

## Appendix D – Evaluation of Alternative Designs

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
<b>Natural Environment</b>			
Effect on Aquatic Habitat	Temporary effects on aquatic species (including species at risk) and habitat quality during construction	<ul style="list-style-type: none"> <li>• Both design concepts will have similar potential effects on aquatic species, including:                             <ul style="list-style-type: none"> <li>○ Construction and demolition debris spills into the water during wharf removal and construction, potentially covering existing habitat.</li> <li>○ Suspension and settling of disturbed soil particles in the water column, creating increased turbidity and deposition of soil particles that could impact fish and fish habitat.</li> </ul> </li> <li>• Impacts can be mitigated using a turbidity curtain to enclose the area during and immediately after work periods and by ensuring all waste materials are contained, collected and removed off-site for disposal.</li> <li>• The potential impacts to aquatic habitat during demolition and construction are anticipated to be minor and temporary, with no long-term impacts anticipated.</li> </ul> <p style="text-align: center;"><b>Moderately Preferred</b></p>	<ul style="list-style-type: none"> <li>• Both design concepts will have similar potential effects on aquatic species, including:                             <ul style="list-style-type: none"> <li>○ Construction and demolition debris spills into the water during wharf removal and construction, potentially covering existing habitat.</li> <li>○ Suspension and settling of disturbed soil particles in the water column, creating increased turbidity and deposition of soil particles that could impact fish and fish habitat.</li> </ul> </li> <li>• Impacts can be mitigated using a turbidity curtain to enclose the area during and immediately after work periods and by ensuring all waste materials are contained, collected and removed off-site for disposal.</li> <li>• The potential impacts to aquatic habitat during demolition and construction are anticipated to be minor and temporary, with no long-term impacts anticipated.</li> </ul> <p style="text-align: center;"><b>Moderately Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
	Permanent effects on aquatic species (including species at risk) and habitat quality	<ul style="list-style-type: none"> <li>• No long-term impacts from construction activities are anticipated for either design alternative.</li> <li>• The removal of the existing timber cribs and replacement with steel piles, steel sheet pile walls and floating docks will result in the net gain of available channel floor surface, providing additional aquatic habitat.</li> <li>• No existing aquatic habitat vegetation will be covered by the proposed work.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• No long-term impacts from construction activities are anticipated for either design alternative.</li> <li>• The removal of the existing timber cribs and replacement with steel piles, steel sheet pile walls and floating docks will result in the net gain of available channel floor surface, providing additional aquatic habitat.</li> <li>• No existing aquatic habitat vegetation will be covered by the proposed work.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
Effect on Terrestrial Habitat	Temporary effects on terrestrial habitat quality and species (including species at risk) during construction	<ul style="list-style-type: none"> <li>• The potential for temporary impacts on terrestrial habitat quality and species during construction is equally low for both alternative designs.</li> <li>• Barn swallows have been identified as nesting on the site in and around the wharf area. There is the potential for some disturbance of nesting sites during construction. However, these can be mitigated either through completing the construction outside of the nesting timing window (May to August 31<sup>st</sup>) or, if not, putting measures in place to protect nesting birds, such as making sure the birds do not nest and monitor existing nests if being used.</li> <li>• The wharf area does not contain any natural terrestrial habitat.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• The potential for temporary impacts on terrestrial habitat quality and species during construction is equally low for both alternative designs.</li> <li>• Barn swallows have been identified as nesting on the site in and around the wharf area. There is the potential for some disturbance of nesting sites during construction. However, these can be mitigated either through completing the construction outside of the nesting timing window (May to August 31<sup>st</sup>) or, if not, putting measures in place to protect nesting birds, such as making sure the birds do not nest and monitor existing nests if being used.</li> <li>• The wharf area does not contain any natural terrestrial habitat.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
	Permanent effects on terrestrial habitat quality and species (including species at risk)	<ul style="list-style-type: none"> <li>The potential for permanent effects on terrestrial habitat quality and species is equally low for both alternative designs.</li> <li>Nesting under the dock will no longer be available due to the steel sheet pile sea walls.</li> <li>Nesting will continue to be available under the new concrete wharf.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>The potential for permanent effects on terrestrial habitat quality and species is equally low for both alternative designs.</li> <li>Nesting under the dock will no longer be available due to the steel sheet pile sea walls.</li> <li>Nesting will continue to be available under the new concrete wharf.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
<b>Source Water Protection</b>	Impacts to drinking water supply from during or after construction	<ul style="list-style-type: none"> <li>The potential for effects on the drinking water supply is equally low for both alternative designs.</li> <li>The drinking water intake is about 100m away from the project site. Site controls will ensure erosion and spills are managed and are not allowed to create a risk.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>The potential for effects on the drinking water supply is equally low for both alternative designs.</li> <li>The drinking water intake is about 100m away from the project site. Site controls will ensure erosion and spills are managed and are not allowed to create a risk.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
<b>Natural Environment Summary</b>		<p>Given the limited nature for permanent and temporary disturbances to aquatic, terrestrial and avian habitats at the wharf, the overall impact to the natural environment or drinking water supply is low for both alternative design concepts.</p> <p style="text-align: center;"><b>Most Preferred</b></p>	<p>Given the limited nature for permanent and temporary disturbances to aquatic, terrestrial and avian habitats at the wharf, the overall impact to the natural environment or drinking water supply is low for both alternative design concepts.</p> <p style="text-align: center;"><b>Most Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
<b>Social Environment</b>			
Effect of construction on Area Users	Type and magnitude of effects during construction	<ul style="list-style-type: none"> <li>The anticipated construction impacts are similar for both design alternatives, including:                             <ul style="list-style-type: none"> <li>The wharf will be unavailable for use by the community for approximately 35-40 weeks during construction.</li> <li>Noise will be generated when driving in the sheet pile wall.</li> <li>Noise and dust are anticipated from the construction activities.</li> </ul> </li> </ul> <p style="text-align: center;"><b>Moderately Preferred</b></p>	<ul style="list-style-type: none"> <li>The anticipated construction impacts are similar for both design alternatives, including:                             <ul style="list-style-type: none"> <li>The wharf will be unavailable for use by the community for approximately 35-40 weeks during construction.</li> <li>Noise will be generated when driving in the sheet pile wall.</li> <li>Noise and dust are anticipated from the construction activities.</li> </ul> </li> </ul> <p style="text-align: center;"><b>Moderately Preferred</b></p>
Community Space	Area to accommodate community use	<ul style="list-style-type: none"> <li>This alternative does not increase the amount of surface area available for community use.</li> </ul> <p style="text-align: center;"><b>Least Preferred</b></p>	<ul style="list-style-type: none"> <li>This alternative creates an additional 122 m<sup>2</sup> of surface area that could be potentially used by the community.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
Recreational Boating	Ability to accommodate recreational boating	<ul style="list-style-type: none"> <li>Concept A has greater potential to accommodate additional recreational boaters compared to Concept B.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>While Concept A has greater potential to accommodate additional recreational boaters compared to Concept B, Concept B still provides increased capacity for boaters compared to the current wharf.</li> </ul> <p style="text-align: center;"><b>Moderately Preferred</b></p>
<b>Social Environment Summary</b>		<p>The anticipated construction disruptions are similar for both design concepts.</p> <p>While Concept A provides an increased area to accommodate recreational boaters, it will not provide an increase to the area available for non-boating uses, including pedestrians, site-seers, and other users of the wharf.</p> <p style="text-align: center;"><b>Moderately Preferred</b></p>	<p>The anticipated construction disruptions are similar for both design concepts.</p> <p>While Concept A provides an increased area to accommodate recreational boaters, Concept B will provide an increase area for pedestrians and other users of the wharf.</p> <p style="text-align: center;"><b>Most Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
<b>Cultural Environment</b>			
Effect on Archaeological Resources	Loss and/or disturbance of archaeological resources	<ul style="list-style-type: none"> <li>• A Stage 1 Archaeological Assessment determined that the study area does not have archaeological potential. Therefore, no loss and/or disturbance of archaeological resources is expected.</li> <li>• A Marine archaeological screening indicated that the site has low archaeological potential. Therefore, loss and/or disturbance of archaeological resources is not expected.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• A Stage 1 Archaeological Assessment determined that the study area does not have archaeological potential. Therefore, no loss and/or disturbance of archaeological resources is expected.</li> <li>• A Marine archaeological screening indicated that the site has low archaeological potential. Therefore, loss and/or disturbance of archaeological resources is not expected.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
Effect on Cultural Heritage Resources	Loss and/or disturbance of cultural heritage resources	<ul style="list-style-type: none"> <li>• Both design concepts will continue to enable the wharf's association with the theme of commerce and with the activity of fishing.</li> <li>• Both design concepts will allow the wharf to continue contributing to the area's commercial identity, transportation services, and waterfront tourism industry.</li> <li>• Both design concepts will allow the wharf's historical association with water-based transportation and recreational activities in the area (such as fishing, boating, and tourism) to continue.</li> <li>• Both design concepts will allow the wharf to continue to act as a landmark in the community, as it will ensure the wharf's ability to operate as a safe and desirable destination point for tourists.</li> <li>• Both alternatives 1 and 2 allow the wharf to maintain its cultural significance to the community.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• Both design concepts will continue to enable the wharf's association with the theme of commerce and with the activity of fishing.</li> <li>• Both design concepts will allow the wharf to continue contributing to the area's commercial identity, transportation services, and waterfront tourism industry.</li> <li>• Both design concepts will allow the wharf's historical association with water-based transportation and recreational activities in the area (such as fishing, boating, and tourism) to continue.</li> <li>• Both design concepts will allow the wharf to continue to act as a landmark in the community, as it will ensure the wharf's ability to operate as a safe and desirable destination point for tourists.</li> <li>• Both alternatives 1 and 2 allow the wharf to maintain its cultural significance to the community.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
<b>Cultural Environment Summary</b>		Both alternatives are equally preferred. <b>Most Preferred</b>	Both alternatives are equally preferred. <b>Most Preferred</b>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
<b>Built Environment</b>			
Effect on Wharf and Associated Facilities	Disturbance/improvements to the wharf, docking areas, landing and on-site amenities	<ul style="list-style-type: none"> <li>• Both alternatives would provide long-term improvements to the dock and docking areas and accommodate existing on-site amenities.</li> <li>• Both alternatives would accommodate the Municipality's future plans for the adjacent marina purchased in the Fall of 2022.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• Both alternatives would provide long-term improvements to the dock and docking areas and accommodate existing on-site amenities.</li> <li>• Both alternatives would accommodate the Municipality's future plans for the adjacent marina purchased in the Fall of 2022.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
Alignment with Land-use Planning	Implications of alternative for current zoning and designated land uses	<ul style="list-style-type: none"> <li>• Both alternatives align with existing and zoned land uses.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• Both alternatives align with existing and zoned land uses.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
<b>Built Environment Summary</b>		<p style="text-align: center;">Both alternatives would similarly accommodate the existing use of the wharf and align with existing and zoned land uses.</p> <p style="text-align: center;"><b>Most Preferred</b></p>	<p style="text-align: center;">Both alternatives would similarly accommodate the existing use of the wharf and align with existing and zoned land uses.</p> <p style="text-align: center;"><b>Most Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
<b>Economic Environment</b>			
Effect on Economic Development	Potential benefits and impacts on local businesses and economic opportunities	<ul style="list-style-type: none"> <li>• Both concepts would similarly disrupt potential activities established at the wharf during construction.</li> <li>• Concept A has less wharf area available for potential future local economic development activities compared to Concept B.</li> </ul> <p style="text-align: center;"><b>Moderately Preferred</b></p>	<ul style="list-style-type: none"> <li>• Both concepts would similarly disrupt potential activities established at the wharf during construction.</li> <li>• Concept B has more wharf area available for potential future local economic development activities compared to Concept A.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
Effect on Municipal Leases	Ability of Municipality to meet terms of municipal wharf leases	<ul style="list-style-type: none"> <li>• Both concepts would similarly allow the Municipality to meet terms of municipal wharf leases.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>	<ul style="list-style-type: none"> <li>• Both concepts would similarly allow the Municipality to meet terms of municipal wharf leases.</li> </ul> <p style="text-align: center;"><b>Most Preferred</b></p>
<b><i>Economic Environment Summary</i></b>		<p>Concept A is less preferred compared to Concept B because it will result in less wharf area than Concept B, thereby providing less space for local activities that may generate economic opportunities.</p> <p style="text-align: center;"><b>Moderately Preferred</b></p>	<p>Concept B is most preferred as it provides the more wharf area than Concept A (thereby providing more opportunity for local activities that may generate economic opportunity) while allowing the Municipality to meet terms of municipal wharf leases.</p> <p style="text-align: center;"><b>Most Preferred</b></p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
<b>Technical</b>			
Construction Material	Construction material readily available	<ul style="list-style-type: none"> <li>Both alternatives would utilize similar construction material including steel sheet piles, steel tube piles and reinforced concrete.</li> </ul> <p>Most Preferred</p>	<ul style="list-style-type: none"> <li>Both alternatives would utilize similar construction material including steel sheet piles, steel tube piles and reinforced concrete.</li> </ul> <p>Most Preferred</p>
Construction Schedule	Anticipated length of construction period	<ul style="list-style-type: none"> <li>Smaller concrete dock footprint would translate to shorter construction period.</li> </ul> <p>Most Preferred</p>	<ul style="list-style-type: none"> <li>Bigger concrete dock footprint would translate to longer construction period.</li> </ul> <p>Moderately Preferred</p>
Climate Change Adaptation	Resilience of wharf to future climate change impacts, including increased lake levels and severe weather events	<ul style="list-style-type: none"> <li>Both alternatives would provide similar resiliency to extreme weather events through the anchored sheet pile wall.</li> <li>Both alternatives would raise the entire dock above the record high levels to best ensure the wharf is least impacted by water levels and wave action.</li> </ul> <p>Most Preferred</p>	<ul style="list-style-type: none"> <li>Both alternatives would provide similar resiliency to extreme weather events through the anchored sheet pile wall.</li> <li>Both alternatives would raise the entire dock above the record high levels to best ensure the wharf is least impacted by water levels and wave action.</li> </ul> <p>Most Preferred</p>
<i>Technical Summary</i>		<ul style="list-style-type: none"> <li>Concept A is most preferred due to its relatively shorter construction period.</li> </ul> <p>Most Preferred</p>	<ul style="list-style-type: none"> <li>Concept B is moderately preferred as a longer construction period is anticipated.</li> </ul> <p>Moderately Preferred</p>
<b>Financial</b>			
Capital Costs	Anticipated net capital costs (considering federal grants)	<ul style="list-style-type: none"> <li>The anticipated capital cost for both alternatives are in the order of \$2.8M (based on 2020 estimate).</li> </ul> <p>Most Preferred</p>	<ul style="list-style-type: none"> <li>The anticipated capital cost for both concepts are in the order of \$2.8M (based on 2020 estimate).</li> </ul> <p>Most Preferred</p>

Category / Criteria	Indicator(s)	Alternative Design Concept A:	Alternative Design Concept B:
Operating Costs	Anticipated annual operations and maintenance costs	<ul style="list-style-type: none"> <li>• The annual operations and maintenance costs for both concepts are anticipated to be similar in magnitude.</li> </ul> <p style="text-align: center;">Most Preferred</p>	<ul style="list-style-type: none"> <li>• The annual operations and maintenance costs for both concepts are anticipated to be similar in magnitude.</li> </ul> <p style="text-align: center;">Most Preferred</p>
Financial Summary		<p>The anticipated capital and operating costs are not significantly different for either concept.</p> <p style="text-align: center;">Most Preferred</p>	<p>The anticipated capital and operating costs are not significantly different for either concept.</p> <p style="text-align: center;">Most Preferred</p>
Overall Evaluation Summary		Moderately Preferred	Most Preferred
		<ul style="list-style-type: none"> <li>• Generally, the two design concepts will each affect the natural, economic and social environment similarly, based on the evaluation.</li> <li>• However, Alternative Design Concept B is considered the most preferred design option due to increased surface area compared to Alternative Design Concept A. This increased surface area provides for more economic and social opportunities for the community at the wharf.</li> <li>• While Concept B is expected to have a slightly longer construction duration due to the larger size of the concrete dock, this duration is not expected to be significant.</li> </ul>	