APPENDIX J

BRIDGES

Addendum Note:
See Final Rail Trail Bridge Assessment Report and Detail Drawings Sealed (May 5, 2021), and Structural Specification Drawings Sealed (May 20, 2021)

Visit the website for any updates or addendums
www.shuswapnorthokanaganrailtrail.ca/development-plan

ASSESMENT-Bridge Inspection Summary

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PROJECT:	CSRD Rail Trail-Bridge Inspection Summary	FILE:	19-383
ATTENTION:	Phil McIntyre, Shuswap Trail Alliance & Thomas Simkins, Urban Systems Ltd.	PAGES:	1 of 11

Introduction

On April 20, 2020 Bourcet Engineering (BE) performed visual inspections on four [4] bridges along the decommissioned Canadian Pacific Railway (CPR) line between Armstrong and Grindrod, BC. The bridges were at kilometers 17 (Rosemond Lake), 40, 42 (Stepney Cross Road) and 49 (Fortune Creek). All four bridges were part of the original CPR line and had not been used or maintained since the decommissioning of the line.

Observations

All the wood bridges were constructed similarly, with creosote treated solid timbers, piles and pile caps with treated wood retaining wall type abutments on each end. The main deck beams had secondary support frames that consisted of secondary beams, piles and bracing. The piles were buried in the earth or riverbed to an undermined depth. Three [3] bridges had secondary support lines along their length. The Stepney Cross Road bridge had two [2] bearing lines.

The bridges were found to bel in moderate condition, with upgrades required. Typically, the main beams, secondary beams, piles, and cross bracing all appeared in good condition. They did not show signs of deterioration or rot that would require their replacement. The majority of the deterioration was noticed in the deck ties and abutments. Please refer to table 1 below for general bridge information.

Additional Bridge Observations

1. Rosemond Lake (Km 17) **Pic 1-15**

- Minimum half of the 43 deck ties show signs of rot and deterioration.
- Multiple piles had 11½”x11½” square timber splices. The splices vary in length but averaged about 3’-0” long. BE assumed this was due to previous remediation work that had occurred.
- The [2] interior support lines have 3”x10” cross bracing.
- Abutment A (south) was is poor condition with noticeable rot and deterioration. A section was supported by plywood and a brace.
- Abutment B (north) was in better shape but still showed signs of fatigue and rot.

2. Km 40 Bridge **Pic 16-27**

- A portion of the 46 treated deck ties show signs of rot and deterioration.
- The [2] end piles of the interior bearing line were battered. This means they are on an angle to provide additional stability especially against the thrust of the water.
- The [2] interior support lines have 2”x8” cross bracing.
- The piers appeared in overall good condition.
- The main beam and secondary beam were connected using a 6”x4” piece of angle iron.
- Both abutment timbers were in moderate condition but did show signs of fatigue. The bearing lines near the abutments has moss and mildew in some locations.

3. Stepney Cross Road (km 42) **Pic 28-38**

- A portion of the 15 deck ties showed signs of age and deterioration.
- This bridge was shorter and the water line higher than the other bridges. The confirmation of some dimensions was not obtainable.
- The piers were almost completely submerged meaning confirmation of their condition undeterminable at the time of our site visit.
- The secondary beam was visible on both bearing lines.
- Most beams had green mildew along their length.
- The main beam and secondary beam were connected using a 6”x4” piece of angle iron.
- Abutment A (south/west) was in acceptable condition with some signs of fatigue.
- Abutment B (north/east) showed some signs of rot and deterioration.

4. Fortune Creek (Km 49) **Pic 39-51**

- Some of the 46 deck ties show signs of deterioration and rot.
- The secondary beams came with a 4 x14” top plate.
- Interior bearing line 3 (2nd from west abutment) had rot near the south end.
- The main beam and secondary beam were connected using a 6”x4” piece of angle iron.
- Bearing line 3 (2nd from east abutment) has a double column at 1 location.
- Both abutments were in moderate condition but did show signs of fatigue.
- Piers were in overall good condition.

Recommendations

BE observed the overall condition of the bridges as good with some remediation work required. It is recommended that all bridge decks be replace. We suggest replacing the ties with a similarly sized treated material, such as 6x8”, but at a larger spacing. The exact spacing will be determined by new decking placed over the new deck ties. The decking will provide a safe surface on the bridge for all traffic. A handrail will also be required on all bridges.

In addition, it is recommended that all abutments be replaced. Several abutments showed signs of deterioration or rot while the majority of the other showed signs of fatigue and age. BE recommends excavating them from the back and replacing the railway ties with similarly sized treated lumber and vertical rods to increase the stability.

Finally, any members that have moss or mildew on them will need minor remediation work to have that removed. Please refer to the detailed report and construction drawings (not yet released) for each bridge to get a comprehensive explanation of the conditions and upgrade recommendations.

	Rosemond Lake (Km 17)	**Km 40 Bridge**	**Stepney Cross Road (Km 42)**	**Fortune Creek (km 49)**
Dimensions	12'-0" wide x 42'-2" long	10'-0" wide x 44'-8" long	10'0" wide x15'-6" long	10'-0" wide x 45'-6" long
Maximum Height	9'-0" above grade/water	7'-6" above grade/water	~16" above water	3-10" above water/grade
Decking	9"x7½" or 7"x7½" treated ties @ 1'-0"c/c	7½"x7½" treated ties @ 1'-0"c/c	7½"x7½" treated ties @ 1'-0"c/c	7¼"x 7½" treated ties @ 1'-0" c/c
Main Beams	[2] 9½"x19½" treated beams 6" apart	[4] ply 9½"x17½" built-up treated beam	2'-4"x17" treated beam	3'-0"x17½" treated beam
Bearing Lines	4 lines total -15'-2" c/c, 13'-9" c/c and 11'-9" c/c	4 lines total -15'-2" c/c, 14'-0" c/c and 15'-6" c/c	2 lines total -15'-6" c/c	4 lines total -16'-0" c/c, 15'-0" c/c and 14'-1" c/c
Secondary beams	12"x16" treated	14"x14" treated	14"x14" treated	14"x14" treated
Piles	12" & 13" diameter treated	14" diameter treated	Not confirmable due to water level	10" diameter treated
Abutments	Treated ties, built up	Treated ties, built up	Treated ties, built up	Treated ties, built up

Table 1-Bridge Information

Sincerely,

Attachments: Photo Attachment
Rosemond Lake Pg 4-5
Bridge Km 40 Pg 6-7
Stepney Xing Pg 8-9
Fortune Creek Pg 10-11

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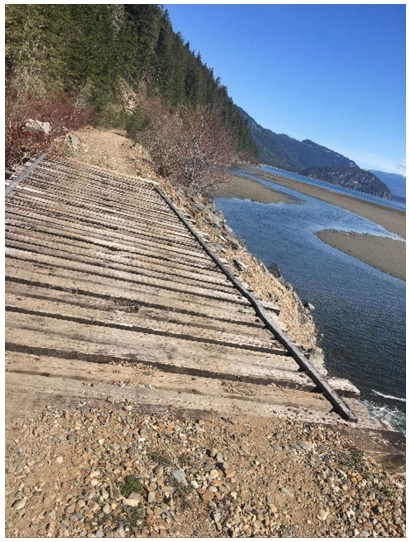
Photo Attachment -Rosemond Lake (Km 17)

Pic 1-Bridge Deck



Pic 2 Bridge Deck

Pic 3-Deck Deterioration

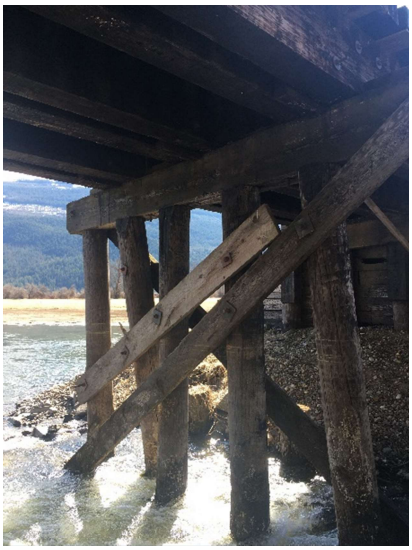
Pic 4-Deck Deterioration

Pic 5-Deck Deterioration

Pic 6-Bearing Line

Pic 7-Bearing Line

Pic 8-Breaing Line



Pic 9-Bearing Line

Pic 10 -Pier Block

Pic 11-Pier Block

Pic 12-Abutment Deterioration

Pic 13-Abutment Deterioration(S)

Pic 14-Abutment (South)

Pic 15-Abutment (North)

Km 40 Bridge

Pic 16-Bridge Deck

Pic 17-Bridge Deck

Pic 18-Deck Deterioration

Pic 19- Deck Deterioration

Pic 20-Deck Deterioration

Pic 21-Bearing Lines

Pic 22-Bearing Lines

Pic 23-Abutment & Bearing Line

Pic 24-Bearing Line

Pic 25- Moss & Mildew

Pic 26-Abutment

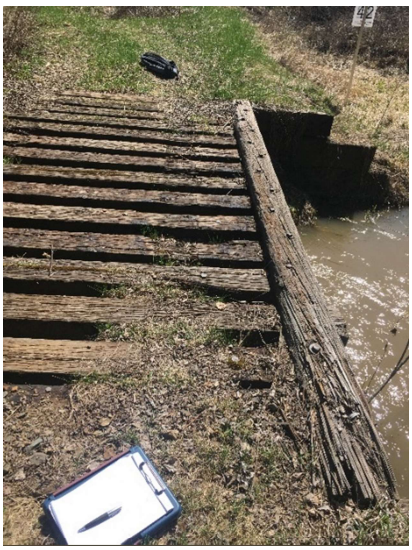
Pic 27-Abutment

Stepney Cross Rd (km 42)

Pic 28- Bridge & Abutment (SW)

Pic 29-Bridge & Abutment (NE)

Pic 30-Bridge Deck



Pic 31-Bridge Deck

Pic 32-Deck Ties

Pic 33- Abutment Deterioration

Pic 34-Angle Connection

Pic 35-water Level/Bearing line

Pic 36-Water Level/Bearing Line

Pic 37-Pier & Cap

Pic 38-Pier & Cap

Fortune Creek (Km 49)

Pic 39-Bridge Deck

Pic 40-Bridge Deck

Pic 41-Tie Deterioration

Pic 42-Interior Bearing Line (W)

Pic 43-Interior Bearing Line (W)

Pic 44-Interior Bearing Line (E)

Pic 45-Interior Bearing Line (E)

Pic 46- Beam Deterioration

Pic 47- Abutment (E)

Pic 48-Abutment (E)

Pic 49-Abutment (W)

Pic 50-Beam Cap & Angle Connection

Pic 51-Main beam