

BRIDGE INSPECTION REPORT

Status: Released
 CD Guid: 4033385e-ed60-446d-87f9-220028a222c9

Printed On: 10/12/2021
 Release Date: 10/11/2021

Agency: Pierce County
 Program Mgr: Sonia L. Lowry

Br. No. 26211-A

SID 08346100

Br. Name FOX ISLAND

Carrying FOX ISLAND BR RD NW

Route On 92510

Mile Post 0.11

Intersecting HALE PASSAGE

Route Under

Mile Post

Rick Barron

BEA

Inspector's Signature RSR Cert # G9926 Cert Exp Date 4/15/2026

Co-Inspector's Signature BEN

				Inspections Performed:					
						Freq	Hrs	Date	Rep Type
2	Structural Eval (1657)		Operating Tons (1552)	4	No Utilities (2675)				
2	Deck Geometry (1658)	0.61	Op RF (1553)	1	Bridge Rails (1684)	24	3.5	4/23/2021	Routine
9	Underclearance (1659)		Inventory Tons (1555)	1	Transition (1685)				Fract Crit
6	Alignment (1661)	0.37	Inv RF (1556)	1	Guardrails (1686)				
5	Deck Overall (1663)	1	Operating Level (1660)	1	Terminals (1687)	60	12.0	7/17/2017	UW
5	4 Superstructure (1671)	P	Open/Closed (1293)	0.00	Asphalt Depth (2610)				Special
4	Substructure (1676)	7	Waterway (1662)		Design Curb Ht (2611)				Interim
9	Culvert (1678)	U	Scour (1680)		Bridge Rail Ht (2612)				UWI
8	Chan/Protection (1677)		Soundings Flag (2693)	1954	Year Built (1332)				Damage
2	Pier/Abut/Prot (1679)	N	Revise Rating (2688)	0	Year Rebuilt (1336)				PRM Safety
4	Drain Cond (7664)		Photos Flag (2691)	Y	Subj to NBIS (2614)				SEC Safety
1	Drain Status (7665)		Measure Clrc (2694)						Condition
M	Deck Scaling (7666)	7	Sdwk Cond (7673)		Alpha Span Type:				Short Span
5	Scaling Pct (7667)	7	Paint Cond (7674)		Sufficiency Rating: 6.23				In Depth
7	Deck Rutting (7669)	6	Approach Cond (7681)		Status: SD				Geometric
5	Exposed Rebar (7670)	9	Retaining Wall (7682)		Routine Risk Category: High Risk				
7	Curb Cond (7672)	7	Pier Prot (7683)		Underwater Risk Category: High Risk				

BMS Elements							
Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
12	Concrete Deck	42900	SF	42617	136	147	0
35	Concrete Deck Soffit	42900	SF	42900	0	0	0
110	Concrete Girder	4725	LF	4386	38	106	195
113	Steel Stringer	975	LF	975	0	0	0
200	Abutment Fill	2	EA	2	0	0	0
214	Concrete Web Wall between Columns	159	LF	106	0	53	0
215	Concrete Abutment	54	LF	54	0	0	0
220	Concrete Submerged Foundation	12	EA	3	0	9	0
227	Concrete Submerged Pile/Column	82	EA	72	0	10	0
234	Concrete Pier Cap/Crossbeam	416	LF	396	0	20	0
266	Concrete Sidewalk & Supports	7800	SF	7800	0	0	0
310	Elastomeric Bearing	6	EA	6	0	0	0
311	Moveable Bearing (roller, sliding, etc)	48	EA	48	0	0	0
313	Fixed Bearing	48	EA	0	48	0	0

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BMS Elements (Continued)

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
330	Metal Bridge Railing	3900	LF	3900	0	0	0
361	Scour	19	EA	19	0	0	0
370	Seismic - Longitudinal Restrainer	36	EA	36	0	0	0
371	Seismic - Transverse Restrainer	8	EA	8	0	0	0
373	Seismic - Catcher Block	96	EA	96	0	0	0
400	Asphalt Butt Joint Seal	44	LF	0	22	22	0
407	Steel Angle Header	198	LF	198	0	0	0
408	Steel Sliding Plate	44	LF	44	0	0	0

Notes

0 CONCRETE TEE BEAMS AND STEEL BEAMS

The bridge orientation is from south (Fox Island) to north (Gig Harbor).
 Bents and Abutments are numbered 1 to 4 and 17 to 21. Piers are numbered 5 to 16.
 Girders are labeled A to C from west to east.

3 The bridge ID tag is located at the southeast approach guardrail.
 There are horizontal clearance markers at all four corners of the bridge.

9 The WSDOT Bridge Preservation Office Dive Team performed an underwater inspection of the Fox Island Bridge on July 17 and July 18, 2017. Piers 2 through 19 were in the channel during inspection.

Overall the submerged elements were in good to poor condition. Thick marine growth was typical on all surfaces below high water which made identifying defects difficult. Piers 2 to 4 and 17 to 19 were made up of precast concrete piles and were in good condition. Piers 5 to 16 were made up of concrete columns and web walls both of which were in satisfactory condition. There were leaching cracks with some rust staining in the inter-tidal zone. Pier 14 had a corner spall with exposed rebar in the southeast corner. Areas of concrete deterioration were also noted at the columns to footing interfaces. The concrete columns and web walls of Piers 5 to 16 sit on seals / footings. For this report they will be referred to as footings. There were pedestals on all footings that were not on the original construction plans. The top of footings were very irregular. Piers 5, 7, 8, 10, 11, 13, 14, 15, and 16 have formed voids in the pedestal and some in the top of the footing that vary in size and depth. A previous inspection selected several pier footings to measure and found that in general, the measured footing are larger (in plan) than the construction plans indicate. Cold joint deterioration was typical on most exposed footing faces. The inspection found the deterioration to be varied drastically with up to six feet of penetration into the footing. There were exposed horizontal steel H-beam walers seen in the lenses. The extent of cold joint deterioration is the reason that the substructure NBI code WB76-76 is a "4". Channel bottom elevations were very similar to the previous underwater reports. No local scour was noted. Channel was well vegetated with rip rap placed at bridge abutments. The stream bed consisted of sand, gravel, cobbles, and some large rock.

Although no immediate repairs are recommended at this time, due to the extents of the footing deterioration planning for future repairs is recommended. Retaining the 60 - month underwater inspection frequency is recommended.

11 Single Truck Postings:

- 2-6 Axles (21T); 7+ Axles (24T)
 AASHTO 3S2, and 3-3 Postings:
 - Tractor & Trailer (29T); Truck & Trailer (37T)
 The bridge is also posted with Speed Limit 35 Trucks 25 signs.
 There is one "NO DIVING SWIMMING FISHING CRABBING" sign on each end of the bridge.

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Notes (Continued)

12 Deck:

Overall, the deck is worn to aggregate throughout with many rock pop outs, and has transverse cracks throughout the deck surface. In the cantilever drop spans there are multiple locations of 2" diameter holes drilled through the deck. Six holes per end with some holes spalling.

[136 SF] in CS 2 'repaired' and [147 SF] in CS 3 'spalled' (including large transverse cracks.) See below for areas.

Span 1:

- The four exposed transverse rebar, 16" long located 10'-0" north of Pier 1 (south abutment) have been patched [3 SF].

Bent 3:

- At Bent 3 the six locations of exposed rusty rebar up to 12" in length and several spalled areas have been patched [11 SF].
- There is 2 sf of new spalling areas with one 6" exposed rebar.

Bent 4A:

- At Bent 4A the several small spalls some with exposed rusty rebar have been patched [4SF].

Span 8:

- From 30' to 40' north of Pier 8, there are transverse cracks that are up to 1/8" wide and one 6" long exposed rebar.
- There are 6 cracks at 22' long each (curb to curb) x 1' = [132 SF].

Piers/Spans 6 through 19:

- There is additional pattern cracking and scaling throughout.

Span 9:

- Multiple areas of exposed rusty rebar with spalling have been patched [22 SF]. There is [2 SF] of new spalling.

Over Pier 14:

- The multiple spalls in both lanes with exposed rusty rebar has been patched. [60 SF]. There is [4 SF] of new spalling.

Span 14 near Pier 15:

- The deck areas with exposed rusty rebar have been repaired. [16 SF] There is [1 SF] of new spalling

Span 15, near pier 15:

- The areas of exposed rusty rebar and spalling have been patched [4 SF]. There is [2 SF] of new spalling.

Span 16:

- Several small potholes with exposed rusty rebar have been patched [8 SF].
- Near Bent 17, at centerline, there is a 12" x 7" x 1.5" deep spall centered over a lift hole that has a little patching material around it.

Near Bent 18:

- The lines of exposed rusty rebar have been patched [8 SF].

Span 19 near Bent 19:

- At centerline there is a 1'-0" diameter x 1.5" deep pothole at centerline.

35 See UBIT Inspection Report dated August 23, 2021.

110 Concrete Girder: See UBIT Inspection Report dated August 23, 2021.
Some outside girders of Spans 8, 9, and 11 have areas in CS2
Some outside girders of Spans 2, 6, 8, 9, 11, 12, 13, 14, 15, and 17 have areas in CS3
Girders 17A, 17B, and 17C are coded in CS4 (3 x 65' = 195lf) do to the spalling at Pier 17.
The back vertical end of Span 17 girders at Pier 17 have spalled off reducing the overall bearing an estimate 50%.

113 It was reported that on May 31, 2021 a mask of a sailboat struck the bottom of the main span, mid-channel, where there is a steel drop span. No damage was visible looking from the deck. The August 2021 UBIT inspection found no visible damage.

200 There is sloughing at the northeast corner exposing the back wall, the bottom (soffit) of the approach side walk, and as side of the adjacent utility vault. This area has been repaired since the April 26th, 2021 inspection.

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- 214 Underwater Inspection Findings:
Piers 5 through 16 have concrete web walls between the columns. All concrete surfaces below the inter-tidal zone have heavy marine growth up to 1'-0" thick making it difficult to see the concrete condition. The web walls have leaching cracks with some rust staining. See photo UW-2.
- 215 At the south abutment, there is some sloughing below the abutment cap. The gap is along ~90% of the length and up to 2" high.
- 220 Underwater Inspection Findings:
Piers 5 through 16 have exposed foundations. The concrete columns and web walls of Piers 5 to 16 sit on seals/footings. For this report they will be referred to as footings. Field measurements determined that the footings are larger than the construction plans indicate. See attached pier sheets for the field measured dimensions of Piers 6, 8, 11, and 13. The footings are sheet pile shaped. See photo UW-3. All concrete surfaces below the intertidal zone have heavy marine growth up to 1' thick making it difficult to see the concrete condition. All footings also have a pedestal that is not shown on the original construction plans. See photo UW-4. The top of footings are very irregular. Piers 5, 7, 8, 10, 11, 13, 14, 15, and 16 have formed voids in the pedestal and some in the top of the footing that vary in size and depth. Cold joint deterioration is typical on most exposed footing faces. See photos UW-3 and UW-5. This deterioration varies drastically with up to six feet of penetration into the footing. There are exposed horizontal steel H-beam walers seen in the lenses. See photos UW-6 and UW-7.

See attached underwater drawings for approximate location and extents of these lenses.
- 227 Underwater Inspection Findings:
Piers 2, 3, 4, 17, 18, and 19 are made up of concrete piles. See photo UW-8. Piers 5 through 16 have two concrete columns on a footing. All concrete surfaces below the inter-tidal zone have heavy marine growth up to 1'-0" thick making it difficult to see the concrete condition. Multiple concrete columns have corner spalls just above the marine growth. See photo UW-2. The largest spall is at Pier 14 in the southeast corner and is two feet tall by three inches on both sides with exposed rebar. Areas of concrete deterioration were noted at the column to footing interfaces.
- 234 Concrete Pier Caps and Cross Beams: See UBIT Inspection Report dated August 23, 2021.
In general, there is spalling and exposed rebar on many of the pier caps and crossbeams.
- 310 In April 2014, at both abutments, the steel sliding plate bearings were replaced with elastomeric bearing pads.
- 311 Movable Bearing: See UBIT Inspection Report dated August 23 2021.
- 313 Fixed Bearing: See UBIT Inspection Report dated August 23 2021.
- 361 Underwater Inspection Findings:
Piers 2 through 20 are regularly submerged and considered affected by scour. No local or general scour was noted. Ground lines are similar to previous underwater reports.
- 370 Longitudinal Restrainers Installed June 2004.
- 371 Transverse Restrainers Installed June 2004.
- 373 Catcher Blocks Installed June 2004.
- 400 Asphalt Butt Joint Seals are located at both abutments. Joints were originally 3/4" open joints with preformed felt joint filler. Measurements taken at east fogline. Temperature at time of inspection was 55 ° F.

Location	Measurement	Notes
South Abutment	n/a	The joint is filled with chip seal and crack seal.
North Abutment	1-1/4"	

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Notes (Continued)

407 Stee Angle Header Joints are located at Piers 4A, 7A, 7B, 10A, 10B, 13A, 13B, 16A (cantilever drop spans) and 20 (north approach span).
 Measurements taken at east fogline. Temperature at time of inspection was 55 ° F.

Location	Measurement	Notes
Pier 4A	1/2"	The south edge is higher than the north edge by 1/8 to 1/4"
Pier 7A	2"	
Pier 7B	1/8"	
Pier 10A	1-1/2"	No change in measurement on June 4, 2021 site visit.
Pier 10B	2-1/2"	No change in measurement on June 4, 2021 site visit.
Pier 13A	1/4"	North edge of northbound lane at the fog line is 3/8" higher.
Pier 13B	1-1/2"	South edge is higher than the north edge by 1/4".
Pier 16A	7/8"	The north edge is higher than the south edge by 1/2".
Pier 20	5/8"	

408 Sliding Joints are located at Piers 3 and 17 (drop spans).
 Measurements taken at east fogline. Temperature at time of inspection was 55 ° F.

Location	Measurement	Notes
Pier 3	2"	
Pier 17	1-1/2"	

1660 The Controlling Rating Factor (SU6-SU7 trucks) = 0.63
 The NRL, NBI Rating Truck (HS20), and the Overload Trucks are not "Legal Loads" with respect to Field 1660.

1663 The deck is coded '5' due to exposed rebar, patches, hairline cracking and spalling throughout. See note 12- Concrete Deck for details.

1671 It was reported that on May 31st at 11:30am a sailboat, traveling west, mask struck the underside of the main span (span 10). See note 113 "Sreel Stringer"

There are hairline cracks throughout the concrete girder T-beams in the webs and along the bottom flanges. At the abutments and at Pier 20 the back of each girder is spalled with exposed rebar. This area was painted over in April 2014. Some of the rebar corrosion has worked its way through the paint. There are (3) 3" diameter patched core holes at midspan on the east face of the east T-beam web in Spans 1 and 20.

UBIT Summary:

Most of the concrete beams have vertical hairline cracks throughout their length as well as shear cracks at the supports. Many of the concrete I-girders have areas of delamination and spalling in the bottom flange mainly on the outside of the exterior beams. Some of the delaminated areas are failing patches from previous repairs. The spalling on the west exterior beams in Spans 8 and 9 have exposed the 2" square rebar. The exposed rebar has surface rust but there is no measurable section loss. The end of Span 17 girders, at Pier 17 have spalled reducing the bearing capacity by 50%. See note 110 "Concrete Girder" The ends of most of the T-beams at Pier 20 have spalls and cracks that extend from the center of the bearing to the end of the beam. The steel beams in drop Spans 4, 7, and 10 have minor areas of rust. The paint on the steel beams on drop Spans 13 and 16 are failing and there are areas of rust throughout especially in the bottom flange. Debris is accumulating at the steel drop span bearings. See UBIT Inspection Report dated August 27 2021 for additional details.

1676 The Substructure is coded "4 - poor condition" due to extensive lensing and section loss in the majority of the footing faces. See elements 214, 220, and 227. See UBIT Inspection Report dated August 23, 2021.

1677 Large slope protection rocks are in place at both abutments and along the south approach road. See photos UW-9 and UW-10.

1679 There is a fender system at Piers 10 and 11. There are some missing horizontal rubbing timbers. See photo UW-11. Pier protection has some deterioration but is still functional.

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Notes (Continued)

- 1680 The scour code was changed to a "U" because the pile tip elevations are unknown. The pile tip elevations on the UW report are from the plans and were noted as "for estimation purposes only".
- 1684 The bridge rail consists of nested thrie beam on steel posts.
 On the east side, in addition to the thrie beam, a rusty steel pipe is present.
 On Spans 6 and 13, west side, a nut is missing from the guardrail bolt (2 total).
- 2675 Near the south abutment, under the sidewalk overhang, utilities include two 4" diameter; two 3" diameter conduits.
 Near the north abutment, under the sidewalk overhang, utilities include two 4" diameter; two 3" diameter; and one 2" diameter (navigation lights power) conduits.
Navigation Lights:
 The navigation light control box, located on a utility pole at the NW approach, was opened and the navigation lights tested using the bypass switch.
 On June 4, 2021, it was observed that the east green center channel light was burned out. Both green center channel lights were replaced on June 6th, 2021.
 The four red side channel navigation lights and the green center channel navigation lights are visible from the bridge deck.
 The photo cell was last replace in 2019.
- 2693 Tidal bridge, soundings are included in the underwater inspections.
- 7673 There is one sidewalk located on the east side of the bridge. The sidewalk deck has minor transverse cracks throughout. The frequency of transverse cracks increases at Piers 6 and 12.
 There is some spalling in the top corner of the sidewalk in span 4.
 The south sidewalk ramp is a wedge of HMA. The north sidewalk ramp is constructed of concrete.
- 7681 There is transverse cracking and spalling at the back of the south pavement seat.
 There is sloughing/settlement at the NE corner of the bridge that exposes two power line conduits.
- 7683 See element 1679 Pier/Abutment Protection

Repairs

Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified
18382	2	B	Seal the transverse deck cracks using in Span #8 using "KwikBond's KBP 204 P Seal -- High Molecular Weight Methacrylate Healer Sealer". Contact Bridge Engineering to arrange a site visit to discuss the repairs.	4/23/2021		
18383	2	B	Bridge deck has new spalling and potholes (some with exposed rebar) in multiple locations. The majority of the spalling and potholes occur in the northbound lane. - These areas are new with respect to the 2019 patching. Break out any loose concrete, clean exposed rebar and patch with "KwikBond's PPC 1121 B-11 Fine Mix" patching material. Contact Bridge Engineering to arrange for a field (site) visit to discuss the repair.	4/23/2021		
18384	2	B	Clean the debris from the steel drop span bearings. There are five drop spans. Contact Bridge Engineering for a sitge visit to discuss the cleaning.	8/23/2021		
18385	2	B	Install shims under all three concrete girders located at Pier 17 and proceed with an agreement with a consultant to design of a permanent repair for the concrete girders located at Pier 17 and possibly at Pier 20.	9/21/2021		

Inspections Performed and Resources Required

Report Type	Date	Freq	Hrs	Insp	CertNo	Coinsp	Note
Routine	4/23/2021	24	3.5	RSR	G9926	AEK	

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Underwater	7/17/2017	60	12.0	JRWH	G0911	DON	For UW inspection findings, see notes: 9, 214, 220, 227, 361 and 1676.		
2 Man UBIT	8/23/2021	24	6.5	RSR	G9926	DH	UBIT inspection performed on Piers and Spans 1-20. See "UBIT Summary" in note 1671-Superstructure. See UBIT Inspection Report (word document) dated August 23, 2021, for complete UBIT inspection details.		
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date	Override	Notes
UBIT	5.50	62	62	62	24	8/27/2019	8/27/2021		UBIT deployed off of the east side.
Flagging									Contact Rick Russom of Pierce County at 253-798-2241 to arrange for flagging
Informational	10/6/2021		0.0	RSR	G9926	BEN			