

Project:

ROTARY BEACH TEE PIER
CONDITION ASSESSMENT REPORT
UPDATE DECEMBER 2022

LAKESHORE DRIVE SOUTH, SUMMERLAND, BC

22-00359

Submitted by:



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Submitted to:

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December 19, 2022

Introduction:

Riding Engineering was retained by the District of Summerland to complete a follow-up review of the Rotary Park Tee Pier located on Lakeshore Drive South, Summerland, BC. The purpose of the review is to determine if the pier continues to be safe for public use with minor repairs and how long it would remain safe without major improvements and to determine if a revised timeline is required based on our updated report dated July 29, 2018. Lawrence Riding, P.Eng. of Riding Engineering attended at the site on November 25, 2022, to complete a general review of the overall structure gathering information on the pier guardrails, deck planks, deck framing and pilings.

The top end of the pier tee is approximately 24'-0" wide x 40'-0" and supported with 3 rows of 5 Douglas Fir pilings, the remaining pier is approximately 20'-0" wide x maximum 179'-6" supported with 14 rows of 3 Douglas fir pilings and 1 row of 3 concrete pillar supports at the foreshore. There are a total of 57 Douglas fir pilings and 3 concrete pillar supports.

A review was completed by Shoreline Pile Driving on February 19, 2016 of the Tee Pier. Based on that review, a report was provided on the general condition of the pier with particular attention to the pilings. We have reviewed this report and have structured our report to follow the way the pier plan was labelled, rating of pilings, etc.

Guardrail:

The main section of the pier along the edges has a wood guardrail installed. The guardrail is constructed with 4" x 6" pwf posts at approximately 8'-0" o/c. The guardrail wood posts are mounted to the outside face of the pier outer joist member. The guardrail wood posts are in good condition. The bottom of the guardrail wood post is fastened with 2 through bolts into the outer joist member with washer and nut. As general annual maintenance all through bolts should be checked and tightened. The guardrail is approximately 3'-11" in height from the top of the decking surface to the top of the cap plate. There is a continuous 2" x 6" pwf top rail and intermediate rail near the midheight installed. There is a 2" x 6" pwf continuous cap plate running over the top of the guardrail posts and secured to the continuous top rail. The top and intermediate rails are in good condition. The top cap plate is showing signs of potential slivering, otherwise in good condition. Sanding areas is recommended.

The top section of the pier along the back edge has a wood guardrail installed. The guardrail is constructed with 4" x 6" pwf posts at approximately 5'-0" o/c. The corner has a 6" x 6" pwf wood post. The guardrail wood posts are mounted to the outside face of the pier outer joist member. The guardrail wood posts are mounted to the outside face of the pier rim joist member. The bottom of the guardrail wood post is fastened with 2 through bolts into the outer rim joist member with washer and nut. As general annual maintenance all through bolts should be checked and tightened. The guardrail is approximately 3'-11" in height from the top of the decking surface to the top of the cap plate. There is a continuous 2" x 6" pwf top rail and intermediate rail near the midheight installed. There is a 2" x 6" pwf continuous cap plate running over the top of the guardrail posts and secured to the continuous top rail. The top and intermediate rails are in good condition. The top cap plate is showing signs of potential slivering, otherwise in good condition. Sanding areas is recommended.

There are two swim ladders installed at the outer far corners of the top section of pier, one at each end. The ladders have pipe stringers that are secured to the top side deck planking with 4 lag bolts. As well the ladder is secured with an extension pipe from the pipe stringer to the outer joist member and fastened with 2 lag bolts in the end plate.

Pier Decking:

The main section of the pier surface is covered with 2" x 12" x 20'-0" decking planks over the deck joists. Each decking plank is spiked into the top of the joists with 3 fasteners. Some of the deck planks are showing surface rot or splintering. These can be replaced on an individual basis.

The top section of the pier surface is covered with 2" x 12" x 20'-0" decking planks over the deck joists. Each decking plank is spiked into the top of the joists with 3 fasteners. Some of the deck planks are showing surface rot or splintering around the locations of the ladders. These can be replaced on an individual basis. On the three outer edges of the deck surface there is a double 4" x 6" pwf boarder. This is installed to provide a barrier along the edge. The double members are through bolted into the deck joist members below. There is visible rot and deterioration of the top members in a few locations and these will need to be replaced.

Pier Framing:

The main section of pier is constructed with 6" x 8" x 20'-0" Douglas Fir cross timber beams siting directly on top of the piling rows. There are 15 columns of 3 pilings. There is a piling near each end of the cross timber beam and one near the center. The cross member beams are in good condition. The cross member beams are fastened to the top of each piling with a ¼" x 2" thick 'U' shaped band. The band is bent over the top of the cross beam and extends approximately 16" down from the top of the piling and is secured to the sides of the piling with two lag screws each side. On top of the cross beams there is a 6" x 8" Douglas Fir joist member on the outside row each side with 6 rows of equally spaced 3" x 8" Douglas Fir intermediate support joists. All joist members are toe-nailed into the top of the cross beams. At most locations the joists span over more than one cross beam. The joist members are in good condition.

The first cross timber beam at the foreshore is supported on a single row of 3 concrete pillars. The cross beams is butt end to end over the center pillar. The cross beam is secured to the top of the concrete pillars with an embedded anchor bolt extended through the middle of the cross beam with a washer and nut on top. The one end of the cross beam is basically touching the granular backfill along the shoreline and has some visible dampness and deterioration but the remainder is in good condition. The ends of the joists extending over the first cross beam could not be reviewed. The ends will be placed in granular backfill and will most likely have some degree of rot and/or deterioration.

The end section of pier is constructed with 6" x 8" x 20'-0" Douglas Fir cross timber beams siting directly on top of the piling rows. There are 3 columns of 5 pilings. There is a piling near each end of the cross timber beam and three approximately equally spaced throughout the middle section. The cross beams members butt end to end over the center located piling. The cross beams are in good condition. The cross member beams are fastened to the top of each piling with a ¼" x 2" thick 'U' shaped band. The band is bent over the top of the cross beam and extends approximately 16" down from the top of the piling and is secured to the sides of the piling with two lag screws each side. On top of the cross beams there is a 6" x 8" Douglas Fir

joist member on the outside row each side with 14 rows of equally spaced 3” x 8” Douglas Fir intermediate support joists. On the front and back of this section at the ends of the joists there is a 3” x 8” Douglas Fir rim board installed. All joist members are toe-nailed into the top of the cross beams. The joist members are in fair to good condition. Water staining is visible on the sides of the members at the gap spacing between the deck planks as a result of additional moisture dripping from swimmers.

Piling:

There are 57 Douglas Fir pilings supporting the pier framing. All of the pilings are peeled and untreated. Based on information provided, the original pilings were installed in the summer of 1999 making the pier 23 years old. We reviewed each piling individually and also reviewed the rating given in the Shoreline Pile Driving report and provided a rating of its condition. An overall pier plan drawing S1 is included at the end of this report. We have followed the rating system implemented in the previous Shoreline Pile Driving report. That is; a rating system that consists of a 0 to 10 score, with 0 being the lowest possible rating and 10 the highest. A 10 rated piling would be a new pile freshly cut and installed. A -0 rated piling would be a broken one. A 0 to 1 rated piling would be missing sections and not capable of adequately supporting the imposed loads of the structure above. Pilings with a 2 to 3 are in poor condition and have a very short future life span. A 4 to 5 rated piling shows signs of exterior deterioration with some strength left in the core. A piling that scores a 6 will have surface softness but has a solid core and a higher life span. A 5 was the highest score of any piling for the pier.

<u>Description</u>	<u>Score Given</u>	<u>current # of piles</u>	<u>previous # of piles</u>	<u>diff</u>
Broken	- 0	10	3	+ 7
Failed	0 – 1	15	11	+ 4
Poor	2 – 3	15	19	+ 4
Moderate (core strength)	4 – 5	17	21	- 4
Good	6	0	3	- 3
Excellent	7 – 10	0	0	0
		Total 57	57	

There are existing repaired pilings with a score of -0 and 0 to 1 (8 in total) with a double 3” x 8” Douglas Fir vertical splint installed on opposite sides of the pile. The two vertical members were fastened with through bolts at approximately 48” o/c with the first bolt near the top of the piling. It appears that the new vertical brace members extend a minimum of 4’-0” below the depth of the lake surface. We did not dive below the lake surface so this depth cannot be confirmed. Whoever completed the repairs should be able to provide the District of Summerland with the length of members that were used. The two splint pieces were toenailed to the underside of the cross member beams. The splint repair that has been installed on the 8 existing failed pilings is not performing well due to accelerated deterioration and in our opinion cannot adequately support the imposed loads from the pier, waves and wind.

Based on our evaluation 15 pilings have dropped to a lower score from good and moderate to poor, failed and broken with a rating of 2 to 3, 0 to 1 and -0 respectively since the last evaluation. Replacement of these pilings is required.

There are 25 pilings that have failed and need immediate replacement. There are another 15 pilings that are in critical condition and need immediate replacement. A total of 40 pilings are now in need of immediate replacement of the total of 57. As noted in the Shoreline Pile Driving report, replacing a single pile would require the removal of the deck planks within that location along with the deck joists and the cross beam on top of the pilings. Since the deck joists span over a couple of cross members, the existing joists may need to be cut above the location of the cross member with the piling to be replaced. As this would need to be done for each pile it would be advantageous to change a complete set of 3, all at one time. This will save time and labor costs. There are no 3 piling sets that have completely failed; however, there are a number of sets that are very close. There are 5 sets with a total score between 1 and 4. There are 11 sets with a total score between 5 and 9, and another 3 sets with a total score of 10.

Recommendations:

The individual pilings for the pier have deteriorated considerably over the past 41 months since our last review. Most of the visible deterioration is occurring toward the Tee end which has the most exposure. **Based on this accelerated deterioration of the majority of pilings we recommend the pier is closed to the public. Before the pier can be open to the public, we recommend the immediate replacement of all piling sets. The accelerated deterioration of the individual pilings has rendered this decision as the overall safety of the pier is critical.**

Since we recommend closing the pier to the public, we have not made any recommendations on repairs to the pier guardrail and pier decking boards.

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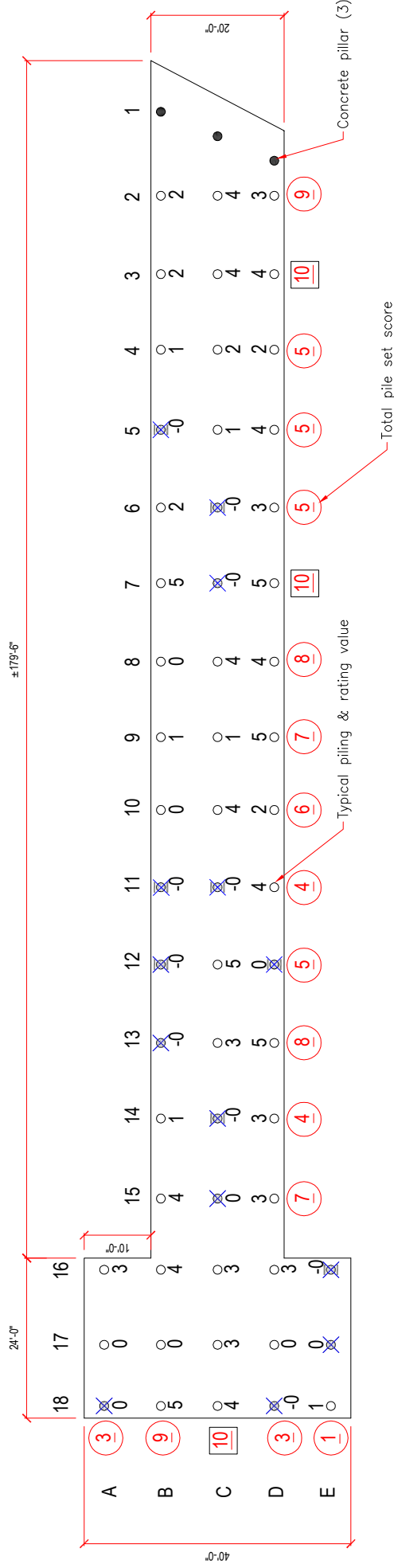
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LEGEND

Pilings are rated with an individual score of 0 to 10 those with the lowest number have failed or are broken

X indicates a broken pile (14)

O indicates the pile set of 3 - total score

O indicates the piling was reinforced (8)

O indicates piling to be reinforced (0)

Those sets in 'red' are most critical (19)

Pile sets with a total score of 30 would be considered new

Pile sets with a total score of 18 is average

Pile sets with a total score of 14 or less, are in poor condition

Pile sets with a total score of 9 or less require immediate attention

Drawing to be read in conjunction with report dated Dec. 19, 2022

TEE PIER PLAN - CURRENT CONDITION

ROTARY BEACH
TEE PIER

LAKESHORE DRIVE SOUTH
SUMMERLAND, BC.
NOV. 25, 2022