



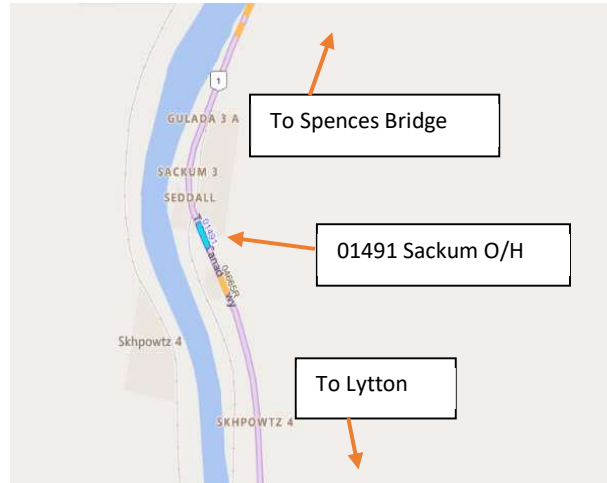
STRUCTURAL ENGINEERING

BC Ministry of Transportation
and Transit

01491 SACKUM O/H BRIDGE INSPECTION REPORT SUMMARY



01491
2024-05-21
North Looking South



Latitude: 50.31075, Longitude: 121.395472

Inspected By: Kelly Mcken – Senior Structural Inspection Technician
Alexandra Marriott – Structural Engineer

Inspection Date: March 3rd, 2025

Report Date: March 6th, 2025



1 Introduction

On March 3rd, 2025, Kelly McKen and Alexandra Marriott performed a detailed inspection of 01491 Sackum O/H bridge in Service Area 14 at the request of the Sackum Bridge Replacement Project Team. The Sackum O/H bridge site is located on Highway 1 over the CPKC rail line approximately 14km south of Spences Bridge.

The project team has requested quarterly detailed inspections via snoopers truck for the bridge. This was the third of such inspections with previous detailed inspections occurring via snoopers on May 23rd, 2023, May 21st, 2024, and October 28th, 2024. The focus of this inspection was to compare current condition to the October 28th, 2024 inspection; as such, this report should be read in conjunction with the previous inspection reports for the full scope of structural condition.

1.1 Configuration

Sackum O/H is a 73.5m, 6 span, 2-lane bridge with concrete deck and precast concrete parapets bolted on existing curb. The spans consist of 6-680x355mm painted steel I-beam stringers spaced at 1690mm on steel on steel (expansion) and steel plate (fixed) bearings. Piers 1 and 5 caps are concrete on concrete columns to spread footings. Piers 2-4 are steel on 2 concrete columns to spread footings. The steel caps directly support the deck and in addition have stringers bolted into the webs. The CPKC rail line runs between pier 3 columns. Abutments and wingwalls are concrete.

1.2 Structure History

Built in 1958 the Sackum O/H bridge has had several detailed inspections completed in the last 14 years, Buckland and Taylor in 2010, COWI in 2016 and additional snoopers inspections performed in 2018 and 2023.

In 2012 all joints were noted to have failed and were leaking, concrete blowouts occurred near the joints in the southbound lane in numerous locations in 2015 with an additional concrete blowout occurring in the deck in 2017.

In 2014 piers 2, 3 and 5 were noted to have a cracked connection angle and a few broken/missing bolts.

In 2015 the concrete caps at piers 1 and 5 had steel collars installed at both ends due to extensive delaminations and spalling.

Starting in 2024 the project team requested quarterly detailed inspections via snoopers truck.

In May 2024 orange broken pavement and 70km/h warning signs were added to both approaches. Frequent concrete deck patching has been ongoing.

In 2024/2025 extensive deck patching was completed and the orange 70km/h signs were replaced with white 70km/h speed limit signs located approximately 1km from the bridge on both approaches.

1.3 Method

A detailed inspection of all components per standard Ministry inspection methods and the BMIS system was performed. Substructure, stringers, and subdeck were inspected by snoopers truck using visual and



hammer sounding. Other components were inspected on foot. New conditions were recorded and photographed throughout.

1.4 Site Conditions

Traffic control was required due to snooper use and a high volume of traffic. A rail flag person was also required for coordination with CPOK Rail. Powerlines were present close-by off the south side of the bridge. No other safety hazards were observed. The weather was sunny and ranged from 2-11°C over the course of the day with no recent precipitation. The small watercourse flowing below span 5 from south to north into a concrete culvert under the rail line present in May 2024 was dry. No flow at this time of year was estimated to be typical.

2 Condition Summary

The primary changes of concern for Sackum O/H bridge since the October 28th, 2025 inspection are:

- Concrete Deck:
 - Cracks throughout have increased in frequency/size, at least one is potentially full depth
 - Occasional new areas of broken up concrete or spall
 - Rutting/wear in wheelpaths up to 13mm throughout with significant loss of cement and areas with loss of aggregates bordering on shallow spalls
- Subdeck:
 - Probable full depth crack in span 1 east of midspan across bays 3-4 with heavy accumulation of efflorescence and water leaching (no recent rain)
 - More extensive spalling particularly at ends of each bay
 - Significant lifting of deck off stringer F with daylight in a few locations

Other notable changes of lesser concern include:

- Generalized minor indications of movement:
 - Squeaking under load at pier 1 stringer F
 - Trimmer plate ends pressed together or overlapping at piers 1 and 5
 - Stringer bolts pressed transversely against bearing plate slots deforming slot
 - Bearing plates tilting at piers 1 and 5
 - Drain bracket bent and pulling off stringer F at pier 1 span 2 (drain moved east)
 - Stringers F minor sag, most notable in span 1
 - Deck lifting off top flange with daylight at pier 1
- Stringers:
 - More extensive and new areas of medium corrosion throughout
 - Angle clip to cap drilled at pier 3 span 3 stringer F bay 5, does not appear to be cracked
- Caps:
 - Piers 2 and 4 have increased generalized corrosion, but no new perforations observed

This report discusses only conditions that have worsened since the October 28th, 2024 report. The previous reports should be read in conjunction with this report for the full scope of structural concerns.



A copy of this report to go to:

- Bill Becker, Senior Asset Management Engineer, SIR
- Anmoal Romana, Senior Project Manager, SIR
- Leah Saik, Project Coordinator, SIR
- Chaun Gassner, Bridge Area Manager, Service Area 14

3 Inspection

New deteriorated condition notes are in green.

3.1 Deck

Concrete.

General

- Transverse and diagonal cracks throughout have increased in frequency, width, and length, some are now very wide (i.e. 2.5mm+) and potentially full depth (noted in span 1 east of midspan bays 3-4 – see subdeck)
- Occasional new areas of broken up concrete or spall, previous areas patched
- Rutting/wear in wheelpaths up to 13mm throughout with significant loss of cement and areas with loss of aggregates bordering on shallow spalls
- Frequent small spalls near joints and patches



Figure 1: Span 1 north lane south wheel path rutting



Figure 2: Typical deck crack

Span 1

- At pier 1 north lane north wheel path 800x200 spall with exposed bar

Span 3

- Frequent multi-directional wide random cracks throughout spaced at less than 1m



- North lane at 2/3 point near centreline large area loose concrete with small spalls, previously 2 wide cracks



Figure 3: Pier 1 joint



Figure 4: Span 3 north lane 3m east of pier 3

Span 5

- At pier 5 north lane north wheelpath 450x160 spall with exposed bar

Span 6

- West abutment north lane north wheel path small 20mmx20mm hole



Figure 5: Pier 5 joint north lane



Figure 6: West abutment joint



3.2 Subdeck

Concrete, non-composite.

General

- More extensive spalling particularly at ends of each bay

Span 1

- Probable full depth crack east of midspan across bays 3-4 with heavy accumulation of efflorescence and water leaching (no recent rain)

Span 2

- North soffit at pier 1 spalled between top flange and deck with exposed corroded bar
- Significant lifting of deck off stringer F with daylight in a few locations
- Bay 5 at pier 2 large spall with exposed corroded bar



Figure 7: Span 1 bay 4 east of diaphragm 1



Figure 8: Pier 1 span 2 stringer F

Span 6

- Bay 5 at pier 5 extensive water leakage with efflorescence staining



Figure 9: Pier 2 north end



Figure 10: Pier 5 span 6 bay 5



3.3 Generalized Minor Indications of Movement

There are a number of indications of minor movements, particularly in the pier 1 stringer F area, that go in multiple components but have been all listed here.

- Live load
 - Squeaking under load at pier 1 stringer F
- Deck Joints
 - Pier 1 span 2 trimmer north end severely misaligned with stringer longitudinally (trimmer pushed approximately 30-50mm east, in contact and overlapping with span 1 trimmer) span 2 trimmer disconnected from stringer, span 1 heavily rust jacked
 - Pier 5 south soffit trimmers misaligned and in V shape, north trimmers pushed together and slightly overlapped



Figure 11: Pier 1 north end



Figure 12: Pier 5 north end

- Stringers
 - Span 2 at pier 1 stringer A bearing bolt slots have bolts pressed against south edge of slot; at pier 1 stringer F bearing bolt slots have bolts deforming north edge of slot
 - Deck lifting off top flange approximately 23mm with daylight at pier 1
- Bearings
 - Pier 1 span 1 bearing D tilted up on east side, bearing E slightly tilted up on east side
 - Pier 1 span 2 bearing D rust jacking below bearing (ends of bottom flanges misaligned with span 2 higher)
 - Pier 5 span 5 bearing D slightly tilted base plate; bearing F base plate slightly bowed
- Drains
 - Span 2 pier 1 stringer F drain plate bolted to stringer is bent and pulling off stringer, appears deck has shifted east compared to stringer



Figure 13: Pier 1 span 2 bearing F



Figure 14: Pier 1 span 2 bay 5 drain anchor

- Camber/Sag
 - Span 1 stringer F more significant sag
 - Stringers F minor sag

3.4 Stringers

6 - 680x355mm steel I-beams at 1690mm spacing.

General

- Spans 1-3, 6 more extensive and new areas of medium corrosion throughout, some areas with sheeting

Span 3

- Stringer F at pier 3 bay 5 L-plate to cap drilled approximately 30mm from bottom, does not appear to be cracked



Figure 15: Span 1 stringer F south face



Figure 16: Pier 3 span 3 stringer F south face



3.5 Caps

Piers 1 and 5 have concrete caps with retrofitted steel collars at both ends and supported by 2 concrete columns. Piers 2 to 4 have steel caps supported by 2 concrete columns.

Piers 2 and 4 have increased generalized corrosion, but no new perforations observed.

3.6 Other Components

Note, comments are interspersed between pictures.

3.6.1 Approaches

Asphalt.

West Approach

- North lane north wheel path at transition small 20mmx20mm hole

3.6.2 Signing/Lighting

In 2024/2025 orange reduce speed signs were replaced with white 70km/h sign installed at approximately 1km before bridge on both approaches. Orange BROKEN PAVEMENT 550M AHEAD signs replaced previous BROKEN PAVEMENT 400M AHEAD signs, and orange BROKEN PAVEMENT 100M AHEAD signs remain.

3.6.3 Curbs

Concrete, 260mm high.

North Curb

- Span 1 at east abutment large shallow spall with 1 exposed bar
- Span 2 midspan 3m long deep large spall at deck level with exposed bars

3.6.4 Pins/Bolts/Rivets

Bolts and rivets on stringers, diaphragms and steel caps

Span 2

- Pier 2 stringer E bottom 3 new bolts appear to be smaller size (possibly non-structural)

Span 3

- Pier 3 at south soffit top flange missing rivet (2025 03 03)
- Pier 3 bay 5 at stringer F missing 1 bolts at bottom
- At pier 3 above north rail track (bay 5) 11 rivet heads missing on bottom of bottom flange, appears to have been an old impact

3.6.5 Bearings

Abutments have fixed steel block on steel plate. Piers 1 and 5 have expansion steel block on steel plate in both spans. Piers 2-4 have fixed steel plate on steel plate. Bearings in both spans at piers 1 and 5 share a base plate.

East Abutment (1st)



- Bearing F both anchor bolts to stringer corroded off

3.6.6 Pier Columns

2 concrete columns at each pier.

Pier 4 Column B

- North face at top wide horizontal crack

3.6.7 Abutments

Concrete.

East Abutment (1st)

- Ballast wall bay 5 delamination, small shallow spall behind stringer F
- North soffit ballast area delaminated, occasional small shallow spall

3.7 Inspection Recommendations

The following is recommended for the next inspection of this bridge:

- Track progress of steel caps top flange perforations
- Visually inspect steel pier caps 2 and 4 for breaking bolts in stringer connections
- Monitor soffit and subdeck above rail tracks for falling concrete
- Monitor concrete deck spalls and areas around joints
- Monitor spalling along top of concrete caps 1 and 5 to ensure bearings are not undermined

The following is recommended for ongoing monitoring of this bridge:

- Continue increased frequency of deck inspection to monitor for potential safety concerns (e.g. spalling, potholes, joint armouring)
- Continuing with quarterly detailed inspections



3.8 Appendix

The Appendix provides a complete set of notes from the 2024 05 21, 2024 10 28, and 2025 03 03 inspections. Changes between the October and March inspections are in **Green** text. The information provided relating to changes below is summarized in the report above.

01491 Sackum OH Detail 2025 03 03

1st abutment East

Abutment Notes

- First abutment E; river is north

OHS

- Structure Horizontal Alignment Rating __1
- Structure Vertical Alignment Rating __2
- Approach Horizontal Alignment Rating __3
- Approach Vertical Alignment Rating __4
- Rail Parapet Adequacy Rating __1
- End treatment Flares Rating __2 (not connected at northeast or southeast)

41 Roadway Flares (E G90 F5 P5 VP X N/A)

CRBs all 4 corners, attached to parapet

2025 03 03

- occasional light scrapes (2023)

East Approach (1st)

- north occasional small spall with exposed corroded bar (2024 10 28)
- north at transition to bridge medium spalls and **large shallow spalls** (2025 03 03)
- north near bridge transition slightly misaligned (2023)
- south at transition to bridge large spall (2023)
- south at bullnose transition small area of random cracking (2023)
- occasional small spall on top corner back face (2023)

West Approach

- south at transition to bridge **large spalls at bottom with loose chunks** (2025 03 03)

40 Roadway Approaches (E G30 F25 P35 VP10 X N/A)

Asphalt

2025 03 03

East Approach (1st)



- roughly patched with medium potholes throughout, loose or missing chunks at transition, very uneven (2024 10 28)
- north lane north wheel path large uneven and settled patch with medium potholes, up to 50mm deep (2024 10 28)
- north wheel paths rutting up to 25mm (2023)
- north lane at centerline large area of map cracking (2023)
- south lane wide transverse cracks at transition with small potholes, map cracking throughout at transition (2024 10 28)

West Approach

- approximately 3m from transition for full width extensive area of wide random cracking (2023)
- north lane both wheel paths up to 25mm of settlement (2025 03 03)
- north lane north wheel path at transition small 20mmx20mm hole (2025 03 03)
- south lane very wide, transverse crack at transition with small areas of broken up asphalt (2023)
- south lane has minor settlement in wheel paths approximately 10-25mm (2023)

2013 - new pavement nov/dec

39 Signing/Lighting (E G100 F P VP X N/A)

Both oncoming approaches have white 70km/h at approximately 1km before bridge; orange BROKEN PAVEMENT 550M ahead; orange BROKEN PAVEMENT 100M AHEAD

West approach has 2 reflective w54s on saddle approximately 10m from bridge; south SACKUM OVERHEAD CPR MILE 81.47

East approach has 2 reflective w54s approximately 10m from bridge, north cantilevered, south on saddle; north SACKUM OVERHEAD CPR MILE 81.47 approximately 10m from bridge

2025 03 03

East Approach (1st)

- w54s and SACKUM OVERHEAD have small chips in paint throughout (2024 10 28)

West Approach

- SACKUM OVERHEAD CPR MILE 81.47 top right corner small area bent (2025 03 03)

2024/2025 – orange reduce speed signs replaced with white 70km/h sign installed at approximately 1km before bridge on both approaches

2024 May – orange broken pavement and reduce speed signs 70km/h installed x6 (see details above)

37 Drains/Pipes (E G90 F P10 VP X N/A)

Both sides have grated steel pipe drains on spans 2, 4, and 6

Span 2 drains go into corrugated plastic drain extensions that extend to below pier 1 cap

Span 4 drains go through trough on pier 3 then into a half CSP flume at ground level

Span 6 north drain goes into corrugated plastic drain extension that extends below pier 5 cap, south goes into a CSP that extends to just above bottom of cap

2025 03 03



- all drains completely filled with sand/gravel (2024 05 21)
- at pier 1 span 2 stringer F bracket bolting drain to stringer bent (drain moved towards east) (2025 03 03)
- span 4 at pier 3 stringer F drainpipe has medium corrosion (2024 05 21)

2023

- span 4 CSP flume completely full of sediment (2023)

35 Railings/Parapets (E G97 F P3 VP X N/A)

Concrete parapet bolted and grouted on curb, 1114mm high (including curb)

2025 03 03

South Parapet

- frequent large areas of light scale (2023)

North Parapet

- occasional grout pocket spalled (2023)
- east end large area of shallow spalling (poor) (2023)

2014 02 21 - parapet damaged in part due to truck/car(s) accident (fatal)

33 Curbs/Wheelguards (E G40 F30 P25 VP5 X N/A)

Concrete, 260mm high

2025 03 03

- extensive wide cracks and large areas of delamination (poor) (2023)
- sections of curb on top of ballast at both abutments are extensively spalled and delaminated (poor) (2023)

North Curb

- occasional small shallow spall (poor) (2023)
- span 1 at east abutment large shallow spall with 1 exposed bar (2025 03 03)
- span 2 midspan 3m long deep large spall at deck level with exposed bars (2025 03 03)
- span 6 large area of extensive spalling with exposed and heavily corroded bars (very poor) (2023)
- at west abutment small spall (2025 03 03)

South Curb

-

32 Deck Joints (E G F P53 VP47 X N/A)

Armoured compression seals throughout

No concrete infill appears to be present, deck continues to armouring



2025 03 03

East Abutment (1st, compression seal) (100VP)

- seal missing throughout (2024 05 21)
- armouring missing throughout (2024 10 28)
- north lane wheel paths joint filled with concrete patch (2025 03 03)

Pier 1 (compression seal) (25P 75VP)

Deck

- seal mostly missing and completely ineffective, remaining sections are heavily shredded (2024 05 21)
- sliding plates in curbs have light corrosion (2024 05 21)
- north lane armouring missing in shoulder (2024 05 21)
- south lane armouring missing throughout (2024 05 21)

Subdeck

- span 2 trimmer north end severely misaligned with stringer longitudinally (trimmer pushed approximately 30-50mm east, in contact and overlapping with span 1 trimmer) span 2 trimmer disconnected from stringer, span 1 heavily rust jacked (2025 03 03)
- span 2 bay 2 trimmer has heavy corrosion (2024 05 21)
- span 2 bay 4 trimmer been pushed down at north end, and slightly throughout due to rust jacking (2024 05 21)
- all trimmers have medium corrosion, most have heavy corrosion, some have rust jacking (2024 05 21)

Pier 2 (compression seal) (100P)

- seal completely shredded but very compressed (2024 05 21)
- armouring has frequent small areas bent or ripped off (2024 05 21)

Pier 3 (compression seal) (100P)

- seal completely shredded but very compressed (2024 05 21)
- armouring has frequent small sections missing or perforated and exposed (2025 03 03)

Pier 4 (compression seal) (100P)

- seal heavily shredded but very compressed (2024 10 28)
- armouring has frequent small sections missing (2024 10 28)

Pier 5 (compression seal) (25P 75VP)

Deck

- seal mostly missing with remaining sections heavily shredded (previously completely shredded with a few small sections missing) (2024 10 28)
- north lane north wheelpath armouring bent (2025 03 03)
- south parapet seal missing (2024 05 21)
- span 6 south lane north wheelpath large section armouring missing (2024 10 28)

Subdeck

- south soffit trimmers misaligned and in V shape (2025 03 03)
- all trimmers have large areas of heavy corrosion throughout (2025 03 03)
- span 5 bay 2 at stringer C trimmer bolt missing (2024 05 21)
- span 5 bay 3 at stringer D trimmer appears slight pushed down (2024 05 21)



- span 5 bay 4 at stringer E trimmer bolt missing (2024 05 21)
- north soffit trimmers pushed together and slightly overlapped (2025 03 03)

West Abutment (compression seal) (25P 75VP)

- seal missing (2024 05 21)
- armouring mostly gone (2024 10 28)

2021 - all seals badly torn and leaking

2019 - all joints are badly torn

2015 - joints 1, 2 and 7 have concrete blowouts in southbound lane; northbound north joint area concrete repaired but no seal installed

2012 - all joints leak, all failed

31 Wearing Surface (E G F37 P50 VP13 X N/A)

Concrete

2025 03 03

- random spot checks indicate frequent large areas of delamination throughout (2024 05 21)
- wheelpaths have rutting/wear up to 13mm with loss of cement and some aggregate, areas of shallow spalling (2025 03 03)
- smoothly polished aggregates throughout with significant loss of cement (2023)

Span 1

- at east abutment at centerline large shallow spall with uneven asphalt patch (2025 03 03)
- frequent wide transverse cracks at greater than 1m spacing, occasional crack appears to have widened (2024 10 28)
- at pier 1 north lane south wheel path large area wide map cracking (2025 03 03)
- at pier 1 north lane north wheel path 800x200 spall with exposed bar

Span 2

- frequent short wide transverse cracks spaced at greater than 1m (2025 03 03)
- south lane north wheelpath occasional small shallow spall with worn aggregate (2025 03 03)
- north lane midspan patches completely surrounded by small spalls (2025 03 03)
- south lane at 2/3 point small shallow spall south wheelpath (2024 10 28)
- at pier 2 a few small shallow spalls throughout (2025 03 03)

Span 3

- at pier 2 random small shallow spalls (2025 03 03)
- frequent multi-directional wide random cracks throughout spaced at less than 1m (2025 03 03)
- north lane at 2/3 point near centreline large area loose concrete with small spalls, previously 2 wide cracks (2025 03 03)

Span 4

- at pier 4 a few shallow small spalls (2024 05 21)
- occasional long wide transverse cracks (2025 03 03)
- at pier 4 frequent small spalls (2025 03 03)



Span 5

- north lane at centreline approximately 1-2m from pier 4 wide cracks with small shallow spalls (2024 05 21)
- at pier 4 frequent small spalls (2025 03 03)
- north lane has frequent short wide cracks (2025 03 03)
- more wear in wheelpaths with small shallow spalls developing (2025 03 03)
- small spalls around patch and cracks (2024 10 28)
- north lane west half has occasional wide transverse/diagonal medium length cracks (2024 10 28)
- at pier 5 north lane north wheelpath 450x160 spall with exposed bar (2025 03 03)

Span 6

- at pier 5 south lane has wide transverse cracks throughout and north wheelpath has spalled patching (2025 03 03)
- at pier 5 south lane patches heavily map cracked with small spalls (2024 10 28)
- north lane very wide cracks around patches (2024 10 28)
- frequent wide transverse cracks (2025 03 03)
- north lane west of midspan small shallow spall at center (2024 05 21)
- west abutment north lane north wheel path small 20mmx20mm hole (2025 03 03)
- west abutment south lane very large area spalled and filled with winter patch, rough driving surface (2024 05 21)

2024 10 30 – maintenance contractor did concrete patching on wearing surface

30 Sub Deck/Cross Ties (E G40 F P50 VP10 X N/A)

Concrete, non-composite deck

2025 03 03

- measuring along north parapet, at pier 1 span 2 is 11mm higher than span 1, at pier 2 span 3 is higher than span 2, at pier 3 span 3 is higher than 4, at pier 4 span 4 is 15mm higher than span 5 due to rust jacking of top flange at subdeck (2024 05 21)
- north soffit has almost continuous spalling with exposed corroded bar, worse in spans 1-3 (2024 10 28)

Span 1

- south soffit extensive delamination and numerous large spalls with exposed corroded rebar (2024 05 21)
- bay 1 near pier 1 large delamination (2024 05 21)
- bay 2 at pier 1 medium spall with exposed lightly corroded bar and large delamination, occasional small delamination, occasional transverse crack (2024 05 21)
- bays 3-4 occasional small to medium delamination, numerous large areas of efflorescence with map cracks, occasional transverse crack (2024 05 21)
- bays 3-4 east of midspan buildup of deep efflorescence with water leaching (on a dry day), probable full depth wide crack full width of both bays (2025 03 03)
- bay 5 near east abutment large spall with exposed corroded bar, east half of span extensive delamination, occasional spall, efflorescence and hairline map cracking throughout, near midspan large spall with exposed corroded bar, west half occasional delamination, extensive efflorescence, scale and cracks (2024 05 21)
- north soffit at east abutment lifted 10mm off stringer due to stringer rust jacking, same near pier 1 but with 18mm gap that continues into span 2 (2024 05 21)



Span 2

- frequent lifting of sub deck from stringers, worst at ends of stringers, **some areas with daylight** (2025 03 03)
- bay 1 at pier 2 large spall with exposed corroded bar with large delamination across entire bay (2024 05 21)
- bay 2 at pier 1 small spall and delamination (2024 05 21)
- bay 2 at pier 2 large spall with exposed heavily corroded bar and large delamination (2024 05 21)
- bay 5 at pier 1 spalling has fully exposed heavily corroded bottom mat, spalled area extends completely between stringers (2024 05 21)
- **bay 5 at pier 2 large spall with exposed corroded bar** (2025 03 03)
- all bays have cracking with efflorescence and scale within 3m of pier 1, bay 3 deterioration extends to midspan, bay 4 extends to diaphragm and bay 5 extends almost throughout span (2024 05 21)
- **north soffit at pier 1 span 2 spalled between top flange and deck with exposed corroded bar** (2025 03 03)
- **span 2 pier 1 stringer F drain plate bolted to stringer is bent, appears deck has shifted east compared to stringer (also have span 2 trimmer overlapping span 1 trimmer at same location)** (2025 03 03)

Span 3

- north soffit at pier 2 has wide cracks with large spalls with heavily corroded bar (2024 05 21)
- bays 1 to 4 have occasional areas of efflorescence, with more in bay 4 (2024 05 21)
- bay 1 at pier 2 large areas spalled with exposed corroded bar, previously delaminated (2024 10 28)
- bay 1 at pier 3 small delamination (2024 05 21)
- bay 2 at pier 3 has small delamination (2024 05 21)
- bay 4 at pier 2 dripping excessively (2024 10 28)
- bay 5 at pier 2 large area of spalling with exposed corroded rebar, east of midspan small spalls with exposed rebar, efflorescence throughout (2024 05 21)
- bay 5 within 3m from pier 3 is delaminated with a medium spall with corroded bar at 3m from pier, at approximately 4m from pier 3 large spall with exposed corroded rebar with large delamination surrounding it (2024 05 21)
- south soffit a few large spalls with heavily corroded bar and a few shallow spalls (2024 05 21)

Span 4

- bay 1 mostly west half but areas throughout of medium spalls with exposed corroded bars (2024 05 21)
- bay 5 at pier 3 very large spall with heavily corroded bar (2024 05 21)
- bay 5 both ends large spall with exposed corroded rebar (2024 05 21)
- all bays west half areas of efflorescence (2024 05 21)

Span 5

- bays 1 and 5 at pier 4 small area of delamination with exposed corroded rebar (2024 05 21)
- bays 1 and 2 at pier 5 have a small area of map cracking (2024 05 21)
- bays 3, 4 and 5 extensive efflorescence and map cracking throughout (2024 05 21)
- bay 5 at pier 5 large delamination (2024 05 21)

Span 6

- extensive map cracking with efflorescence throughout (2024 05 21)
- **bay 5 at pier 5 extensive water leakage with efflorescence staining** (2025 03 03)
- bay 5 at west abutment large spall with exposed and corroded rebar (2024 05 21)



2017 - deck had full depth blowout in april; northeast corner (east abutment) is hollow, bay 1A

29 Coating (Structure) (E G50 F40 P10 VP X N/A)

Painted stringers, diaphragms, bearings, trimmer plates

2025 03 03

- at most joints extensive coating failure, with occasional pitting to light corrosion in areas throughout (2023)
- diaphragms have occasional light pitting throughout, east abutment diaphragms have extensive areas of failure (2023)
- majority of bearings have partial to complete failure (2023)
- trimmer plates coating has failed (2023)
- stringer webs generally have occasional areas of pitting near bottom flange, and at ends of stringers (2023)
- stringer bottom flanges bottom face generally has occasional pitting (2023)

Span 1

- stringers large areas of failure on top and bottom flange edges, bottom flange top face mostly failed, mostly failed throughout at ends, failed on web stiffeners at ends, webs have occasional areas of failure and occasional pitting (2023)

Span 2

- stringers D, E, and F have areas of failure on edges of bottom flange and larger areas adjacent to pier 1 (2023)
- at pier 1 ends, all stringers have failure throughout, most top flanges outside edge have failure (2023)

Spans 3-4

- stringers have occasional failure on flange edges, and complete failure in end zones (2023)

Span 5

- stringers D, E, and F have areas of failure on edges of bottom flange and larger areas adjacent to pier 5 (2023)
- at pier 5 ends all stringers have failure throughout (2023)

Span 6

- stringers D and E have large areas of failure on top of bottom flange and on top flange (2023)

2021 - coating failure on components at the joints and under the areas where water is leaking through subdeck

28 Live Load Vibration (E G F100 P VP X N/A)

2025 03 03

- moderate to excessive vibration under heavy loading at slow speed (2024 05 21)
- lasting minor vibrations under pickup truck loading at slow speed (2024 05 21)
- typical vibration under small vehicle loading (2024 05 21)
- pier 1 at north soffit squeaks under all loads (2025 03 03)

2021 april - noticeable live load vibration under heavy truck loading

2020 - vibration under heavy truck loading

2015 - vibration may have been instrumental in the failed bolts



27 Camber/Sag (E G50 F50 P VP X N/A)

2025 03 03

- all stringer F's show at least minor sag, significant in span 1 (2025 03 03)

2023 - possible slight sag, most evident in parapet alignment but also observed in span 5, stringer F

26 Pins/Bolts/Rivets (E G80 F16 P3 VP1 X N/A)

Bolts and rivets on stringers, diaphragms and steel caps

2025 03 03

- bolts have areas of light corrosion, occasional pitting (2023)

Span 1

- east abutment bay 5 diaphragm north bolts medium corrosion (2023)

Span 2

- at pier 1 bay 2 at stringer C trimmer bolt missing (2024 05 21)

- at pier 1 north soffit at stringer F trimmer bolt missing, misalignment of trimmer will not allow bolt to be replaced (2024 05 21)

- pier 2 stringer E bottom 3 new bolts appear to be smaller size (possibly non-structural, 2025 03 03)

Span 3

- pier 3 south soffit at stringer A missing rivet (2024 05 21)

- pier 3 at south soffit top flange missing rivet (2025 03 03)

- pier 3 stringer A bay 1 new angle clip between stringer and cap

- pier 3 bay 3 at stringer D missing nut at top (bolt won't come out, first noted 2015) (2024 05 21)

- pier 3 bay 5 at stringer F missing 1 bolts at bottom (2025 03 03)

- at pier 3 above north rail track (bay 5) 11 rivet heads missing on bottom of bottom flange, appears to have been an old impact (2025 03 03)

Span 5

- pier 5 bay 2 at stringer C trimmer bolt missing (2024 05 21)

- pier 5 bay 4 at stringer E trimmer bolt missing (2024 05 21)

2015 - 2 broken bolts replaced via snoopers on the south side of the bridge; 2 remain to be replaced near the centerline

2014 - one possible new rivet failure center pier south end, several missing

19 Bracing/Diaphragms (E G85 F14 P1 VP X N/A)

Steel channel diaphragms at midspan, each span, and at abutments

2025 03 03

- occasional light corrosion mostly bottom flange (2023)

Span 1



- east abutment diaphragms have areas of light corrosion throughout (2023)
- bay 5 midspan diaphragm areas of medium corrosion throughout (2024 05 21)
- other diaphragms have occasional light pitting (2023)

Spans 2, 5 and 6

- midspan diaphragms occasional light corrosion on bottom flange (2024 05 21)

2018 - some areas of light to medium corrosion at the joints and under leaks in the subdeck

2015 - crack stable, checked in early 2015 with ladders and July with snooper

2014 - crack forming on bottom 25mm in new angle

16 Stringers (E G75 F20 P5 VP X N/A)

6 - 680x355mm steel I beams at 1690mm spacing

2025 03 03

- typical light corrosion on webs at ends and edges of flanges throughout (2025 03 03)

Span 1

- stringers A-C small areas medium corrosion at pier 1 (2025 03 03)
- stringers D-E flanges have medium corrosion with sheeting, particularly in large areas towards midspan (2025 03 03)
- stringer F continuous medium corrosion with sheeting on both flanges and large areas of web (2025 03 03)
- at pier 1 stringer F spans 1 and 2 deck lifted off stringers approximately 23mm due to rust jacking (first noted 2016, no quantity) (2024 10 28)
- minor rust jacking at pier 1 ends (2023)

Span 2

- at pier 1 stringer A bearing bolt slots have bolts pressed against south edge of slot (2025 03 03)
- stringers A-C medium corrosion flaking at ends including stiffeners (2024 10 28)
- stringers D-F flanges small areas medium corrosion throughout, large areas at pier 1 (2025 03 03)
- stringer F top flange at pier 3 rust jacking, web at both ends small areas medium corrosion (2024 05 21)
- at pier 1 stringer F bearing bolt slots have bolts deforming north edge of slot (2025 03 03)
- stiffeners sheeting at pier 1 (2025 03 03)

Span 3

- stringers A-B at pier 2 medium corrosion on end (2025 03 03)
- stringer F at pier 2 top flange rust jacking lifted deck 10mm; top flange north face extensive medium corrosion; random areas medium corrosion throughout (2025 03 03)
- stringer F at pier 3 bay 5 L-plate to cap drilled approximately 30mm from bottom, does not appear to be cracked (2025 03 03)

Span 4

- stringer A at pier 4 top flange medium corrosion (2024 05 21)
- stringers E and F top flange at pier 3 and small areas of web medium corrosion (2024 05 21)

Span 5



- stringer A at pier 4 medium corrosion throughout at end (2024 05 21)
- stringers at pier 5 have areas of medium corrosion including stiffeners (2024 05 21)
- at pier 5 deck has lifted off stringer F by 10-20mm due to rust jacking (first noted 2016) (2024 05 21)

Span 6

- at pier 5 stringers have medium corrosion on ends throughout (2024 05 21)
- stringer B has medium corrosion on edge of top flange (2024 05 21)
- stringer D midspan web medium corrosion; flanges medium corrosion throughout (2025 03 03)
- stringers D-F top flange has occasional medium corrosion (2024 05 21)
- stringer E top flange medium corrosion throughout (2025 03 03)

12 Caps (E G42 F10 P25 VP23 X N/A)

Piers 1 and 5 have concrete caps with an external confinement collar retrofitted below bays 1 and 5 (installed 2015)

Piers 2-4 have steel I-beam caps

2025 03 03

Pier 1 (concrete)

- heavy corrosion on exposed rebar (mostly nothing left) (2024 05 21)
- wide cracks throughout, ends have extensive wide cracking (2024 10 28)
- collars bottom beams have medium corrosion (2024 10 28)

Span 1

- top face extensively delaminated (2024 05 21)
- edges of bearing seats C-E undermined due to spalling, bearings not yet undermined (2024 10 28)
- essentially all delaminated with a heavily spalled area between columns (below bays 3-4) with exposed heavily corroded rebar with up to complete section, smaller spalls with exposed corroded rebar at both ends at collars, wide horizontal cracks near the top (2023)
- underside between columns has extensive spalling with exposed heavily corroded rebar with up to complete section loss (2023)

Span 2

- very large spall below bay 3 with exposed extensively corroded rebar, delamination on most of cap, wide horizontal cracks near top edge (2023)
- below bearing E large spall on bearing seat, not yet undermining bearing (2024 10 28)

Pier 2 (steel)

Span 2

- bay 1 top flange heavy corrosion throughout, only thin section remains in middle of bay (2025 03 03)
- bay 2 top flange large area medium corrosion (2024 10 28)
- bay 4 top flange medium corrosion (2024 10 28)
- bay 5 middle section of top flange heavy corrosion with large perforation at web 430mm long, north end top flange medium corrosion with rust jacking, bottom flange light corrosion, top flange flexes from center to stringer F (2025 03 03)

Span 3

- bay 1 top flange heavy corrosion with rust jacking (2025 03 03)



- bay 2 top flange areas of medium corrosion (2024 05 21)
- bay 3 top flange light corrosion, medium corrosion at web on south end (2024 05 21)
- bay 4 top flange medium corrosion (2024 05 21)
- bay 5 top flange center 470mm long narrow perforation, previously a series of small perforations with heavy corrosion, bottom flange medium corrosion (2024 10 28)

Pier 3 (steel)

Span 3

- bay 1 top flange medium corrosion along edge (2024 05 21)
- bay 5 top flange medium corrosion (2024 05 21)
- north end top flange small dent, frequent light corrosion (2024 05 21)

Span 4

- bays 1 and 5 top flange medium corrosion, bottom flange small area of medium corrosion (2024 05 21)
- south end frequent large areas of light corrosion (2024 05 21)
- top flange has frequent light corrosion (2024 05 21)
- web has occasional small area of light corrosion (2024 05 21)
- bottom flange below stringer F rust jacking between stiffener plate and cap (2024 05 21)

North End

- areas of pitting and light corrosion (2024 05 21)

Pier 4 (steel)

South End

- small areas medium corrosion throughout (2024 05 21)

Span 4

- bay 1 top flange continuous perforations at web from stringer B towards stringer C for 810mm, rust jacking throughout, heavy corrosion, web occasional light corrosion (2024 05 21)
- bays 2-4 top flange medium corrosion (2024 05 21)
- bay 4 at pier 4 stiffener medium corrosion (2024 05 21)
- bay 5 top flange mostly separated from web due to perforations, heavy corrosion throughout, deck not bearing on cap due to spalling, web and bottom flange also have areas of medium corrosion (2024 05 21)
- north end top flange from stringer F to end of cap has fully perforated, previously medium corrosion throughout (2024 10 28)

Span 5

- bay 1 bottom flange areas of medium corrosion, top flange 600mm long perforation between web and flange, heavy rust jacking top flange, small area heavy corrosion between top flange and web south of middle (2024 05 21)
- bay 2 top flange medium corrosion along edge (2024 05 21)
- bay 3 flanges medium corrosion, extensive on top (2024 05 21)
- bay 4 top flange medium to heavy corrosion, stiffener, web and bottom flange have medium corrosion (2024 05 21)
- bay 5 perforation 650mm long between top flange and web, heavy corrosion throughout with large perforations, medium corrosion on web and bottom flange (2024 05 21)

North End

- medium corrosion throughout (2024 05 21)

Pier 5 (concrete)



South end

- small area cracking, spall at southwest corner with exposed bar

Span 5

- between bearings C-D cap covered in mud (2023)
- below stringer C medium shallow spall, below stringers E-F large spall with exposed and corroded bar near top of cap (2023)
- bay 4 stringer E bearing seat delaminated, encroaching on bearing, delamination has grown since 2023 (2024 10 28)
- above and between columns extensive delamination (2023)
- underside spalled with exposed rebar along both edges with wide cracks, delamination throughout (2023)

Span 6

- bearing A spalling up to edges of base plate (2025 03 03)
- extensive delamination throughout with large spalls with exposed corroded bar with up to complete section loss below bays 2-3 (2023)
- both ends delamination (2023)
- collars have light corrosion throughout and occasional medium corrosion (2023)

2015 - braced via collars

11 Bearings (E G30 F35 P35 VP X N/A)

Abutments have fixed steel block on steel plate

Piers 1 and 5 have expansion steel block on steel plate in both spans

Piers 2-4 have fixed steel plate on steel plate

Bearings in both spans at piers 1 and 5 share a base plate

2025 03 03

East Abutment (1st) (fixed, steel block on steel plate)

- light to medium corrosion throughout (2023)
- bearing F both anchor bolts to stringer corroded off (2025 03 03)

Pier 1 (expansion, steel block on steel plate, spans 1 and 2)

Span 1

- all bearings have areas medium corrosion (2024 10 28)
- bearing D tilted up on east side, bearing E slightly tilted up on east side (2024 05 21)
- light corrosion throughout (2023)

Span 2

- bearings A and F have medium corrosion on span 2 expansion blocks (2024 05 21)
- bearing D rust jacking below bearing (ends of bottom flanges misaligned with span 2 higher) (2024 05 21)
- medium corrosion with flaking (2023)

Pier 2 (fixed, steel plate on steel plate)

-



Pier 3 (fixed, steel plate on steel plate)

- occasional light corrosion (2023)

Pier 4 (fixed, steel plate on steel plate)

- areas of medium corrosion, light corrosion throughout (2023)

Pier 5 (expansion, steel block on steel plate, spans 5 and 6)

- medium corrosion throughout (2024 05 21)

Span 5

- bearing D slightly tilted base plate (2025 03 03)

- bearing F base plate slightly bowed (2025 03 03)

West Abutment (fixed, steel block on steel plate)

- occasional light corrosion (2023)

10 Pier Columns/Walls/Cribs (E G70 F P28 VP2 X N/A)

2 concrete columns at each pier

2025 03 03

Pier 1

Column A

- extensive spalling full height (2023)

- northeast corner, areas of exposed bar (2023)

- extensive delamination almost throughout (2023)

- wide cracks on northwest corner (2023)

Column B

- extensive delamination almost throughout (2023)

- very wide cracks on north and southeast corners (2023)

- northwest corner mostly spalled (2023)

Pier 3

Column B

- large spall with exposed bar approximately 2m from ground on southeast edge (2023)

Pier 4

Column B

- north face at top wide horizontal crack (2025 03 03)

Pier 5

- wide vertical cracks near corners throughout (2023)

Column A

- west and north faces extensive delamination and wide cracks (2023)

- at top northeast corner very large spall with exposed corroded bar (2023)

- south and east faces occasional small to medium delamination (2023)



Column B

- south face extensive delamination near top, some areas throughout (2023)
- wide cracks near corners (2023)
- east face nearly complete delamination (2023)
- north face occasional delamination (2023)

9 Footings/Piling (E G10 F P VP X90 N/A)

Concrete spread footings

2025 03 03

East Abutment (1st) - Pier 3

- not visible

Pier 4

- concrete partially visible

Pier 5

- concrete partially visible below column B, bank sandbagged around northeast corner

West Abutment

- mostly not visible

8 Embankment (E G90 F10 P VP X N/A)

2025 03 03

East Bank (1st)

- at north corner below stringer E erosion channel almost at breast wall (2024 10 28)
- a few shallow erosion channels not affecting footings (2023)

West Bank

- embankment very steep below bridge, appears to be gradually eroding with a few erosion channels from deck drains (2023)

Previous - fill washed away around piers 4 and 5 footing from runoff and creek

7 Wing/Retaining Walls (E G90 F P10 VP X N/A)

4 concrete wing walls

2025 03 03

Northeast Wall

- large delamination adjacent to abutment (2023)
- 2 small, shallow spalls (2023)

Northwest Wall

- occasional wide random crack (2023)



6 Abutments (E G70 F10 P20 VP X N/A)

Concrete

2025 03 03

East Abutment (1st)

Deck

- top of ballast (deck) mostly extensively spalled and covered in winter patching (2023)
- south lane top of ballast has frequent wide longitudinal cracks (2023)

Substructure

- breast wall extensive delamination, light scaling, frequent wide horizontal cracks throughout (2023)
- ballast wall bay 5 delamination, **small shallow spall behind stringer F** (2025 03 03)
- **north soffit ballast area delaminated, occasional small shallow spall** (2025 03 03)

West Abutment

Deck

- top of ballast spalled throughout and patched over with asphalt, occasional exposed corroded bar (2023)

Substructure

- bay 2 breast wall, medium full height vertical crack (2023)
- occasional vertical hairline cracks (2023)

5 Foundation Movement (E100 G F P VP X N/A)

2025 03 03

- no indication of movement (2023)

Urgency Notes (urgency 5)

2025 03 03

- steel caps at piers 2 and 4 have large perforations between top flange and web between stringers (2024 10 28)
- deck has **frequent very wide cracks, possibly a few full depth cracks, small spalls, and rutting/wear in wheelpaths** (2025 03 03)
- concrete caps at piers 1 and 5 have extensive spalling and corroded bars, some spalls undermine bearing seats, but do not yet undermine bearings (2024 10 28)
- joint seals and armouring at abutments and piers 1, 2, 5 are mostly missing (2024 10 28)
- subdeck has extensive efflorescence, delaminations throughout, random areas of large spalls with exposed corroded bar, **possibly a few full-depth cracks** (2025 03 03)
- **various superstructure components show minor indications of movement, particularly at pier 1 stringer F – e.g. squeaking under load at pier 1, trimmer plates overlapping, stringers pressing against side of bearing slots transversely, bearing plates tilting, drain bracket bent and pulling off stringer, stringers F sagging, deck lifted off top flange with daylight** (2025 03 03)
- pier 2 span 2 stringer E bottom bolts have history of breaking, currently repaired with 3 smaller sized bolts

Maintenance Work Notes



2025 03 03

- wash structure including cleaning out drains
- patch spalling in deck, joints and curb
- restore approaches
- monitor deck condition
- monitor soffit and subdeck over rail tracks for loose concrete
- replace missing or undersized bolts

2015 - put in pier cap braces in march and sandbagged scoured area

Rehab Work Notes

2025 03 03

- monitor deterioration of steel caps 2 and 4
- monitor deterioration of concrete caps 1 and 5
- consider rehab of wearing surface, subdeck, pier columns and caps
- consider replacement of joints

2021 - major rehab required on wearing surface, joint replacement, subdeck, pier columns, and caps

See B&T report, scheduled for major repair starting in FY 13

2012 - discussions on 7 November indicated possible (early) tender for 2014

General Inspection Notes

2025 - hired snooper mar 3

2024 - hired snooper may 21 and oct 28

2023 - hired snooper; first abutment changed to east to match drawings

2018 - snooper inspection

2017 - hired snooper was used to replace bolts

2016 - detailed inspection was completed by COWI

2015 - snooper was used to access bolts missing on the angle brackets. CPR flagging by Jeff Livesey. Consultant Surveyors on site

2010 - Buckland and Taylor (Sergio Aroneanu and T.J. (Steve) Zhu) did a detailed inspection in Aug; Levelton Consultants did half cell survey; Report dated 22 Sept 2010 is in filed both electronically and hard copy in the Merritt office; Project Manager Reid Drummond

Other Posted Hazard Warning Signs

2025 03 03

- both oncoming approaches have white 70km/h at approximately 1km before bridge; orange BROKEN PAVEMENT 550M ahead; orange BROKEN PAVEMENT 100M AHEAD



Previous

- right curve warning
- tight width clearance

Drainage Area Description

2024 10 28, 2025 03 03 - creek is dry

2023 - creek flowing below span 4 into a circular concrete culvert below rail, and out into Thompson River, very high flow