural Systems

Structural System	Seismic	Sea Level	Permitting	Insurance	Durability	Schedule	Constructability	Total
Weighting	**2**	**1**	**2**	**1**	**1**	**2**	**1**	**10**
Timber Pile and Deck	4	4	4	4	3	5	5	42
Steel Pile and Timber Deck	5	5	4	3	3	4	4	41
Micropile and concrete deck	4	5	5	3	4	4	3	41
Steel pile and concrete deck	5	5	4	3	4	5	5	45
Concrete pile and deck	4	5	4	3	5	3	3	38

5.1 Seismic Performance Criteria

As discussed in Section 3.1, in situ soil at the project site is expected to liquefy under the design seismic events and ground improvement will likely be required under and over a prescribed width on either side of the pier. The steel pile alternatives have high ductility and hence, are preferred from the perspective of seismic performance. Both the steel and concrete pile alternatives are robust and more likely to resist soil flow and kinematic loading in comparison with timber pile and deck and micropile systems. The timber deck alternatives have lower seismic mass and attract less seismic loads when compared to the heavier concrete deck options. In combination with ground improvement, all the structural systems can likely be designed to achieve the desired seismic performance.

5.2 Design Elevation of Pier

The current deck elevation of the White Rock Pier does not consider future sea level rise. Should the CoWR decide to replace the White Rock Pier in the future, it is likely that the replacement structure will be designed to an elevation that is higher than the current deck elevation to account for sea level rise. It is prudent to make provisions in the current design such that future elevation changes can be accommodated. All the proposed structural systems can be designed to allow addition of elements to increase deck elevation.

The concrete deck systems can be modified by the addition of precast elements that can be custom built to closely match elevation changes. The timber pile and deck systems can be modified by the addition of timber elements on top of existing pilecaps or stringers. However, achieving an integral timber system requires a significant number of connecting hardware which will likely affect durability. The steel pile and timber deck alternative can be modified by the addition of new sections of steel elements either through bolted or welded connections.

5.3 Permitting Considerations

Damaged sections of the pier are located close to shore where water depths are limited even during high tides. From the perspective of disturbance to the marine habitat, structural systems that require large construction equipment are less preferred when compared to structural systems that can be installed using smaller equipment. Installation of micropiles can be carried out from above deck using drilling equipment that does not require impact driving and hence, is most preferred. The concrete pile and deck system is likely least preferred as it requires large construction equipment for both handling and installation of heavy concrete piles and deck sections. The steel pile alternatives require smaller equipment when compared to the concrete pile and deck system followed by the timber pile and deck system that requires even smaller equipment. Regardless of the structural system chosen, ground improvement will require the placement of construction equipment along the beach. Synergy between equipment for the timber pile and deck system and ground improvement could be argued as an advantage for the timber option.

5.4 Insurance requirements

Some insurance policies specify the type of material to be used for reconstruction, i.e. it may be specified that the policy only covers reconstruction using the same materials as that used in the original construction. Policies may or may not cover the cost of code upgrades that might be required by the AHJs for reconstruction after an incident. More information on the terms of the CoWR's insurance policy is required to determine if a specific structural system would be preferred over others. For the traffic light evaluation, we have assumed that the timber pile and deck option would have an advantage over the other options considering that this alternative is of the same material of construction as the existing pier.

5.5 Durability

Durability and maintenance determine the life cycle costs for the structure and are key when selecting a structural system. With the use of concrete mix designs appropriate for the marine environment, adequate cover to reinforcement, appropriate detailing, and good workmanship, the concrete pile and deck alternative would rate the highest from a durability and maintenance perspective. The timber pile and deck and steel pile and timber deck alternatives score poorly in this criterion owing to the susceptibility of timber to decay and steel to corrode in the intertidal and splash zones. The steel pile and concrete deck and micro pile alternatives rate in between the concrete and timber alternatives.

5.6 Schedule and constructability

The CoWR would like to complete reconstruction of damaged sections of the White Rock Pier by the August 31, 2019. The DFO generally requires all in water works to be completed within the least risk fisheries windows i.e. by February 28, 2019 unless special authorization is granted. Structural systems that can meet this DFO requirement are strongly preferred over options that are unlikely to meet this schedule. From a schedule perspective, structural systems in descending order of preference are timber pile and deck, steel pile and concrete deck, steel pile and timber deck, micropile and concrete deck and finally, concrete pile and deck.

The marine construction industry in Vancouver is seeing an exceptionally busy period and structural systems that are commonly used in the region will be preferred over unconventional systems. Accordingly, the timber pile and deck and steel pile and concrete deck structural systems are preferred over the other three systems.

6 Timber Repairs

The storm event of December 20, 2018 resulted in the collapse of entire pile bents and the associated super structure. Specifically, Bent Nos 33 to 44 and 51 to 52 sustained significant damaged. It is proposed that these sections of the pier be reconstructed using the selected structural system.

In addition to the sections that are proposed to be reconstructed, there are structural elements, elsewhere in the pier, that sustained localized damaged from the storm event. This includes failed pile to pile cap connections, fractured and/or split piles, fractured pilecaps and failed cross bracing. At these locations reconstruction of entire pile bents is not considered necessary. Instead, in kind replacement of failed timber elements and/or localized repairs is proposed.

The recommended timber repairs include realignment of piles and reconnecting to pilecaps, replacement of piles, installation of steel banding around spilt piles, replacement or repairs to pilecaps and replacement of cross bracing. These repairs will be carried out using conventional timber marine construction methods that have previously been used during maintenance and rehabilitation of the White Rock Pier. These methods include temporary shoring of pile bents to implement repairs to pilecaps (Figure 4), removal of localized sections of the deck to drive timber piles (Figure 5 and 6), installation of steel clamps around split piles (Figure 7) and installation of jackets around piles (Figure 8).

It is recommended that the above repairs be implemented at the same time as reconstruction of the collapsed sections of the piers and included in the scope of work of the reconstruction marine contractor.

Figure 4 – Temporary shoring of pile bents

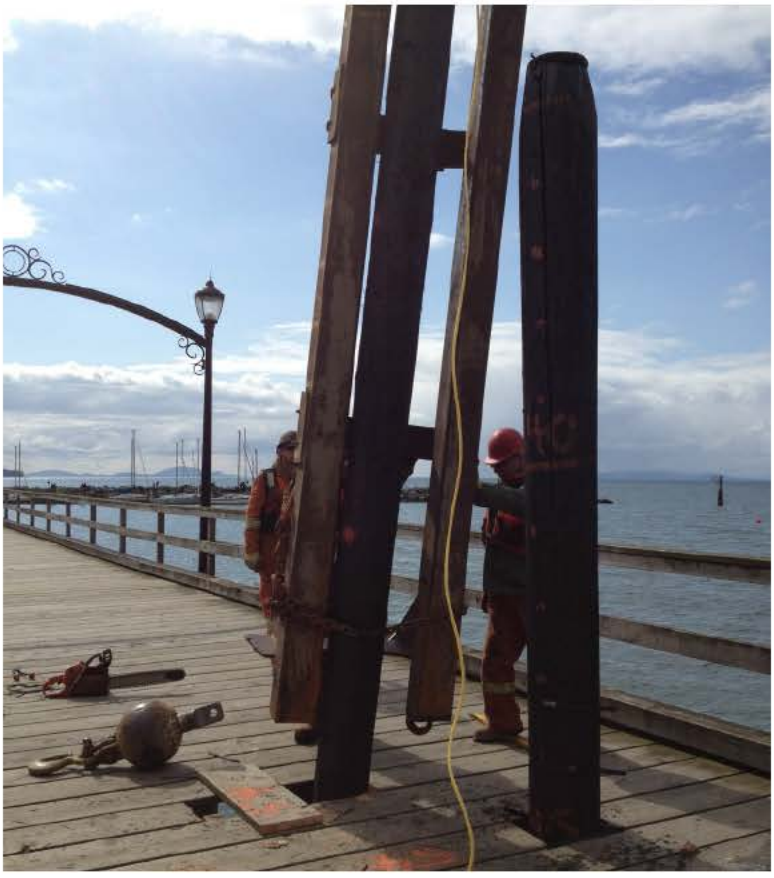

Figure 5 – Localized removal of deck to install piles

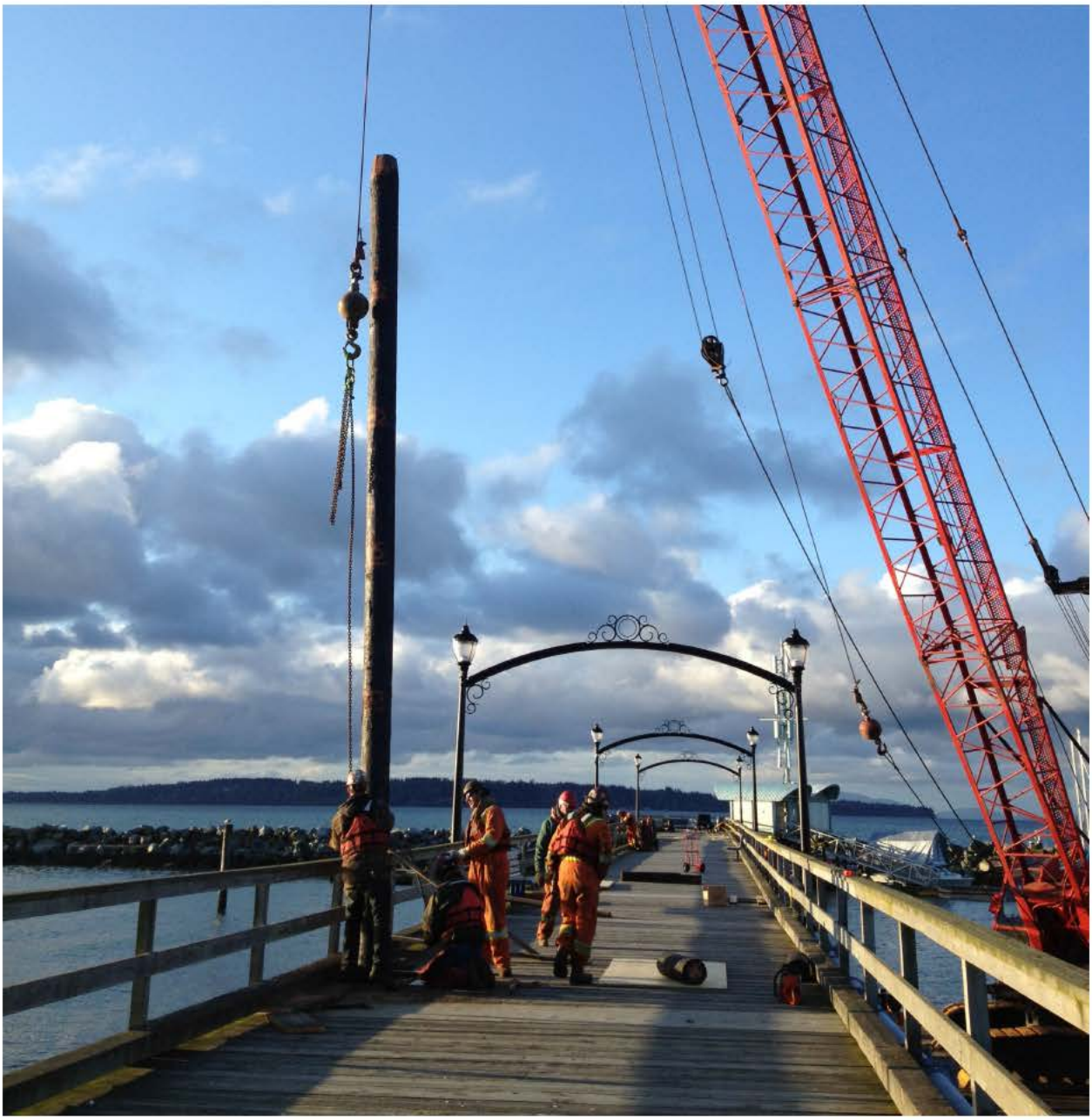

Figure 6 - Localized removal of deck to install piles

Figure 7 – Steel Clamps around Piles

Figure 8 – Installation of Jackets around piles

7 Architectural Considerations

Previous studies have looked at opportunities for viewing platforms, seating, and vendor kiosks along the Pier. The following features will be given due consideration in designing reconstructed sections of the Pier:

- If the steel pile and concrete deck alternative is selected, the concrete panels could be modified at multiple locations to provide space for these components while still maintaining the current pedestrian walking width and without the need for additional piles.
- The handrails along the White Rock Pier do not comply with the current edition of the BC Building Code. For the reconstructed sections of the pier, an updated version is proposed to meet current codes while closely matching the visual appearance of the existing handrails. To meet current codes, the handrail posts would be galvanized steel angles sandwiched between timber and the horizontal rails would be augmented with expanded metal to prevent the handrails from being climbable. A photo of the proposed code compliant handrails is presented in Figure 9. Sketch 1180031-SK-104 in Appendix 2 presents a comparison between the existing handrails and the proposed code compliant handrails.

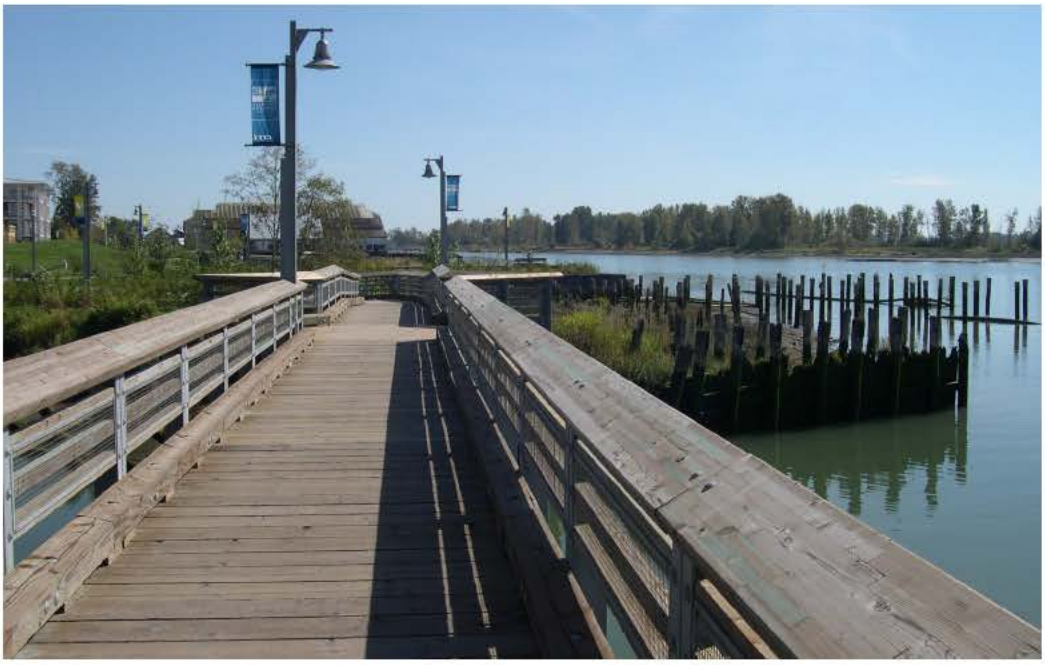

Figure 9 – Example of proposed code compliant handrails.

- In addition to the current conduits and utilities for lighting, marina power, communications, and water, it is recommended that conduits and junction boxes be included in the reconstructed sections of the Pier to facilitate the addition of foot lighting at benches or handrails, power junction boxes for vendors or maintenance, and hose bibs for washdown and other uses.
- The use of composite lumber materials will also be investigated to evaluate strength and durability trade-offs.
- The new structural system will allow for widening or re-alignment at the entrance to the Pier in order to provide better transitions to Memorial Park and the Promenade.

8 Summary and Recommendations

8.1 Summary

On December 20, 2018, several sections of the White Rock Pier were damaged due to a storm event. Upon assessment of the damage, it was determined that reconstruction of damaged sections is required to restore the pier to a serviceable condition. The CoWR would like to restore the pier to a serviceable state by the end of August 2019. While the CoWR is considering replacement of the entire pier in the future, this is not considered a feasible option within the currently proposed timeframe. Instead, it is proposed that damaged sections of the pier be reconstructed using a design that may be replicated along the remaining sections of the pier in the future. Depending upon time and cost considerations, replacement of the pier could be carried out in a phased manner.

Key design considerations when selecting alternatives for reconstruction of the pier include seismic performance, sea level rise and design elevation of pier, permitting, insurance requirements, durability and maintenance and construction and procurement schedule. Design considerations were weighted to reflect their relative importance in meeting the project objective of timely completion and code compliance.

Five structural systems, namely, timber pile and deck, steel pile and timber deck, micropile and concrete deck, steel pile and concrete deck and concrete pile and deck were compared. The performance of these systems related to the key design considerations was compared using a traffic light evaluation. Based on the traffic light evaluation, the steel pile and concrete deck alternative is preferred followed by the timber pile and deck alternative. The concrete pile and deck option is least preferred. The steel pile and timber deck and micro pile systems rank higher than the concrete pile and deck option.

8.2 Recommendations

To restore the White Rock Pier to a serviceable condition by the end of August 2019, the following critical actions are recommended:

- Geotechnical information about the project site at the location of the pier is limited. While it is believed that the site is prone to liquefaction, it is recommended that CPT tests be conducted to better understand the extent of liquefaction that will occur during seismic events and to develop a ground improvement scheme;
- The DFO generally requires all in water works to be completed within the least risk fisheries windows i.e. by February 28, 2019 unless special authorization is granted. It is unlikely that in water works for the reconstruction of the damaged sections will be completed before the February deadline and hence, it is recommended that conversations with DFO be initiated to present the project and seek an extension.
- It is proposed that reconstruction of damaged sections of the pier be carried out under a Self-assessment letter from a registered professional biologist. It is recommended that this proposal be confirmed with DFO.
- Terms of the CoWR's insurance policy is presently not available. To determine if the policy precludes the use of any structural systems, it is recommended that details of this insurance policy be obtained.
- To comply with DFO's timelines on in water works and to meet the challenging project schedule, the CoWR may be required to procure certain construction material such as piling in advance of selecting the contractor.
- It is also recommended that the CoWR expedite the selection of a marine contractor in light of the current increased activity in the Vancouver marine construction industry.

Appendix 1 – Inspection Memorandum

WESTMAR ADVISORS

December 21, 2018

City of White Rock
15322 Buena Vista Avenue,
White Rock, BC V4B 1Y6

Project No.: 1180031

Attention: Rosaline Choy, P.Eng. Manager of Engineering

Reference: White Rock Pier – Emergency Inspection December 20, 2018

1 Introduction

Westmar Advisors Inc. (Westmar) was requested by the City of White Rock (CoWR) to attend White Rock Pier on December 20, 2018 to assess damage caused by a storm event earlier on the same day.

Facility: White Rock Pier, BC

Inspected by: Westmar Advisors Inc. - Daniel Leonard, P.Eng.
Westmar Advisors Inc. - Vignesh Ramadhas, P.Eng.
Foreshore Technologies Inc. - Dominic Gerelle
Vancouver Pile Driving Ltd. - Ian Purvis

Time: December 20, 2018 2100 hr to 2330 hrs

1.1 Scope of Work

The scope of work is as summarized below:

- A high level visual inspection from the shore during the low tide of December 20, 2018 to identify obvious damage caused by the storm event earlier on the same day. The following components of the facility were inspected:
  - Sections of the pier from the shore abutment to edge of the dredge pocket for the marina (approximately Bent No. 92);
  - East float, onshore side of breakwater, limited sections of the shoreline protection on either side of the shore abutment (all viewed from a distance);
- The preparation of a letter presenting the inspection findings and recommendations for repairs. An order of magnitude cost estimate to implement repairs to restore the Pier to its previous condition will also be included. It is noted that CoWR may choose to repair the Pier to an upgraded condition such that it will be more resistant to similar storm events in the future. The upgraded condition will result in a higher cost than just returning the Pier to its previous condition and the design for the upgraded condition is beyond the scope of this assignment at this time.

1.2 Evaluation of Results

The inspection, related findings, and recommendations are based on the following:

- Published recommendations and standards relating to structures of this type have been used as a guide to develop the scope of work for this inspection.
- The inspection, findings, and recommendations are based on our engineering judgment and familiarity with the design, construction, and maintenance requirements of similar structures.
- The inspection findings and recommendations are based on our field data.
- The findings and recommendations are for the use of the CoWR only.
- The findings and recommendations are Westmar's assessment of the condition of the structure at the specific time of the inspection.
- The inspection is based on examining and reporting only on the condition of the structure. It is not intended as a check of the original design.
- As the inspection is based on visual observations, there is a possibility that hidden or latent defects have not been detected during the course of the inspection. Users of the facility should always report any unusual conditions so that they can be evaluated.

1.3 Reference Material

The following reference material was made available prior to the inspection:

- WorleyParsons Report No. 307071-00353-00-MA-REP-0005_Rev 0 - White Rock Pier Load Rating and Light Pole Analysis dated December 16, 2011.

2 Description of the Structure

2.1 Description

The White Rock Municipal Pier is located on the north side of Semaihmoo Bay along the White Rock Beach Promenade and Marine Drive. The timber pier structure is approximately 470 m long and extends, in the north to south direction, from the shore out into the bay. A breakwater and mooring float facilities are located at the southern end of the pier.

The pier originally constructed in 1914/1915 underwent a significant repair and restoration program in 1977. Minor repairs and timber replacement have been implemented since then as part of CoWR's ongoing inspection and maintenance program.

2.2 Geometry

The pier structure is of timber construction and consists of piles, pile caps, stringers and decking. Member geometry as indicated on the reference drawings is outlined below:

- Timber Deck: 38 mm by 285 mm
- Stringers: 100 mm by 300 mm
- Edge Stringers: 150 mm by 300 mm
- Pile Caps: 200 mm by 250 mm
- Piles: 305 mm diameter

2.3 Reference System

Bent numbering starts at the North end of the pier and increases sequentially to the South. The bent located closest to shore is numbered as Bent No. 1. Bayline numbering start at the West end and increases towards East. The west most pile at each bent is numbered "A".

3 Inspection Results

General observations from the inspection are presented in this section. Detailed findings are presented in Appendix 1.

In reviewing results of the inspection, please note the following:

- The term "serviceable condition" is used to describe a structure, or a specific element of a structure, which is considered to still function in the manner in which it was originally intended.
- The term "monitor for further deterioration" is used to describe an element with damage and/or deterioration but does not require immediate remedial action. It is anticipated that repairs will be required in the future.

3.1 Inspection Findings

Damage identified to the White Rock Pier directly attributed to the storm event of December 20, 2018 is summarized as follows. Photos recorded during the inspection are presented in Appendix 2.

The recommended actions noted are to restore the Pier to its previous condition. It is noted that CoWR may choose to repair the Pier to an upgraded condition such that it will be more resistant to similar storm events in the future. Recommendations for the upgraded condition are beyond the scope of this assignment at this time.

- Several pile bents along the pier have sustained impact damage likely from floating debris and/or loose vessels. Typical damage observed during the inspection includes displacement of pile resulting in failure of drift pins, fracturing of piles at connection to pile cap and failure of cross bracing. A detailed list of damage identified during the inspection along with recommended repair is presented in Appendix 1.
- The section of the Pier between Bent No. 33 to Bent No. 43 has failed completely (Photograph Nos. 1 to 3). Most piles and all superstructure at this location are missing. Utilities and power lines at this location have been dislodged from their installed position and have been strewn on the East side. Debris from damaged boats have been lodged along this section of the pier.

Removal of debris from this location, replacement of pile bents and superstructure and installation of removed utilities and power lines is recommended.

- There is severe damage to Bent Nos. 51 and 52 with most piles missing. This has resulted in the superstructure no longer being supported at this location.

Replacement of missing piles and damaged sections of the superstructure is recommended.

- Most sections of the West marina float have been dislodged from their moored position, rotated 90 degrees towards the shoreline and deposited on the beach (Photograph Nos. 4 and 5). The mooring piles have failed but are attached to the side of the float. The west gangway is supported by a small section of float that is still in place.

Replacement of the west marina float is recommended.

- In speaking to marina users that were present during the inspection, Westmar understands that a total of the 34 boats were moored at the marina before the storm. During the inspection, Westmar observed two sets of three boats grounded on the west side of the Pier between Bent No. 60 to 70. Three to four boats were loose and floating near the bottom of the west gangway. It is inferred that the remaining boats were either destroyed due to collision with the piles (Photograph Nos. 6 and 7), dispersed within a few hundred metres east of the Pier, or on the rocks along the shoreline at East Beach. There are several outboard motors that are dispersed in the beach west of the Pier.

Removal of debris is recommended.

- The east float and gangway appear to be in a serviceable condition with no visible signs of major damage from the storm event.
- There is no observable damage to the new services that were installed beneath the shore abutment (Photograph No. 8). The construction fencing that was around this area is strewn around this area of the beach and partially covered with sand with some fence sections destroyed.

Following the inspection, Mr. Daniel Leonard from Westmar visited the Fire Hall in White Rock and discussed Westmar's concerns related to further damage to the Pier due to changing tides with Fire Chief Lemire. Westmar's concerns were as follows:

- There was a high potential for the loose boats and broken west float to cause further damage to the pier with rising tides (high tide was just before 600 hrs). In particular, the two sets of rafted boats with bows under the Pier were of concern;
- Further damage to the remaining section of west float could result in failure of the west gangway.

Fire Chief Lemire first called the Coast Guard but the Coast Guard was unable to confirm their ability to respond prior to high tide. A private company in Steveston that was already rescuing boats in Ladner was contacted and they confirmed that they could respond in short order. Fire Chief Lemire also received approval from Mr. Dan Bottrill, Chief Administrative Officer, City of White Rock for costs associated with the emergency call-out. The following instructions were provided to the private boat rescue company:

- Sail boats to be pulled away from the Pier and tied up to the east float;
- Twisted portion of the west float to be cut to allow the serviceable portion of the west float to continue supporting the gangway; and
- Identify a safe moorage location for the damaged portion of the west float.

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4 Summary and Cost Estimate

Based on the findings of our inspection, Westmar considers the White Rock Pier to be no longer in a serviceable condition with several sections of the pier damaged and/or missing. It is recommended that a repair/rehabilitation program be undertaken to restore the facility to a safe and operable condition.

A summary of order of magnitude cost estimates to return the Pier to its previous condition is presented below. It is noted that CoWR may choose to repair the Pier to an upgraded condition such that it will be more resistant to similar storm events in the future. The upgraded condition will result in a higher cost than just returning the Pier to its previous condition and the design for the upgraded condition is beyond the scope of this assignment at this time.

Description	Unit	Rate	Cost
Mobilization / Demobilization	1	$150,000	$150,000
Demolition and Disposal	1	$250,000	$250,000
New Pile Installation	75	$12,000	$900,000
Deck Replacement	520	$1,400	$730,000
Bracing and Pile Cap Replacement	1	$250,000	$250,000
Lighting Replacement	1	$75,000	$75,000
Watermain Repairs	1	$25,000	$25,000
Power and Communications Repairs	1	$75,000	$75,000
Float Replacement	270	$950	$300,000
Contingency (35%)			$1,000,000
Total			**$3,760,000**

In reviewing the above estimated costs, note the following:

- The estimate is based on in-house experience and budget price quotations from local contractors and suppliers for similar projects.
- The estimate is in Canadian dollars and is based on prices at the fourth quarter (Q4) 2018.
- The estimate assumes a competitive bidding process.
- The estimate is based on replacement of structural elements with those of similar type and size.

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- The estimate includes an allowance for mobilization/demobilization. There may be an opportunity for cost savings if the work can be done in conjunction with other work in the vicinity so that mobilization/demobilization costs can be shared.
- The estimate does not include:
  - any applicable taxes;
  - escalation;
  - permitting;
  - owner's costs;
  - and allowances for ongoing future maintenance, upgrades, or further remedial measures unless indicated.
- A contingency of 35% of the total estimated cost is included. The contingency is not a reflection of the accuracy of the estimate, but covers undefined items of work which will have to be performed, and elements of cost which will be incurred, but which are not explicitly detailed or described due to the level of engineering and estimating which has been completed to date.
- The total estimated cost, including contingency, is considered accurate to ±50%.

Please do not hesitate to contact us at 604-562-4797 or via email at dleonard@westmaradvisors.com should you have any questions or require additional information or clarification.

Sincerely,

Daniel Leonard, P.Eng.
Vice President
Westmar Advisors Inc.

cc: Jim Gordon, City of White Rock
Phil Lemire, City of White Rock
Vignesh Ramadhas, Westmar Advisors Inc.

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Appendix 1 – Inspection Findings

Bent No	Pile	Description	Recommendations to Restore the Pier to its Previous Condition
4	C	Pile cap fractured above pile C	Repair pilecap
5	A	Pile has displaced 50 mm to the East	Monitor for further Deterioration
	B	Pile fractured at top 900 mm. Drift pin connection to pile cap has failed	Replace Pile
6	A	Pile to pilecap connection has failed	Replace Pile
	B	Pile to pilecap connection has failed	Replace Pile
8	-	Cross brace is fractured	Replace cross brace
	C	Pile is split in the top 600 mm	Install steel clamps
9	C	Pile is split in the top 900 mm	Install steel clamps
10	A	Pile has displaced 75 mm to the East	Monitor for further Deterioration
11	A	Pile has displaced 125 mm to the East. Pile is split in the top 1500 mm.	Replace Pile
	B	Pile is split in the top 600 mm	Install steel clamps
12	A	Pile has displaced 100 mm to the East.	Monitor for further Deterioration
	-	Cross brace is fractured	Replace cross brace
13	A	Pile has displaced 50 mm to the East.	Monitor for further Deterioration
	B	Pile is split in the top 600 mm	Install steel clamps
14	-	Cross brace is fractured	Replace cross brace
15	A	Pile has displaced 75 mm to the East. Pile is split in the top 900 mm.	Replace Pile
17	A	Pile has displaced 75 mm to the East	Monitor for further Deterioration
20	A	Pile has displaced 75 mm to the East	Monitor for further Deterioration
	-	Cross brace is fractured	Replace cross brace
21	A	Pile fractured at top 1200 mm. Drift pin connection to pile cap has failed. Pile has displaced 100 mm to the east	Replace Pile
	B	Pile fractured at top 900 mm. Drift pin connection to pile cap has failed. Pile has displaced 75 mm to the east	Replace Pile
22	A	Pile has displaced 25 mm to the East	Monitor for further Deterioration
	-	Cross brace is fractured	Replace cross brace
23	A	Drift pin connection to pile cap has failed. Pile has displaced 450 mm to the east.	Realign pile and attach to pilecap with steel straps
25 to 26	-	Boat debris lodged between bents	-
25	A	Pile has displaced 25 mm to the East	Monitor for further Deterioration
	C	Pile has displaced 75 mm to the North	Monitor for further Deterioration

Bent No	Pile	Description	Recommendations to Restore the Pier to its Previous Condition
26	A	Drift pin connection to pile cap has failed. Pile has displaced 300 mm to the east	Replace Pile
	-	Cross brace is fractured	Replace cross brace
27	A	Pile fractured at top 900 mm. Drift pin connection to pile cap has failed. Pile has displaced 100 mm to the east	Replace Pile
28	A	Pile fractured at top 600 mm. Drift pin connection to pile cap has failed. Pile has displaced 150 mm to the east	Replace Pile
29	A	Pile has undergone significant displacement and is no longer supporting the pilecap	Replace Pile
	B	Drift pin connection to pile cap has failed. Pile has displaced 200 mm to the east	Replace Pile
	-	Cross brace is fractured	Replace cross brace
31	A	Pile is missing	Replace Pile
33	A	Pile fractured at top 1500 mm. Drift pin connection to pile cap has failed.	Replace Pile
33 to 44	All	Piles are either missing or have failed	Replace Piles
	-	Super structure is missing	Replace superstructure
45	A	Pile fractured at top 1500 mm. Drift pin connection to pile cap has failed.	Replace Pile
45	A	Pile fractured at top 1200 mm. Drift pin connection to pile cap has failed.	Replace Pile
48 to 49	-	Boat debris lodged between bents	-
50	A	Drift pin connection to pile cap has failed.	Replace Pile
51 to 52	-	Piles damaged or missing	Replace Piles
	-	Superstructure is unsupported or damaged	Replace/repair superstructure
51 to 53	-	Watermain has failed and is missing	Reinstall watermain
54	-	Cross brace is fractured	Replace cross brace
	-	Watermain has failed	Reinstall watermain
55	A	Pile fractured at top 1200 mm. Drift pin connection to pile cap has failed.	Replace Pile
60	A	Pile is missing	Replace Pile
60 to 61	-	Boat debris lodged between bents	-
83 to 85	-	Boat debris lodged between bents	-

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Appendix 2 – Photos

Photo 1: Failed section of Pier between Bent No. 33 to 44

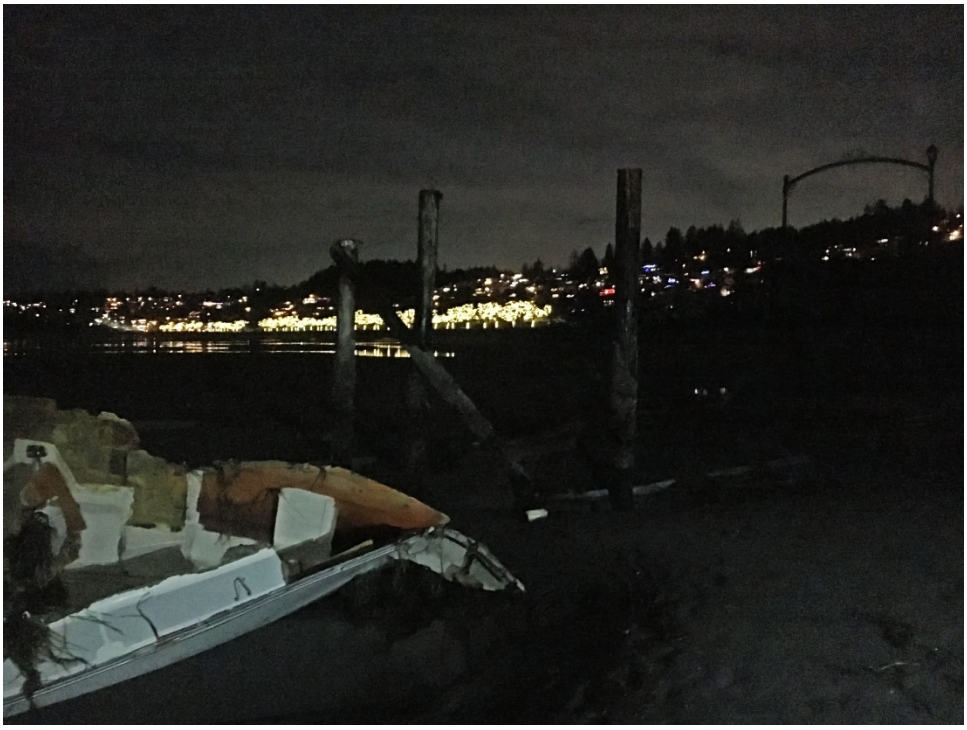


Photo 2: Failed section of Pier between Bent No. 33 to 44

Photo 3: Failed section of Pier between Bent No. 33 to 44

Photo 4: Failed section of West Marina Float

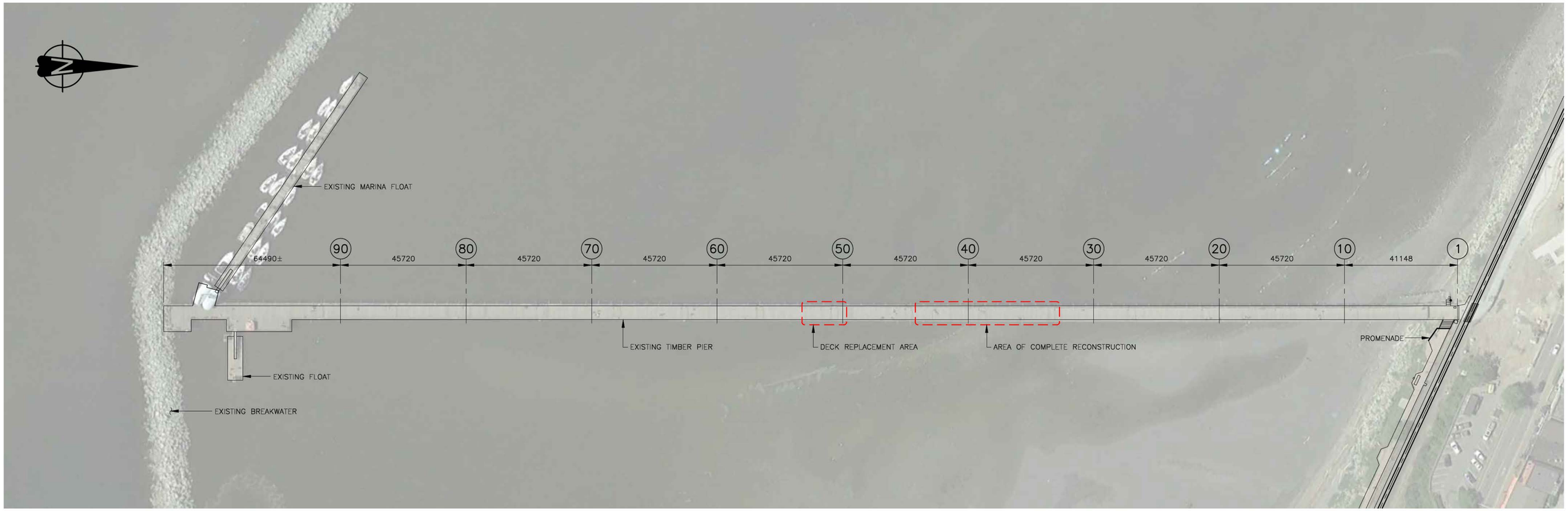
Photo 5: Failed section of West Marina Float

Photo 6: Boat debris lodged between pile bents

Photo 7: Boat debris lodged between pile bents

Photo 8: New services installed near shore abutment

Appendix 2 – Drawings



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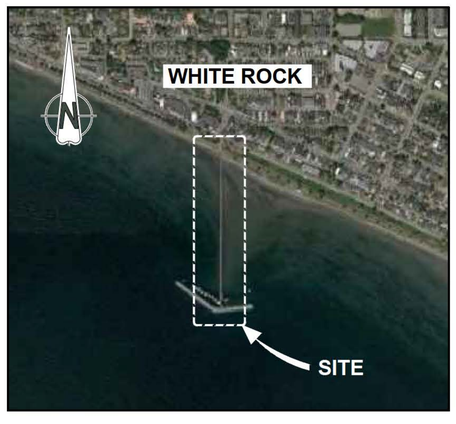

KEY PLAN

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P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: EXISTING SITE PLAN

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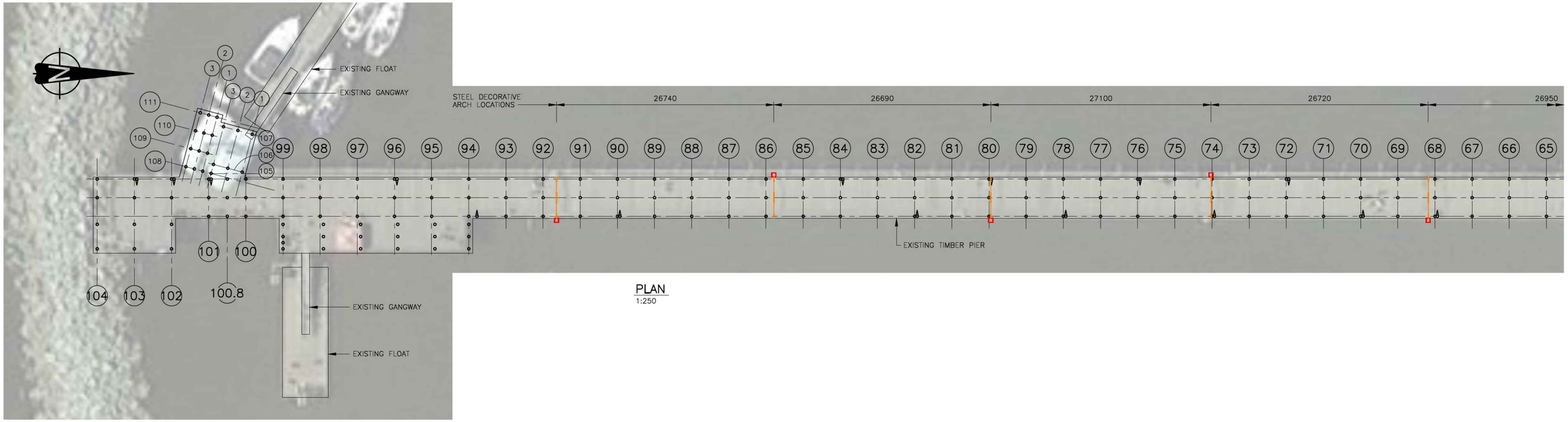

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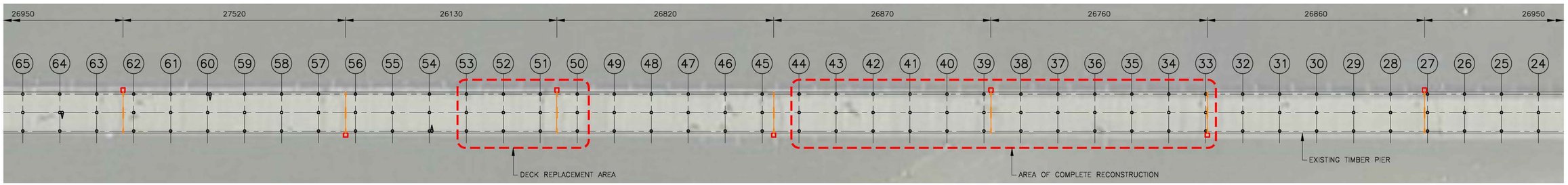

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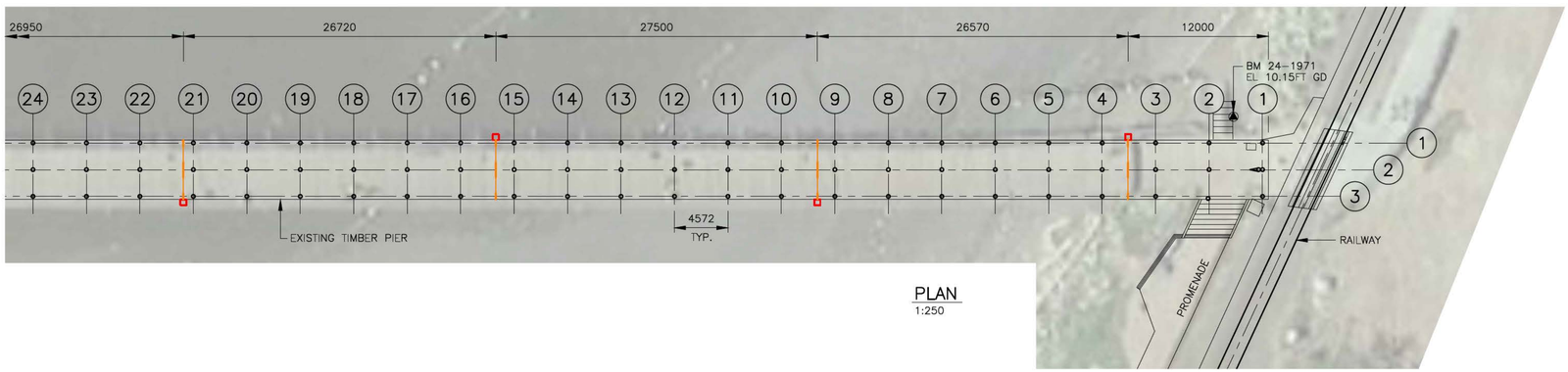

PLAN
1:250

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1:250

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Last Saved: Jan. 13/19 6:40pm

LEGEND:
- ELECTRICAL J-BOX
- STEEL DECORATIVE ARCH

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P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT PLAN

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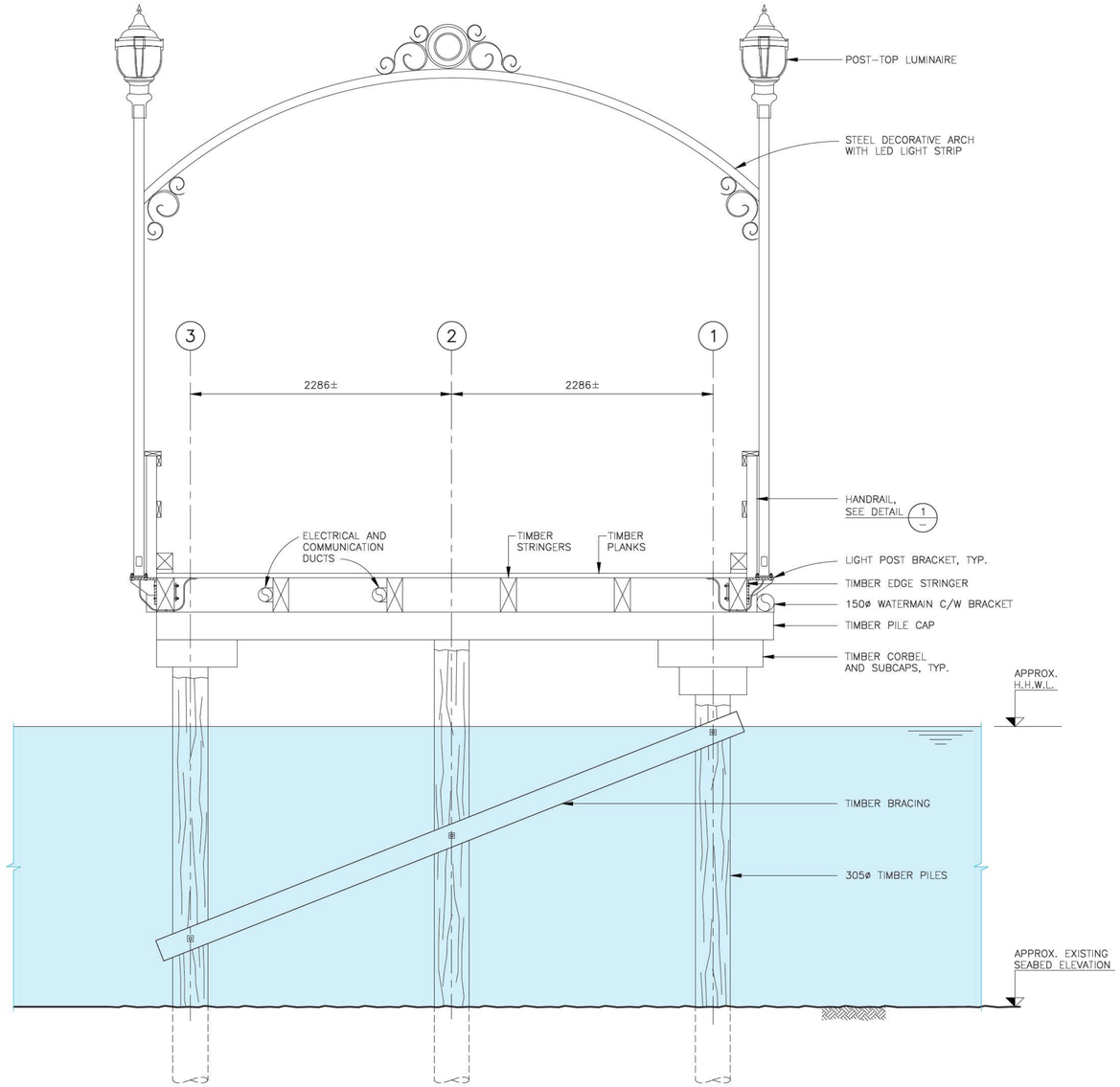
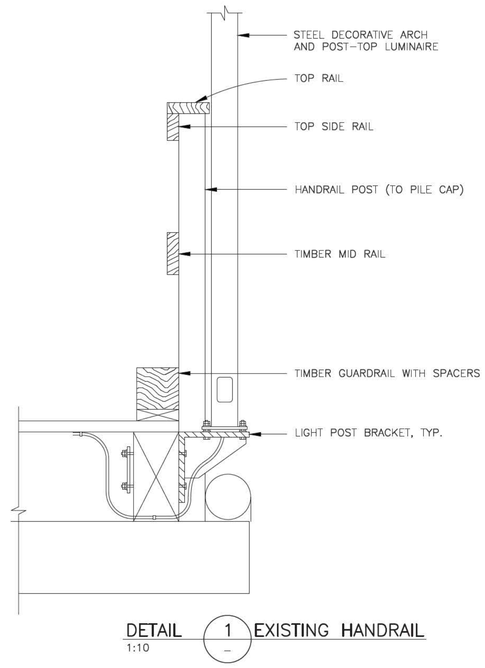


EXISTING CROSS SECTION – LOOKING SOUTH
1:25



DETAIL 1 EXISTING HANDRAIL
1:10

EXISTING PIER HANDRAIL

PRELIMINARY
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ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT
TIMBER STRUCTURAL SYSTEM

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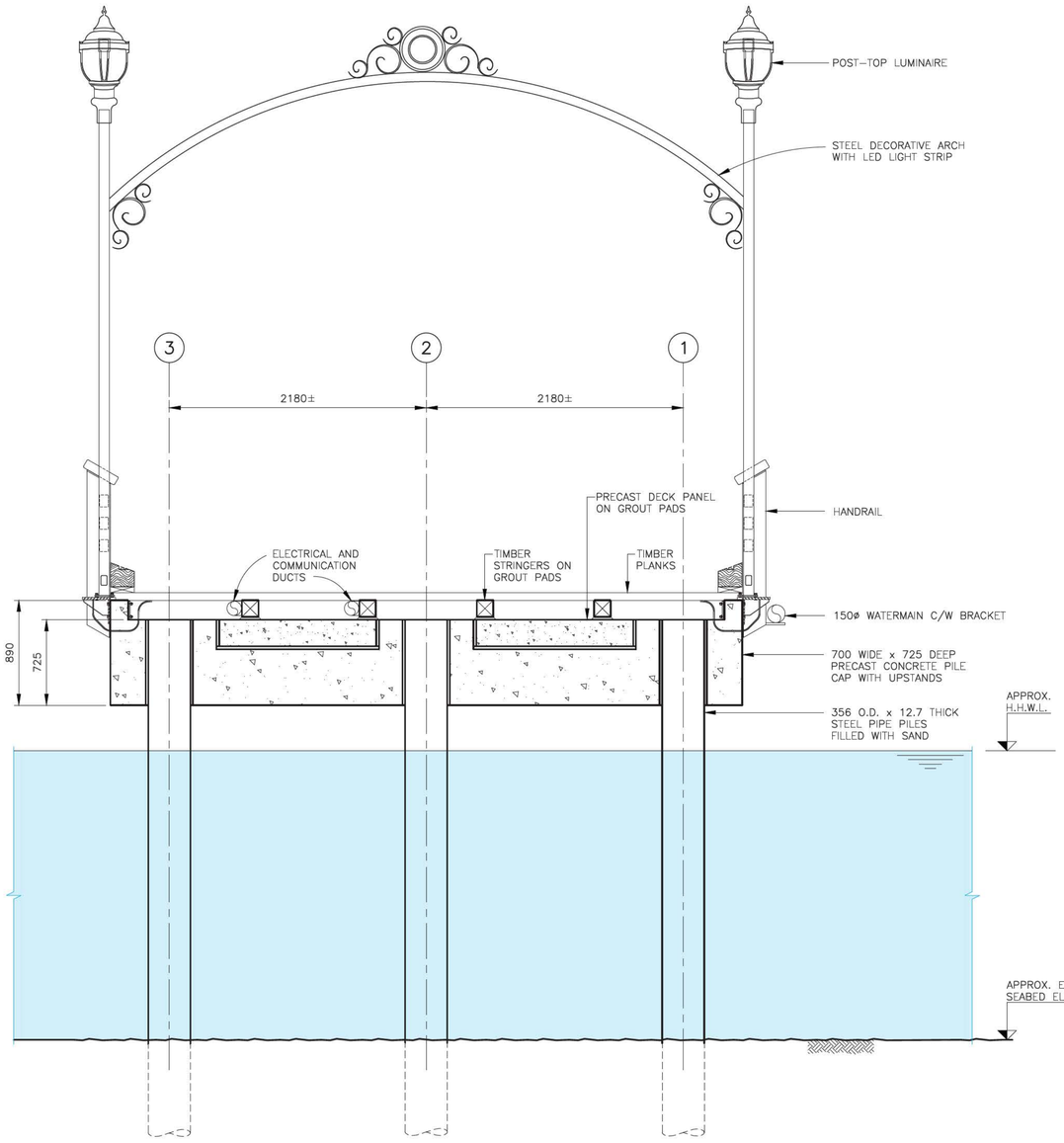
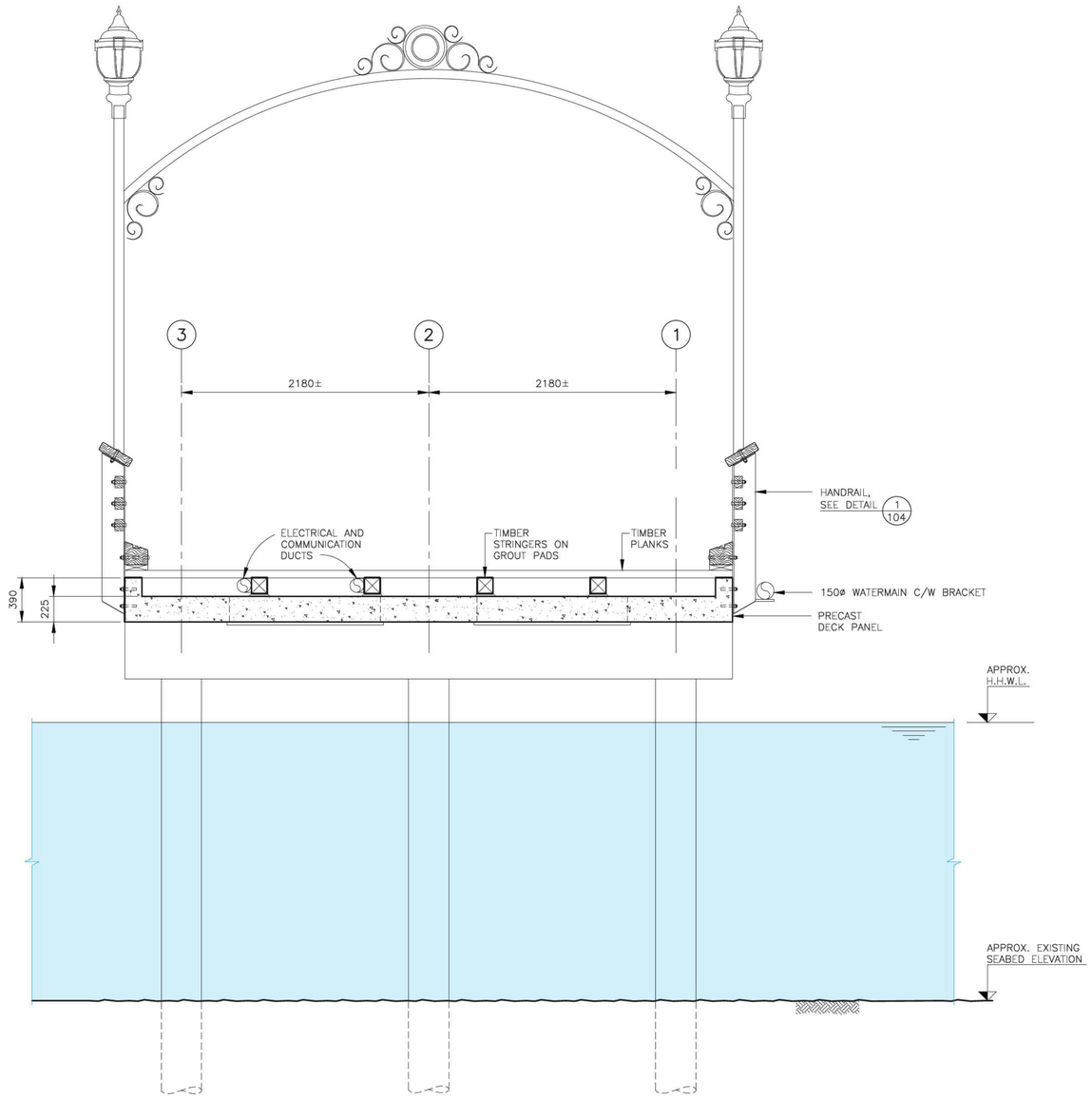


PROPOSED CROSS SECTION AT PILE CAP – LOOKING SOUTH
1:25



PROPOSED CROSS SECTION AT MID–SPAN – LOOKING SOUTH
1:25

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

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P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

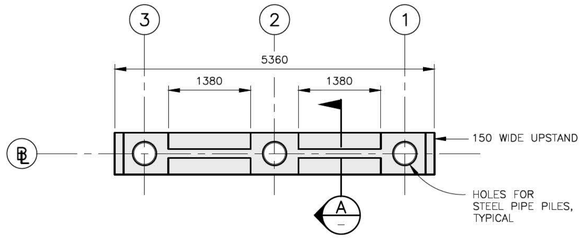
CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

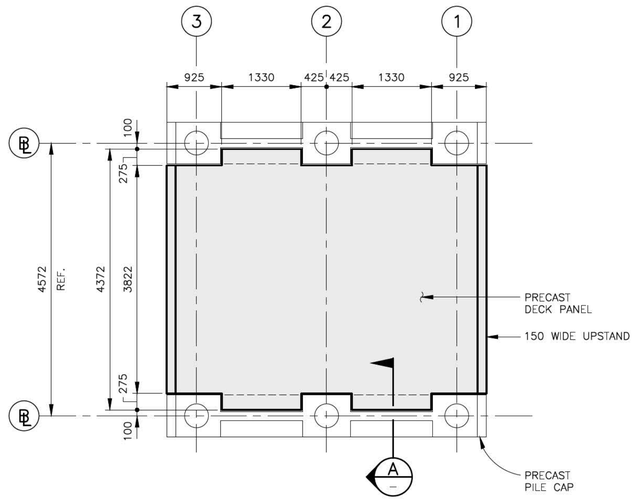
WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT STEEL PILE STRUCTURAL SYSTEM SECTIONS

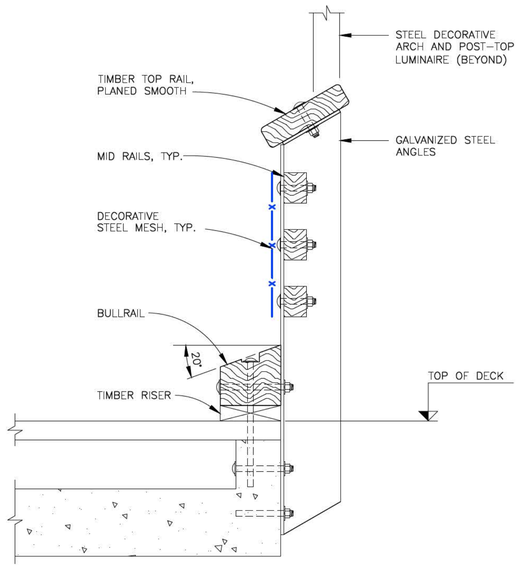
DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1180031	SK–103	P2



PLAN – PRECAST PILE CAP
1:50

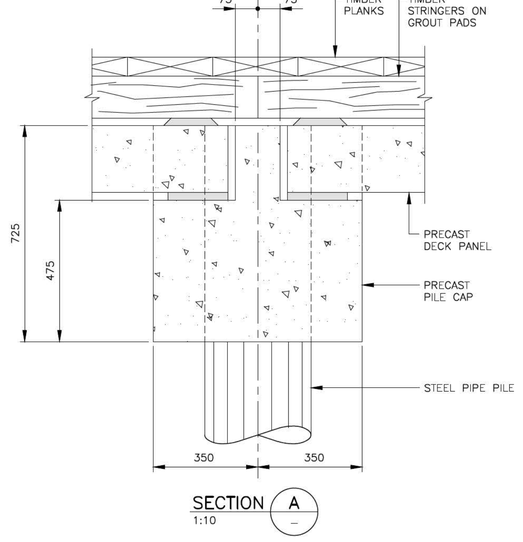


PLAN – PRECAST DECK PANEL
1:50



DETAIL 1/103 HANDRAIL
1:10

PROPOSED PIER HANDRAIL



SECTION A/–
1:10

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P2	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL
P1	JAN10/19	ISSUED FOR CLIENT REVIEW	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

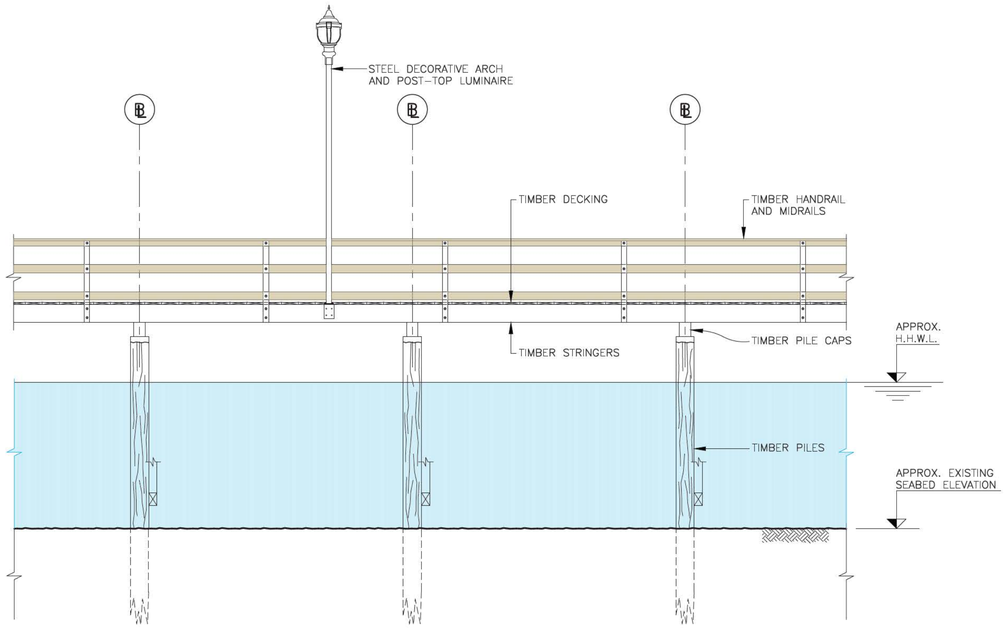
CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

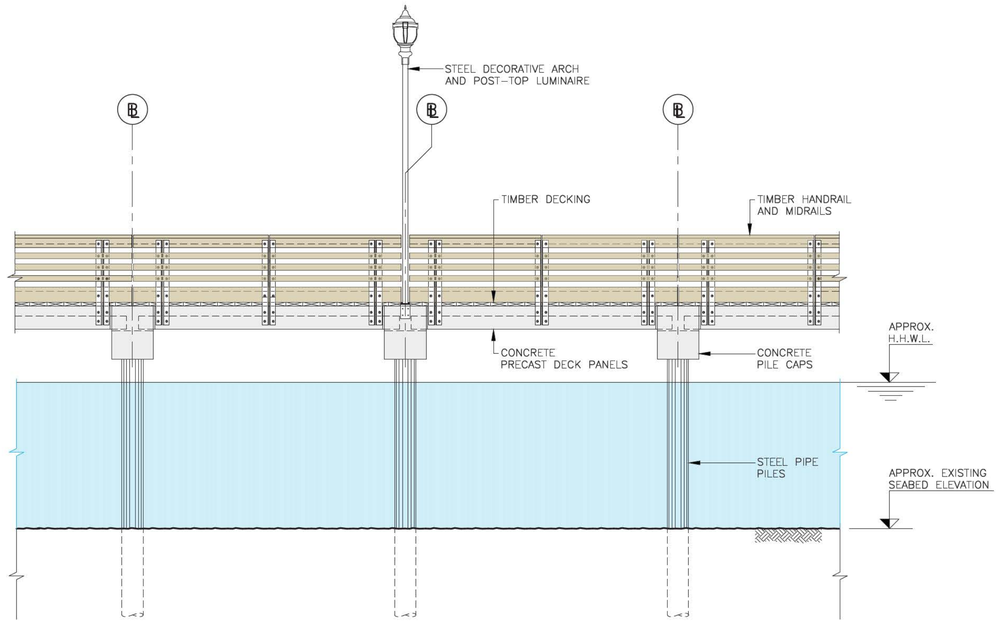
WESTMAR ADVISORS

TITLE: GENERAL ARRANGEMENT STEEL PILE STRUCTURAL SYSTEM DETAILS

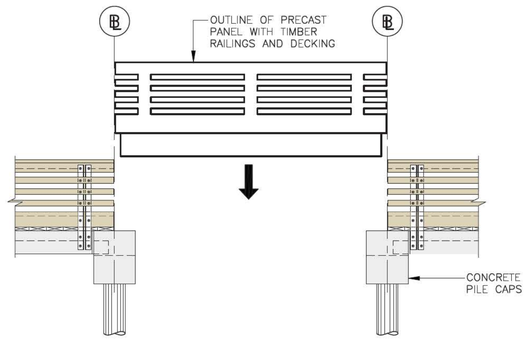
DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1180031	SK–104	P2



TYPICAL ELEVATION LOOKING WEST – EXISTING TIMBER PIER
1:50



TYPICAL ELEVATION LOOKING WEST – CONCRETE AND STEEL RECONSTRUCTION PIER
1:50



INSTALLATION OF PRECAST PANEL
1:50

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Jan. 13/19 6:40pm

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
P1	JAN14/19	ISSUED WITH STRUCTURAL SYSTEM STUDY REPORT	RM	–	DL	VR	DL

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

CLIENT: WHITE ROCK City by the Sea!

PROJECT: PIER RECONSTRUCTION

WESTMAR ADVISORS

TITLE: EXISTING AND PROPOSED ELEVATIONS

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	1180031	SK–105	P1

Appendix 3 – Project Schedule

Project Tasks		Total Days	December, 2019			January, 2019				February, 2019				March, 2019				April, 2019					May, 2019				June, 2019			
Description	Interval or Date	Week Starting >	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24
		Total Weeks >	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Storm Event	20-Dec	1																												
Damage Assessment	20-Dec	1																												
Findings and Recommendations	21-Dec	1																												
Holiday Closure	Dec 24 - Jan 1	9																												
Notice to proceed	02-Jan	1																												
Structural System Study	Jan 2 - Jan 10	9																												
Selection of Structural System	Jan 8 - Jan 11	4																												
Preliminary Design	Jan 8 - Jan 22	15																												
Preliminary Design for CoWR Review	Jan 17 - Jan 21	5																												
Submission for Provincial Grant	23-Jan	1																												
Permitting	Jan 3 - Jan 31	29																												
Selection of Contractor	Jan 21 - Feb 1	12																												
Detailed Design	Jan 23 - Feb 28	37																												
Material Procurement and Mobilization	Jan 21 - Feb 10	21																												
Inwater Works	Feb 11 - Mar 24	42																												
Superstructure works	Mar 25 - May 4	41																												
Partial Opening	05-May	1																												
Topside Works	May 6 - June 14	40																												
Project Completion	15-Jun	1																												

LEGEND

Submission or Milestone

Activity

Fisheries Closure

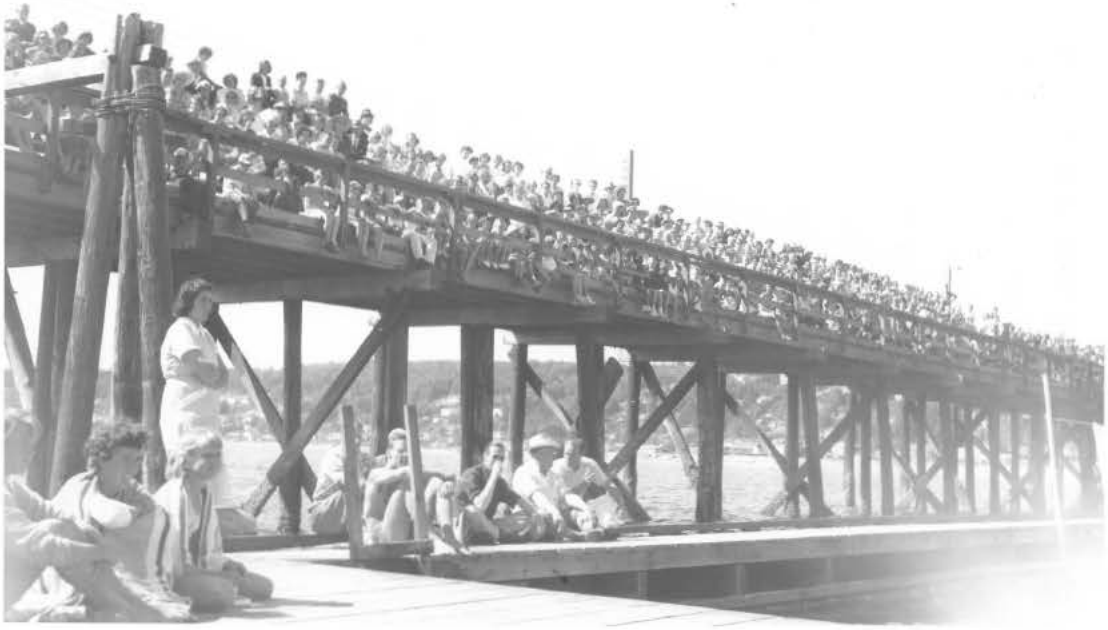
WHITE ROCK

My City by the Sea!

Appendix – White Rock Pier

Part of the White Rock Experience and Life Long Memories

MORE THAN JUST A PIER



WRMA image #1994-1-125
A crowd on the pier watches swimming races in the 'tank', ca. 1965.

"White Rock's Iconic Pier, is more than just a Pier, it's the jewel in White Rock's crown." ~ Mayor Darryl Walker

WHITE ROCK
My City by the Sea!

DESTRUCTION OF PIER | DECEMBER 20, 2018

Photo Credits: Jane Bonde

WHITE ROCK
My City by the Sea!

DESTRUCTION OF PIER | DECEMBER 20, 2018

Photo Credits: Jane Bonde

WHITE ROCK
My City by the Sea!

DESTRUCTION OF PIER | DECEMBER 20, 2018

Photo Credit: Brian Strilesky

WHITE ROCK
My City by the Sea!

DESTRUCTION OF PIER | DECEMBER 20, 2018

Photo Credit: Brian Strilesky

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MAJOR TOURISM ATTRACTION

Economic Driver

Each year, the City of White Rock hosts various events that attract residents and visitors alike, sometimes drawing in over 30,000 people per event.

Left photo: Canada Day by the Bay
Estimated Number of Attendees: 35,000 people per year

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MAJOR TOURISM ATTRACTION

Photos Above: TD Concerts at the Pier
Estimated Number of Attendees: 12,000 people (6 concerts are held throughout the summer, with roughly 2000 people in attendee per concert.)

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MAJOR TOURISM ATTRACTION

Photos Above: Tour de White Rock
Estimated Number of Attendees: 5000 people (Part of the race occurs on Marine Drive down in the City's Waterfront.)

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MAJOR TOURISM ATTRACTION

WHITE ROCK
My City by the Sea!

Photos Above: White Rock Sea Festival and Semiahmoo Days
Estimated Number of Attendees: 35,000 people (three day festival, in partnership with Semiahmoo First Nation)

WHITE ROCK PIER | MORE THAN JUST A PIER

Photo Credit: Surrey Now Leader

Connecting the Community

Left Photo: Picnic On the Pier

"There are very few landmarks in the Lower Mainland as iconic as our very own White Rock Pier which makes the annual Picnic on the Pier all the more special." Peace Arch Hospital Foundation Website

About Picnic on the Pier:
Annual fundraising event in support of the Peace Arch Hospital Foundation

Estimated Number of Attendees: over 450 people

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MORE THAN JUST A PIER

Part of the White Rock Experience
+
Life Long Memories

Left Photo : CBC News, "Heart of White Rock Breaks along with Pier."

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MORE THAN JUST A PIER

[redacted] • Follow
White Rock, British Columbia

[redacted] A few shots from my absolutely gorgeous cousins wedding [redacted] in White Rock BC this past weekend! Thank you so much for trusting me with your special day that was so perfect! Love you so much! More to come #photographer #wedding #wisemanwedding #whiterockbeach #bc #bcphotography #family #cousins #blessed #grateful #gorgeous #whiterockpier #lightroom #ocean #views #gorgeous #justtryingtocapturememories #memories

27 likes

OCTOBER 30, 2018

Add a comment...

Part of the White Rock Experience
+
Life Long Memories

Photo and Comment: Screenshot from Instagram User

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MORE THAN JUST A PIER

[redacted] • Follow
White Rock Pier

[redacted] We are in the midst of a day long windstorm. One of the victims was this beautiful pier in a cute little suburb of Vancouver. Boats slammed up against the pier causing sections to collapse into the ocean. Luckily no one was hurt. This town is adjacent to the border with the US. The second photo shows why the town is named White Rock. When I was a kid the rock was still naturally white. I'm sure it has doubled in size with the many coats of paint ! The second photo also shows beautiful Mt Baker in Washington state #whiterockpier #whiterock #beautifulbc #explorebc #veryvancouver #canada #604now #pacificnorthwest #northwest #westcoast #pnw #vancouver #yvr #vancity #604 #naturalbeauty #nature #mountbaker #mtbaker #boundarybay #salishsea #ocean #pacificocean #georgiastrait #beach

80 likes

DECEMBER 20, 2018

Add a comment...

Photo and Comment: Screenshot from Instagram User

Part of the White Rock Experience
+
Life Long Memories

WHITE ROCK
My City by the Sea!

WHITE ROCK PIER | MORE THAN JUST A PIER

HELP US REBUILD

Help us rebuild our iconic Pier so that it can continue to be a community hub and multi-purpose space used to bring people together, and to our waterfront, from a social, cultural and quality life standpoint, for years to come.

WHITE ROCK
My City by the Sea!

WESTMAR ADVISORS

January 18, 2018

City of White Rock
15322 Buena Vista Avenue,
White Rock, BC V4B 1Y6

Project No.: 1180031

Attention: Rosaline Choy, P.Eng. Manager of Engineering

Reference: Reconstruction of White Rock Pier – Order of Magnitude Cost Estimates

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The City of White Rock (City) is in the process of developing a design for the reconstruction of the White Rock Pier that sustained damaged during a storm event on December 20, 2018.

Two options are being considered for the proposed reconstruction:

- A timber pile and deck option, similar to the existing pier that consists of timber deck planks supported on timber stringers, pile caps and piles. Sizing and spacing of timber elements will be checked and revised as required in accordance with current design codes and standards.
- A steel pile and concrete deck option that consists of steel tubular pipe piles supporting a concrete superstructure and deck with a timber plank walking surface to be similar in appearance to that of the existing pier. To facilitate quick construction, a deck system consisting predominantly of precast concrete elements is proposed for the reconstruction of the Pier.

The City is also considering two approaches to carry out the reconstruction; reconstruction of the entire Pier and reconstruction in phases starting with the damaged sections of the Pier. To assist the City with comparing the two structural systems and the two approaches to reconstruction, an order-of-magnitude cost estimate for each of the options has been prepared.

Additionally, the estimated cost of replacing the damaged West float using a timber float or a concrete float has also been prepared. The estimated costs are presented in Table A.

Table A Order-of-Magnitude Cost Estimate

Description	Estimated Cost	Contingency	Total Estimated Cost
Timber Pile and Deck Option (Complete Replacement)	$6,800,000	$2,400,000	**$9,200,000**
Steel Pile and Concrete Deck Option (Complete Replacement)	$8,200,000	$2,900,000	**$11,100,000**
Timber Pile and Deck Option (Damaged Sections Only)*	$1,700,000	$600,000	**$2,300,000**
Steel Pile and Concrete Deck Option (Damaged Sections Only) *	$2,000,000	$700,000	**$2,700,000**
Timber Replacement Float	$300,000	$100,000	**$400,000**
Concrete Replacement Float	$400,000	$150,000	**$550,000**

** includes localized repairs to damaged timber elements in addition to complete replacement of missing and/or collapsed sections*

In reviewing the above estimated costs, please note the following:

- At the time of developing the cost estimates, limited engineering has been completed. The estimates are based on conceptual design only of the two proposed options.
- The cost estimates in Table A do not include the cost of ground improvement. There is limited geotechnical information available at the project site and further ground investigations are required to confirm the liquefaction potential of in-situ soils. If investigations reveal that the in-situ soil is prone to liquefaction, ground improvement will be likely required and the cost, which could be significant, will need to be added to the above estimates. The cost of ground improvement is estimated to be in the order of 2 to 3 million dollars.
- The estimates are based on historical pricing data available with Westmar and experience with similar projects. No budget price quotations from local contractors and suppliers have been obtained.

- The estimates do not include:
  - Taxes.
  - Inflation.
  - Costs associated with permitting and regulatory approvals.
  - Costs for mitigation of environmental impacts.
  - Allowances for long term maintenance and upgrades.
  - Project management or owner's costs.
- A contingency and engineering allowance of 35% of the total estimated cost is included. The contingency is not a reflection of the accuracy of the estimate but covers undefined items of work that not explicitly detailed or described due to the level of engineering and estimating which has been completed to date. The contingency also covers variability of pricing due to market conditions.
- The total estimated cost, including contingency, is considered order of magnitude only. More accurate estimates can be provided after the completion of additional structural and geotechnical engineering

Please do not hesitate to contact us at 604-729-8125 or via email at vramadhas@westmaradvisors.com should you have any questions or require additional information or clarification.

Sincerely,

Vignesh Ramadhas, P.Eng.
Practice Lead, Infrastructure
Westmar Advisors Inc.

cc: Jim Gordon, City of White Rock
Daniel Leonard, Vice-President, Westmar Advisors Inc.
Colleen Ackermann, Technical Specialist, Westmar Advisors Inc.

Investing in Canada Infrastructure Program

Community, Culture and Recreation Stream

Detailed Cost Estimate

Applicant Name: City of White Rock
Project Number: IC0132
Project Title: White Rock Pier Reconstruc ion
Project Category: Community
Cost Estimate Developed By: Rosaline Choy
Date of Cost Estimate (DD-MM-YYYY): 22-01-2019
Cost Estimate Class: D

ELIGIBLE COSTS				
	Description	**Quantity**	**Per Unit Amount**	**Total Cost**
Project Planning				
For example, costs associated with environmental assessment, aboriginal consultation, climate lens assessments, community employment benefit plans	Archaeology and Enviornmental			200,000
	Construction and Project Management			150,000
	Planning Sub-Total:			**$350,000**
Design / Engineering				
(Note max 15% of construction project costs should be engineering/consulting fees)	Engineering Design Consultant			100,000
	Design / Engineering Sub-Total:			**$100,000**
Construction / Materials				
Items should reflect the major components in your project without going into specific detail, add lines as necessary	Steel Pile and Concrete Deck Pier			8,200,000
	Pier Arches			100,000
	Ground Improvements			3,000,000
	Electrical and Lighting			200,000
	Telecommunications Conduits			200,000
	Concrete Replacement Float			550,000
	PST			200,000
	Construction / Materials Sub-Total:			**$12,450,000**
Other Eligible Costs				
For example (communications, testing)				
	Other Eligible Costs Sub-Total:			**$0**
Contingency				
	Construction Contingency			2,950,000
	Contingency Sub-Total:			**$2,950,000**
	TOTAL ELIGIBLE COSTS*:			**$15,850,000**

INELIGIBLE COSTS				
	Description	**Quantity**	**Per Unit Amount**	**Total Cost**
Land Acquisition Cost				
Leasing Land, Building and Other Facilities				
Financing Charges				
Legal Fees				
In-kind Contribution				
Tax Rebate				
Other	Consultant costs for emergency inspection and design			50,000
	TOTAL INELIGIBLE COSTS*:			**$50,000**

TOTAL GROSS PROJECT COSTS (Eligible + Ineligible)*:		**$15,900,000**

***Totals must match totals in the Project Costs section of the Application Form.**

Cost Estimate Comments

The determination of eligible and ineligible costs are based on the assumption that the decision regarding this application will be expedited. If this does not occur, amendments will be made to the eligible and ineligible cost amounts.

White Rock Pier Reconstruction

Site Plan