



INFORMATIONAL MEMORANDUM

TO: **Transportation and Infrastructure Committee**
FROM: **Henry Hash, Public Works Director** *H.H.*
BY: **Hari Ponnekanti, City Engineer**
CC: **Mayor Allan Ekberg**
DATE: **January 31, 2020**
SUBJECT: **42nd Ave South Bridge Replacement**
Project No. 91810404
Project Update and Next Steps

ISSUE

Provide an update and seek direction on the next steps for the 42nd Avenue South Bridge Replacement funding and potential options moving forward.

BACKGROUND

The City applied to the Federal Bridge Replacement Advisory Committee (BRAC) through Washington State Department of Transportation (WSDOT) Local Programs for grant funding in April 2019. The City was informed in November that the 42nd Ave South Bridge Replacement Project was not selected. At the December 3, 2019 Transportation and Infrastructure meeting, the Committee directed that additional analysis be performed to weigh the options moving forward.

Currently, the 42nd Ave S Bridge has a sufficiency rating of 7.56. The sufficiency rating formula is a method of evaluating highway bridge data by calculating four separate factors to obtain a numeric value which is indicative of the bridge sufficiency to remain in service. The sufficiency rating considers a number of factors, only about half of which relate to the condition of the bridge itself. The sufficiency ratings for bridges are part of a formula used by the Federal Highway Administration when it allocates federal funds to the states for bridge replacement.

Some of the factors to calculate the sufficiency rating are:

- 1) Structural Adequacy
- 2) Serviceability and Functional Obsolescence
- 3) Special Reductions

Although the 42nd Ave S Bridge has a sufficiency rating of 7.56, there are no known major structural deficiencies. A more in-depth structural analysis will provide further information about the condition of the bridge.

ANALYSIS

The Public Works Department proposes three options moving forward.

Option 1

Continue to monitor the bridge conditions, continue the bi-annual (routine) and fracture critical inspections through King County inspectors, and reapply for the BRAC grant.

Option 2

Perform a more in-depth structural inspection using non-destructive testing to better understand how the bridge steel is performing internally. The inspection will include ultrasonic thickness measurements of gusset plates and steel members that exhibit areas of corrosion and pack rust. The inspection will also include a mag-particle inspection in areas of concern to identify if cracks in the steel members are present. There is a possibility that one lane or both lanes of traffic (up to two weeks) will need to be closed during the inspection to allow the inspector access with a bucket truck or Under Bridge Inspection Truck (UBIT).

The results of the in-depth inspection will illustrate what is happening internally with the steel at the critical locations. Staff will return to Committee with the in-depth inspection report.

Option 3

Begin 30% design to have a “shovel ready” bridge project to better position the City to receiving funds from other sources. Having the 30% design allows the City to have a physical product to present to potential funders, including a future statewide transportation package, direct allocation from the State capital budget, Freight Mobility Investment Board (FMSIB), State Transportation Improvement Board, and Federal grants. Also, having the design illustrates the City’s commitment to this project if/when the City reapplies for the BRAC grant.

FINANCIAL IMPACT

Staff estimates that the in-depth inspection costs described in Option 2 will be up to \$39,000 and is available in the current 2019/2020 Annual Bridge Inspection budget.

For Option 3, the current approximate cost to perform the 30% design is \$1.5 million and would take at least six months to complete from the date the contract is awarded. Funding will need to be allocated. The City has the opportunity beyond the Federal BRAC grant to explore other possible funding partners or other funding sources to accelerate the replacement of the bridge.

Projects	2019/2020 Expenditures	2019/2020 Bridge Budget
Annual Bridge Inspections	\$ 44,800	\$ 335,000
TranTech Bridge Support	107,384	
S 196 th /200 th Bridge Repair	477,679	335,000
42nd Ave S Bridge Inspection	39,000	
Total	\$ 668,863	\$ 670,000
42nd Ave S Bridge Design 30%	\$ 1,500,000	\$ 320,000
Solid Waste Utility Tax		680,000
Total	\$ 1,500,000	\$ 1,000,000

RECOMMENDATION

Staff will continue with Option 1 and recommends Option 2 with the \$39,000 in-depth analysis and Option 3 to begin 30% design of the 42nd Ave S Bridge. If Committee agrees, staff will return with the in-depth analysis results, estimated to be available in the third quarter of 2020. Concurrently, staff recommends working with the Finance Committee to determine how the City can fund the 30% design.

Attachments: Pages 15 and 17, 2019 CIP
 42nd Avenue South Bridge Structural Assessment Report
 08109700 Tukwila 42nd Ave S Bridge Funding Submittal 20190424
 BRAC FFY 2019 Local Bridge Awards

CITY OF TUKWILA CAPITAL PROJECT SUMMARY

2019 to 2024

PROJECT: 42nd Ave S Bridge Replacement

Project No. 91810404

DESCRIPTION: Design and construct a replacement structure for the existing 42nd Ave S Bridge near the Tukwila Community Center.

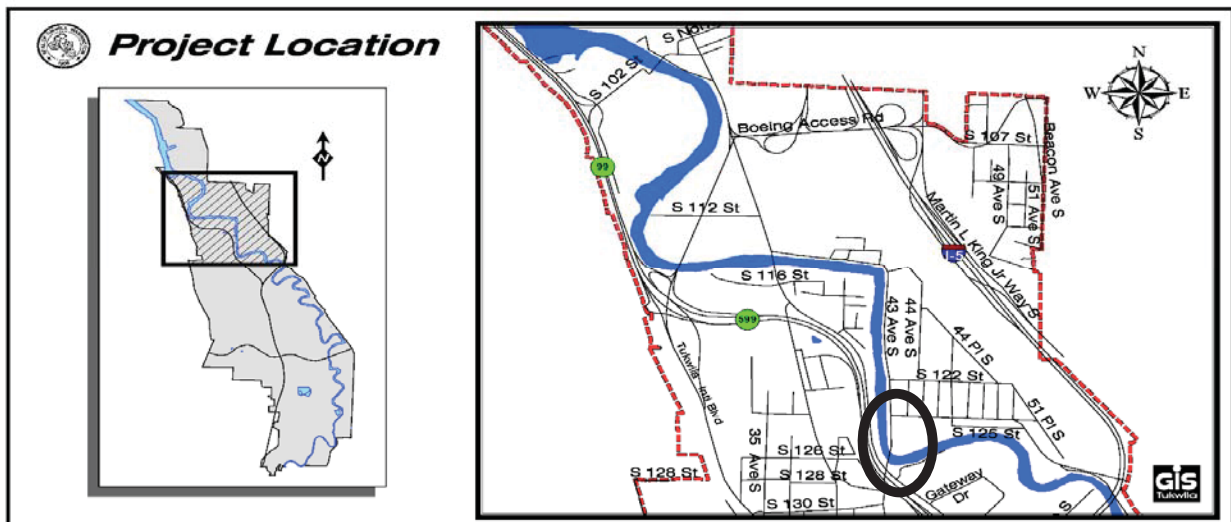
JUSTIFICATION: The current bridge has a sufficiency rating of 7.6 (out of 100), is load restricted for AASHTO Type 3 trucks and is structurally deficient. Truck speed was reduced to 15 mph in 2018.

STATUS: New project for 2019 - 2024 CIP. In 2017, Bridge Replacement Advisory Committee (BRAC) funding was submitted, but not awarded. If there is a BRAC funding round in 2019, staff will apply for those grant funds.

MAINT. IMPACT: New bridge.

COMMENT: BRAC funding would be at 80% match for up to \$12.5 million. Project partners may include BNSF Railroad as they have over 1,800 trips a day on the 42nd Ave S Bridge and it is the only ingress/egress available for their intermodal yard.

FINANCIAL (in \$000's)	Through		Estimated								TOTAL
	2017	2018	2019	2020	2021	2022	2023	2024	BEYOND		
EXPENSES											
Design				1,600							1,600
Land (R/W)					1,000						1,000
Wetland Mitigation/Monitoring					250	250	250				750
Const. Mgmt.						750	750				1,500
Construction						5,500	5,400				10,900
TOTAL EXPENSES	0	0	0	1,600	1,250	6,500	6,400	0	0	15,750	
FUND SOURCES											
Awarded Grant											0
Proposed Grant				1,280	800	5,000	4,920				12,000
Fund Balance-Bond					450	1,500	1,480				3,430
Mitigation											0
City Oper. Revenue	0	0	0	320	0	0	0	0	0	0	320
TOTAL SOURCES	0	0	0	1,600	1,250	6,500	6,400	0	0	15,750	



CITY OF TUKWILA CAPITAL PROJECT SUMMARY

2019 to 2024

PROJECT: Annual Bridge Inspections and Repairs

Project No. 9XX10402

DESCRIPTION: Ongoing program of bi-annual inspections, repairs, painting and rehabilitation of the 22 City bridges.

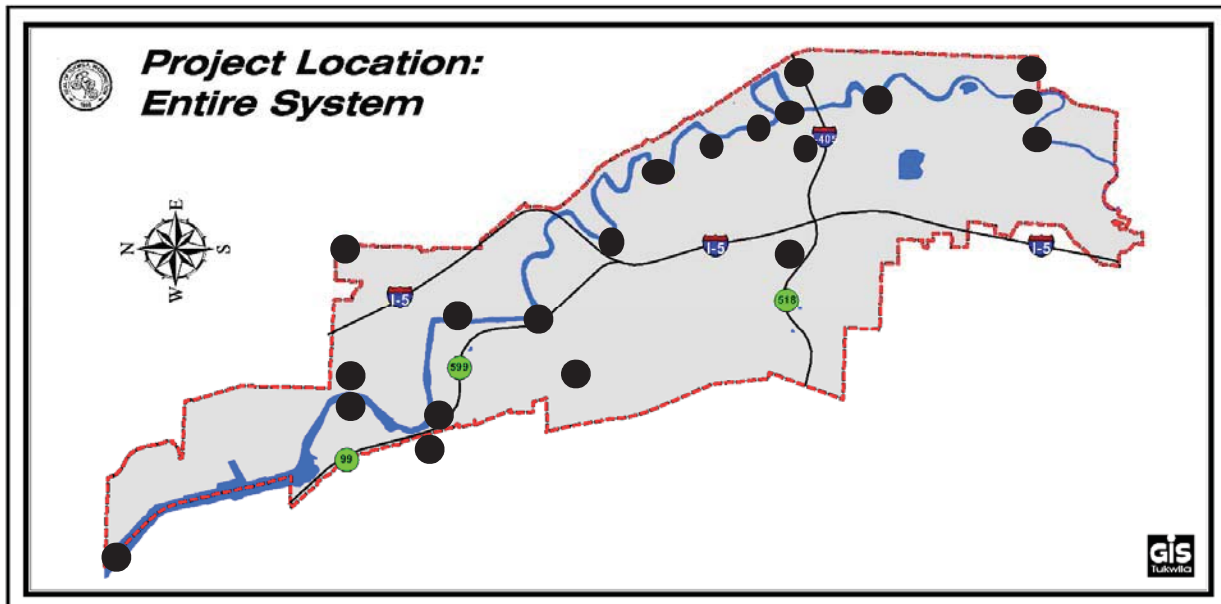
JUSTIFICATION: Federally required program identifies safety or repair needs in the early stages to minimize hazards and costs. The number of bridge inspections necessary each year can vary year to year. Inspection frequencies vary from bridge to bridge and King County has provided some inspection services.

STATUS: Construction projects will be determined from inspection reports and noted deficiencies/problems.

MAINT. IMPACT: Reduces maintenance costs.

COMMENT: Ongoing project, only one year actuals are shown in the first column.

FINANCIAL (in \$000's)	Through 2017	Estimated 2018	2019	2020	2021	2022	2023	2024	BEYOND	TOTAL
EXPENSES										
Design	141	45	45	45	55	55	65	65	65	581
Land (R/W)										0
Const. Mgmt.	1	40	40	40	50	50	60	60	60	401
Construction	32	250	250	250	300	300	325	325	325	2,357
TOTAL EXPENSES	174	335	335	335	405	405	450	450	450	3,339
FUND SOURCES										
Awarded Grant										
Proposed Grant										0
Mitigation Actual										0
Mitigation Expected										0
City Oper. Revenue	174	335	335	335	405	405	450	450	450	3,339
TOTAL SOURCES	174	335	335	335	405	405	450	450	450	3,339





The City of Tukwila Public Works

August 2017

42nd Avenue South Bridge Structural Assessment

Executive Summary

The 42nd Avenue South Bridge is a 3-span 280-foot-long bridge built in 1949. The bridge is composed of a 220-foot-long fracture critical steel thru-truss main span with 30-foot-long concrete T-beam approach spans at each end. The existing bridge is both Structurally Deficient and Functionally Obsolete.

A three-tier structure assessment has revealed that there are critical structural elements within the 42nd Ave bridge structure that have deteriorated into poor conditions. The examples of these are the short plinth columns at the bridge approaches, truss gusset plates, and main span deck structure.

The bridge is currently nearing the end of its service life and requires strengthening, repainting, deck work, a seismic retrofit, and scour protection, if it were to remain in service. The cost of this work would be prohibitively expensive and would exceed the cost of a new bridge.

The proposed new structure will have the added advantages of being a redundant concrete bridge with very low life cycle maintenance costs to the Bridge Program or to the City of Tukwila.

A cost estimate for the proposed replacement bridge is presented in Appendix C.

Furthermore, it is recommended that until the bridge can be replaced, the interim inspection frequency remains at a six-month interval with special attention being paid to the critical structural elements identified in the structural analysis presented here. A monitoring plan has been developed and will be implemented by the City of Tukwila until bridge funding can be secured and the bridge can be replaced.

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- C Bridge Replacement Estimate

1. INTRODUCTION

The 42nd Avenue South Bridge is a 3-span 280-foot-long bridge built in 1949. The bridge is composed of a 220-foot-long fracture critical steel thru-truss main span with 30-foot-long concrete T-beam approach spans at each end. The existing bridge is both Structurally Deficient and Functionally Obsolete. The plans for the existing bridge are available under the “Records/Plans” tab in the WSDOT Bridge Inspection Application.

The bridge is located within the City of Tukwila on a sharp bend of the Duwamish River that produces turbulent high velocity flows at the truss abutments. These frequent flows



have caused scour damage at the bridge abutments and at the north approach roadway. Because the bridge foundation depths are unknown and there is active scour, the City has implemented a scour Plan of Action (POA) for high flow events. Additionally, existing riprap at Pier 2 is either washing away or is falling into a scour hole developing on the river side of the pier. The bridge is the only access for the BNSF intermodal yard located at the end of South 124th Street as other

routes into the yard prohibit trucks. As a result, the bridge has been subjected to an unusually high percentage of truck traffic constantly crossing the bridge around the clock.

The City of Tukwila has struggled for years to maintain the bridge. Maintenance projects include a major paint project in the mid-1990’s and a significant project to rebuild the north bridge approach after erosion, caused by scour, threatened the existing roadway. This problem is currently resurfacing even after the City installed a sheet pile wall to protect the approach. A dramatic illustration is the sinking of the north approach guardrail posts with a section of the rail currently at almost ground level. There is also the ongoing problem of keeping the bridge clean enough to perform valid inspections. Cleaning the bridge adds significant cost to the



already expensive fracture critical inspections as well as adding equipment scheduling complications.



In addition to the substructure problems, the deck and floor system are in distress as evidenced by significant loud floor system creaking and deck panel banging under traffic. These problems have been reported by bridge inspectors and Tukwila

Maintenance for years. These noises cannot be associated with specific damage at this point but are worrisome in a fracture critical bridge subjected to extreme fatigue stresses by the heavy truck traffic.

The bridge is currently nearing the end of its service life and would require strengthening, repainting, deck work, a seismic retrofit, and scour protection, if it were to remain in service. The cost of this work would be prohibitively expensive and would exceed the cost of a new bridge. The proposed new structure will have the added advantage of being a redundant concrete bridge with very low life cycle maintenance costs to the Bridge Program and to the City of Tukwila.

2. STRUCTURAL ASSESSMENT

The structural assessment activities performed as part of this study have a three-tier approach that is described in detail in the following sections:

2.1 Tier 1 - Bridge Inspections

The 42nd Avenue South Bridge has been inspected on an increased frequency (a reduced frequency duration) since 2014. The frequency change started at 12 months and is now set at a six-month interval for Interim Inspections. These inspections focused on monitoring the damaged short concrete plinth columns supporting the approach span girder bearings at piers 2 and 3 and bridge gusset plates.

Since 2014, the bridge has also undergone several in-depth and routine bridge inspections with the most recent being in spring of 2017. The observations and data obtained from these inspections has been utilized in a new comprehensive load rating per WSDOT and AASHTO recommended Load Factor Rating requirements that includes gusset plate and Emergency Vehicle (EV) ratings. The new load rating is described in further detail in the following sections. The in-depth and interim inspections, some of which were performed with UBIT special access and after bridge cleaning to ensure a valid inspection, indicate that approximately one third of the truss structure is now in BMS Condition State 3 and that the Substructure Overall Condition rating is at a 4-code because of critical damage to the concrete plinth columns at Piers 2 and 3. Please see Appendix A for the latest Inspection Report.

The resulting Sufficiency Rating has dropped in steps as the inspection and analysis has progressed, reaching its current level of 7.56 SD. The new load rating indicates that posting of the bridge for legal loads, single hauling vehicles, and emergency vehicles is necessary. The City is currently implementing the NBIS load posting requirements.

2.2 Tier 2 - Structural Assessment – Piers 2 and 3 Column Damages

The City of Tukwila has initiated a structural evaluation of the short concrete approach span, girder support columns at Piers 2 and 3. The deterioration of these columns was listed as one of the main reasons for the reduction of the Substructure Overall Code to 4 (i.e., Poor Condition) as reported in the 2015 bridge inspection report. This engineering analysis is supporting information to justify the request for bridge replacement funding from the WSDOT administered Local Bridge Program. The results of the structural analyses are summarized below.

Eight short plinth columns support the concrete T-beams of approach Spans 1 and 3. The girders sit on a rocker bearing installed on top of each plinth. These bearings are completely frozen by pack rust and deterioration. In addition, the rocker bearings for the truss span at Pier 2 appear have been frozen or locked in the expansion direction for years.

Each column has six number seven vertical shear friction bars at their interface with the pier wall.

First, the plinth columns were analyzed for temperature and vehicular braking force induced stresses. These results showed that the demand forces are not large enough to create the observed damage.

Next, seismic forces were analyzed and were shown to be large enough to yield the interface of the short columns and the piers wall as the forces are transferred through the semi rigid link caused by the frozen bearings. This condition is accentuated at the obtuse corner (i.e. Column Plinth 3A at northwest corner of the Pier 3).



The existing bridge design, which includes an extreme skew of 38°, puts these columns at additional risk from seismic events as well as from normal temperature and traffic forces as torque forces are developed and added to the high shear forces.



The interface cracking has been documented since 2001 (upper photo) and the cracks are currently opening and starting to spall. In addition, there has been documented evidence for many years of the deterioration of the reinforcing steel as evidenced by rusty leaching. These problems may have been initiated during the April 29, 1965 South Sound Earthquake and were likely compounded by the February 28, 2001 Nisqually earthquake. However, the damage

is aggravated daily by the constant truck traffic and seasonally due to normal temperature

forces. This constant cyclical bombardment of Column 3A make it a failure risk for Span 3.

Since the rocker bearings located on the plinths are all completely frozen, there is a semi-rigid link allowing these high magnitude forces to be transmitted through Span 3 to the North Abutment, Pier 4. Again, due to the bridge's large skew, a concentration of force is toward the northwest side of the abutment as illustrated by the damage at this location. This concentration of force may play a role in the continued settlement issues of the north bridge approach roadway at the steel sheet pile wall repair mentioned above.



2.3 Tier 3 - Updated Load Rating Analysis

A gusset plate load rating update was performed in November 2014 that did not consider the coding changes made during the condition assessments performed in the Spring of 2015. A new comprehensive Load Rating Report was completed in August 2017 as part of the funding analysis as well as to evaluate the bridge for emergency vehicles. The new load rating indicates that the deck and gusset plates have ratings that are below 1.0 with respect to the legal trucks and that the gusset plates control. TranTech has ranked the gusset plates by their criticality and has identified the failure mechanism of each plate. This information will be used to focus the gusset plate inspection during future interim and routine bridge inspections. The rating outcome has further reduced the bridge's capacity and the resulting Sufficiency Rating. A copy of the Summary Sheet from the new load rating is attached in Appendix B.

3. CONCLUDING REMARKS

A three-tier structure assessment has revealed that there are critical structural elements of the 42nd Ave bridge structure that have deteriorated to poor conditions. Examples are the short columns at the bridge approaches, truss gusset plates, and main span deck structure. Rehabilitation of this structure would be prohibitively expensive and a bridge replacement is recommended. A cost estimate for this bridge replacement is presented in Appendix C.

Furthermore, it is recommended that until the bridge can be replaced, the interim inspection frequency remains at a six-month interval with special attention being paid to the critical structural elements identified in the structural analysis. A monitoring plan has been developed and will be implemented by the City of Tukwila until bridge funding can be secured and the bridge can be replaced.



APPENDIX A | Current Inspection Report



BRIDGE INSPECTION REPORT

Status: Released
 CD Guid: 4305b7a6-8599-4765-87ce-c492bac836bd

Printed On: 8/17/2017
 CD Date: 7/27/2017

Agency: TUKWILA
 Program Mgr: Roman G. Peralta

Br. No. TUKWILA-14 **SID** 08109700 **Br. Name** 42ND AVENUE SOUTH BR
Carrying 42ND AVE SO **Route On** 01037 **Mile Post** 1.04
Intersecting DUWAMISH RIVER **Route Under** **Mile Post**

Inspector's Signature GDG Cert # G0014 Cert Exp Date 5/12/2021 Co-Inspector's Signature

2 <input type="checkbox"/> Structural Eval (1657) 2 <input type="checkbox"/> Deck Geometry (1658) 9 <input type="checkbox"/> Underclearance (1659) 8 <input type="checkbox"/> Alignment (1661) 6 <input type="checkbox"/> 5 Deck Overall (1663) 5 <input type="checkbox"/> Superstructure (1671) 4 <input type="checkbox"/> Substructure (1676) 9 <input type="checkbox"/> Culvert (1678) 5 <input type="checkbox"/> Chan/Protection (1677) N <input type="checkbox"/> Pier/Abut/Prot (1679) 4 <input type="checkbox"/> Drain Cond (7664) 1 <input type="checkbox"/> Drain Status (7665) M <input type="checkbox"/> Deck Scaling (7666) 10 <input type="checkbox"/> Scaling Pct (7667) 7 <input type="checkbox"/> Deck Rutting (7669) 7 <input type="checkbox"/> Exposed Rebar (7670) 6 <input type="checkbox"/> Curb Cond (7672)	27 <input type="checkbox"/> 23 Operating Tons (1552) 0.77 <input type="checkbox"/> 0.65 Op RF (1553) 16 <input type="checkbox"/> 14 Inventory Tons (1555) 0.46 <input type="checkbox"/> 0.39 Inv RF (1556) 5 <input type="checkbox"/> 3 Operating Level (1660) A <input type="checkbox"/> Open/Closed (1293) 8 <input type="checkbox"/> Waterway (1662) U <input type="checkbox"/> Scour (1680) <input type="checkbox"/> Soundings Flag (2693) N <input type="checkbox"/> Revise Rating (2688) <input type="checkbox"/> Photos Flag (2691) <input type="checkbox"/> Measure Clrnc (2694) 6 <input type="checkbox"/> Sdkw Cond (7673) 5 <input type="checkbox"/> Paint Cond (7674) 6 <input type="checkbox"/> Approach Cond (7681) 7 <input type="checkbox"/> Retaining Wall (7682) 9 <input type="checkbox"/> Pier Prot (7683)	2 <input type="checkbox"/> No Utilities (2675) 1 <input type="checkbox"/> Bridge Rails (1684) 0 <input type="checkbox"/> Transition (1685) 0 <input type="checkbox"/> Guardrails (1686) 0 <input type="checkbox"/> Terminals (1687) 0.00 <input type="checkbox"/> Asphalt Depth (2610) 6.00 <input type="checkbox"/> Design Curb Ht (2611) 40.0 <input type="checkbox"/> Bridge Rail Ht (2612) 1949 <input type="checkbox"/> Year Built (1332) 0 <input type="checkbox"/> Year Rebuilt (1336) Y <input type="checkbox"/> Subj to NBIS (2614)	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Inspections Performed:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Freq</th> <th style="width: 10%;">Hrs</th> <th style="width: 20%;">Date</th> <th style="width: 60%;">Rep Type</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>6.0</td> <td>4/26/2017</td> <td>Routine</td> </tr> <tr> <td>24</td> <td>6.0</td> <td>4/26/2017</td> <td>Fract Crit</td> </tr> <tr> <td></td> <td></td> <td></td> <td>UW</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Special</td> </tr> <tr> <td>24</td> <td>1.0</td> <td>2/26/2016</td> <td>Interim</td> </tr> <tr> <td></td> <td></td> <td></td> <td>UWI</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Damage</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Safety</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Short Span</td> </tr> <tr> <td></td> <td></td> <td></td> <td>In Depth</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Geometric</td> </tr> </tbody> </table> </div> <div style="margin-top: 10px;"> <p>Alpha Span Type: <div style="border: 1px solid black; padding: 2px; width: 150px; margin: 5px auto;">STrus</div> </p> <p>Sufficiency Rating 7.56 SD <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px auto;">High Risk</div> </p> </div>	Freq	Hrs	Date	Rep Type	12	6.0	4/26/2017	Routine	24	6.0	4/26/2017	Fract Crit				UW				Special	24	1.0	2/26/2016	Interim				UWI				Damage				Safety				Short Span				In Depth				Geometric
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BMS Elements							
Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
12	Concrete Deck	6,816	SF	6,811	0	5	0
35	Concrete Deck Soffit	6,816	SF	6,812	0	4	0
110	Concrete Girder	256	LF	256	0	0	0
113	Steel Stringer	1,100	LF	1,050	0	50	0
126	Steel Thru Truss	440	LF	286	0	154	0
133	Truss Gusset Plates	40	EA	20	0	20	0
152	Steel Floor Beam	332	LF	282	50	0	0
205	Concrete Pile/Column	18	EA	10	0	8	0
212	Concrete Submerged Pier Wall	74	LF	71	3	0	0
215	Concrete Abutment	76	LF	66	0	10	0
234	Concrete Pier Cap/Crossbeam	149	LF	149	0	0	0
266	Concrete Sidewalk & Supports	1,100	SF	1,100	0	0	0
311	Moveable Bearing (roller, sliding, etc)	10	EA	2	0	0	8
313	Fixed Bearing	2	EA	2	0	0	0

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Intersecting DUWAMISH RIVER **Route Under** **Mile Post**

BMS Elements (Continued)

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
330	Metal Bridge Railing	568	LF	456	100	12	0
340	Metal Pedestrian Railing	284	LF	284	0	0	0
357	Pack Rust	50	EA	46	4	0	0
361	Scour	4	EA	2	2	0	0
362	(Discontinued) Impact Damage	1	EA	1	0	0	0
402	Open Concrete Joint	216	LF	0	0	216	0
408	Steel Sliding Plate	48	LF	0	0	48	0
901	Red Lead Alkyd Paint System	17,000	SF	11,800	4,000	1,000	200

Notes

0	ORIENTATION Beginning of bridge at south abutment (nearest traffic signal at Interurban Ave).
1	FRACTURE CRITICAL INSPECTION This includes visual inspection of truss tension members, bottom chords, floor beams, diagonal and vertical members. See Fracture Critical Report in Files Tab.
3	UBIT 60 UBIT can deploy through both sides of truss. However, the bridge deck is narrow with low portals and sways. Suggest closing the bridge for next UBIT inspection due to the bouncing motion of the UBIT caused by the high volume of truck traffic on the bridge. Also added congestion to main arterial Interurban Ave S from the in inadequate approach distance on 42nd Ave S to south portal of the bridge. TRANSIENTS Activity under Span 3. Garbage accumulated, litter and needles on top of cap 3.
11	EV2 RF = 0.62 EV3 RF = 0.42 LOAD RATING Gusset Plate at L2U1-East controls. A new load rating has been performed (August 2017) and the bridge requires load posting for AASHTO 2 and 3, SHV 5,6,&7, and EV 2 and 3. The City is in the process of implementing the posting requirements.
12	CONCRETE DECK (SURFACE) Open joints at floorbeam. Exposed aggregate in wheel lines and slight rutting. Moderate scaling, pop-outs and mudball voids scattered throughout surface. Longitudinal cracks concentrated near ends of bridge, some porosity. North bound lane: 4"-6" pavement spall. South bound lane: 6" loose pavement near double yellow line.
35	CONCRETE DECK SOFFIT Diagonal hairline leaching cracks near steel stringers. Deck fillets are spalled in several locations along top flanges of floorbeams. Many short exposed rebar in edge overhangs due to lack of cover and poor consolidation of concrete. Scattered hairline transverse rusty leaching cracks in soffit. Moderate sized pockets of poor consolidation - spans 2-4 thru 2-7.
110	CONCRETE GIRDER Four lines of CIP concrete T-beams in Spans 1 and 3. Webs have hairline vertical and diagonal cracks. 1A - Vertical crack near Pier 2 End diaphragm @ Pier 3 - hairline vertical leaching cracks Span 3 griders are covered with soot
113	STEEL STRINGER Five lines of stringers (5x220=1100 LF). Square cope at connection to floorbeams, no cracks observed. Rusty top flanges. Mud staining on outside stringers. Rust blisters on a few copes.

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Carrying 42ND AVE SO			Route On 01037	Mile Post 1.04
Intersecting DUWAMISH RIVER			Route Under	Mile Post

Notes (Continued)

- 126 **STEEL THRU TRUSS GENERAL:**
 See 2017 FCR for detail on fracture critical members.
 Lower panel points were dry cleaned prior to inspection. Upper panel points and those connecting members are covered in guano droppings, active nests in upper chords and owls nest at L4E. Debris building up in bottom chord. See note #133 Gusset Plates
- PACK RUST: Pack rust is starting to develop in all built-up members but hasn't reached the point of popping rivet heads. - Up to 1/8" pack rust in seams of tension and compression diagonals. - Pack rust between bottom lateral gusset plates and bottom chord has caused bulging up to 3/8" at most chord joints. - Pack rust between interior cover plates and bottom chord channel has caused warping of cover plate up to 1/4". - Bottom laterals have seam rust and pack rust up to 3/8" along tops of members. - Bottom chords two channel beams from L2 to L8 E&W addition plates riveted to webs, pack rust forming between channel webs and plates distorting up to 1/8" between rivets. - Upper chords seam rust along channel/plate seams throughout.
- PORTALS & SWAYS:
 SOUTH PORTAL, U1W-U2E: High load traffic damage to south portal and sway frame. North flange of south portal is bent north 3" over 2 ft length. Bottom flange of sway is pushed up 2" over 8" length. Top flange of sway has a sine-wave shaped crimp, 1" over 7" length. Center of sway is bent 1'-0" to north. -SWAY M1W-M2E: Impact damage to sway, pushed 5" to north with flanges buckled.
 SWAY M2W-M3E: Minor impact damage.
 U5W: Paint blister and minor pack rust along edge of top chord.
 L7W: 2 rusty rivet heads on bottom plate.
 L7-U7E: Paint failure at SW.
 L7-L8W: Pack rust on lower chord.
 L8W: Pack rust 1/8" on bottom plate.
 L9W-U9W: Pitting up to 1/8" near top of bottom gusset plate.
 L9W: Gusset plate 7/16" thick. Pack rust 1/8" on bottom plate and 1/4" V.P.
- 133 **STEEL GUSSET PLATES** 20 gusset plates per truss line. High bird activity. Bottom lateral gusset plates at bottom chord have pack rust causing bulging up to 3/8" at most chord joints. Interior cover plates at bottom chord channel have pack rust causing warping of cover plate up to 1/4". Interior rivet heads have blistered paint or lack paint, many are heavily rusted. 5LE bottom plate has two deformed rivet heads.
- 152 **STEEL FLOOR BEAM** Two skewed end floorbeams and ten transverse floorbeams (2x33.6+10x26.5=332 LF). Dirt and mud at connections to truss. Laminar rust along top flange with minor section loss (<2%).
- 205 **CONCRETE PILE** Five concrete piles each at Piers 1 and 4, with cap and backwall. Rough concrete and a few hairline cracks at cap interface. 1C: 10" spall with exposed rebar. 4A, 4B, 4C: Hairline horizontal cracks at about 1 ft. spacing. **CONCRETE COLUMNS:** 28" tall concrete columns support the sliding plate bearings at Piers 2 & 3. 2A: Horizontal crack at cap interface, exposed rusty rebar, corners are spalled off, NW corner of bearing is unsupported. 2B: Horizontal crack at cap interface, exposed rusty rebar, large spalls in NW corner of bearing is unsupported. 2C: Horizontal crack at cap interface, exposed 4" section of rusty rebar 2D: Hairline crack at cap interface, SE corner is spalled off (18" high by 4" deep) 3A: Horizontal cracks at cap interface 3B: Horizontal cracks at cap interface 3C: 12" of horizontal rebar exposed on south side 3D: Hairline crack at cap interface
- 212 **CONCRETE SUBMERGED PIER WALL** Hairline vertical cracks in pier walls. Many 1-1/2" shallow form tie holes in both walls. Pier 2: water abrasion along north face. Pier 3: Three 12" x 12" x 1" deep areas of abrasion in south face.
- 215 **CONCRETE ABUTMENT**
 Both backwalls have a few hairline vertical cracks throughout. Graffiti at face of abutment.
 Pier 4: gap under backwall from pile 4A through 4D, minor erosion/sloughing.
 NW wingwall: open diagonal crack above top of cap to ground line (1.75" gap at top) with 2 ft x 8" x 6" deep spall with 5" exposed rebar.
 NE wingwall: 8" x 6" x 3" deep spall. Two steel plates attached on the east side of north abutment wall at the NE corner bridge rail.
- MONITOR NOTES 2/25/2016 Pier 2 concrete columns - no change noted. Pier 3 concrete columns - Heavy graffiti on north face of column of all columns and pier cap. Change noted in column 3A; north face - cracks at base along interface with pier cap, full width. Cracks are narrow to open, some new chips and small spalls along crack line. Column is tilted to the north 1.5 degrees. Abutment 4 - west corner at wingwall interface. 2016: Gap is 1.75" at top horizontal face. Concrete piles with transverse cracks - no change

BRIDGE INSPECTION REPORT

Status: Released
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Printed On: 8/17/2017
 CD Date: 7/27/2017

Agency: TUKWILA
 Program Mgr: Roman G. Peralta

Br. No. TUKWILA-14	SID 08109700	Br. Name 42ND AVENUE SOUTH BR	
Carrying 42ND AVE SO		Route On 01037	Mile Post 1.04
Intersecting DUWAMISH RIVER		Route Under	Mile Post

Notes (Continued)

234 CONCRETE PIER CAP
 Hairline vertical cracks in perimeter, tops are covered with mud, moss and transient debris.
 Pier 2 - spall with exposed rebar NW, north & SE face.
 Pier-3. Caps have open form tie holes.
 Pier 4 : 4A, 4B & 4C top of beam cap spall across width of stringer.

266 CONCRETE SIDEWALK & SUPPORTS Surface: Transverse cracks at panel points, open up to 1/8", small spalls starting to form. ACP at south approach to sidewalk is steep (Repair #12316). Vegetation growing along edge next to east truss line. Soffit: Many hairline transverse cracks leaching on underside. Form anchors still in place on soffit along channel web. Supports: Steel knee braces support sidewalk in Span 2. Top clips at truss are separating due to pack rust.

311 MOVEABLE BEARING
 Rocker Bearings- Truss: Both bearings 2-1A & 2-1B are tipped 5° expanded, temperature was 44° F.
 Rocker Bearings - approach spans. Eight skewed steel bearings, each bearing has two hing bars.
 Bearings are mounted on concrete plinths at Piers 2 and 3. Pack rust between sole plates and hing bars on all bearings. Hing bars at 2A, 2D, 3-1A and 3-1D, are bulging up to 1/8" from pack rust, all eight bearings are frozen.
 SEE NOTE 1676 SUBSTRUCTURE - for details on the concrete plinths.

313 FIXED BEARING Two pinned shoe bearings at Pier 3, minor rust on edges.

330 METAL BRIDGE RAILING Retrofitted thrie beam has minor traffic scrapes throughout. Rail has loose connection at U5L5 in east truss and rattles under traffic. Curbs cracked open 1/8" over truss floorbeams. Tack welds broken on west rail, widespread.

340 METAL PEDESTRIAN RAILING Rail panel section loose at bottom tube connection to post, east sidewalk north of centerline of the river, between L4 & L5.

357 PACK RUST Seam rust and pack rust - most 1/4" or less on built-up members throughout truss.

361 SCOUR, FIELD
 Pier 2 is located on the outside of a sharp meander bend in the Duwamish River.
 Riprap along Pier 2 has a scour scallop, about 8 to 10 feet in diameter at the center of pier, two relic piles are exposed in the scalloped area. During inspection flow increased velocity with the changing tide. The main thalweg flow is near the left bank at Pier 2; back eddies were noted along the center and downstream face of Pier 2. Riprap is scattered and missing along the downstream face of Pier 3. Gravel bar visible upstream of pier 3, right bank to mid channel. Riprap has scatted areas upstream and downstream along both banks. 2015 soundings show 2.5' deepening near Pier 2. Little change to gravel bar forming near Pier 3.
 SOUNDINGS: are taken from upstream rail at truss panel points:

Year	L0	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
2015	18.5	30.5	41.5	44.5	40.5	36.0	29.7	28.5	26.5	23.5	16.0
2014	19.0	30.5	39.0	42.0	39.5	34.0	28.5	28.0	26.5	23.5	15.0
2013	18.8	30.2	41.0	42.0	42.0	35.0	30.0	27.5	26.0	23.8	16.0
2007	18.5	30.5	40.0	43.5	43.0	37.5	31.0	28.5	27.0	25.5	15.0

Update soundings every two years or more often if lateral migration is suspected. Monitor riprap at low tide and low flow periods.

362 IMPACT DAMAGE Traffic impact damage to truss south portal and sway members.

402 JOINT FILLER Open joints over floorbeams; most of fabric fill is worn away, allowing mud and water to pump through onto floorbeam top flanges (Repair #12306).

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Intersecting DUWAMISH RIVER		Route Under	Mile Post

Notes (Continued)

408 STEEL SLIDING PLATE
 Joints are full of dirt. D-spalls and delaminations along edges of both joints. Water leaks through joint onto truss main piers.
 MEASUREMENTS: are taken at center line of each joint.

YEAR	TEMP	TIME	PIER 2 (WEST)	PIER 3 (EAST)
2016	62°	09:00	1-0"	1-1/2"
2015	48°	09:20	7/8"	1-1/2"
2013	48°	11:00	15/16"	1-3/8"
2011	50°	15:30	15/16"	1-3/8"
2009	65°	10:00	1-0"	1-5/8"
2007	50°	08:00	1-1/2"	1-5/8"
2005	65°	10:00	1-0"	1-3/8"

901 RED LEAD ALKYD PAINT SYSTEM Top coat of paint on top chord has flaked off in many areas. There are a few rust spots where failed paint has exposed bare metal. Seam rust is bleeding through along edges of built-up members. Moss growth on some diagonal/vertical members.

1663 The Deck Overall code was downgraded based on deck and floor system deterioration. The deck panels are non-composite and are loose and banging on the floor system under traffic. In addition, the floor system is creaking and groaning under load. These problems are not revealing themselves in recordable damage but the loose deck panels and lack of continuity was taken into account in a new load rating update.

1676 SUBSTRUCTURE
 Code reduced to 4 due to condition of concrete plinths under rocker bearings at piers 2 and 3.
 Pier 2 plinth 2A, and 2B have open cracks at interface with pier cap. All plinths have large spalls with exposed rebar along edges, several are spalled under bearing plates.
 Pier 3 plinth 3A and 3B have open cracks at interface with pier cap. Several plinths have spalls with exposed rebar.

 Unknown pile tip elevation of piles supporting Piers 2 & 3.
 Channel thalweg is near pier 2, riprap is scattered.

1680 SCOUR , OFFICE Scour analysis done in 2014. Since pile tip elevations are not available, the scour code = "U". The channel is centered under L3-East and is slightly aggradating at piers 1, 2 and 3. Calculated contraction scour is 0.6 feet, local pier scour ranges between 6 feet and 13 feet depending on angle of attack. Plans indicate bottom of footing at -7.0, top of rail is estimated per plans at 28.0.

1685 TRANSITION Bridge rail transition at Pier 1 west side is missing approach guard rail.

1686 GUARDRAILS SE Traffic impact damage to approach rail flex beam. NW Approach rail is below standard height at settlement area, 18in to top of rail.

1687 TERMINAL Terminals not slotted. Attenuator is located at NE corner.

2675 NO. OF UTILITIES Two utilities are suspended from east edge under sidewalk: One 12" diameter steel waterline with mechanically restrained joints. One 6" diameter gas pipe.

2694 CLEARANCE Vertical clearance at portals and sway braces 3" from curb: East truss: E-M0 - W-M0 = 15'-3 1/8" E-M2 - W-M1 = 15'-0 1/4" E-M3 - W-M2 = 15'-0" E-M4 - W-M3 = 15'-0" E-M5 - W-M4 = 15'-0 7/16" E-M6 - W-M5 = 15'-0 3/8" E-M7 - W-M6 = 15'-1 3/8" E-M8 - W-M7 = 15'-0 1/8" E-M9 - W-M8 = 15'-0 1/8"

7664 DRAINS Drains are plugged throughout.

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Notes (Continued)

- 7681 APPROACH ROADWAY
 Longitudinal and transverse cracking in ACP in both approaches.
 South approach - slight settlement.
 North approach - settlement at sheet pile wall and in southbound lane for 50 ft north of approach, longitudinal cracks and fault cracks around settled area, approximately 1" settlement.
- 7682 RETAINING WALL Sheet pile wall to retain NW approach fill, no defects noted.

Repairs

Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified
12306	1	B	JOINTS SPAN 2: (MAH Revised 4/10/2015) Open Joints: Clean out open joints over floor beams thoroughly and fill with a flexible sealant, priority 1 due to corrosion at top flanges of floorbeams from leaking joints.	3/25/1998		
12316	1	B	SIDEWALK: North approach - rework the sliding plate expansion joint so it is smooth with sidewalk. Deck - patch spalls near panel points, seal open cracks.	4/12/2007		
13469	1	B	RAIL: SW transition is missing approach guard rail and terminal. SE guardrail is bent and deformed. NW guardrail has sunk down below acceptable standards. REPAIR - replace missing guard rail and terminal at SW corner, replace damaged rail at SE corner, reset NW rail and posts to bring rail up to standard height.	4/8/2013		
13471	1	B	PAINT: Paint has failed in many locations on top of top chords of truss. Pack rust is forming in seams of all built-up members. Moist dirt and pigeon guano are trapped in truss panel points and will cause premature paint failure. Algae growing on many members. REPAIR - Thoroughly pressure wash clean truss of all dirt/algae/guano, prepare surface, paint bridge to encapsulate pack rust and protect truss members. Add bird deterrent at all panel points, upper and lower chords.	4/8/2013		
13473	1	B	EXPANSION JOINT: Steel sliding plate expansion joints allows water and dirt to fall onto top of caps at Piers 2 and 3. The edges around the joints are chipped and spalled. REPAIR - Replace steel sliding plate expansion joints with either a strip seal with steel header or modular joint.	4/8/2013		
13474	S	S	SCOUR: Current scour code is coded "5" which means that foundation is stable for calculated scour depths. Need copy of pile tip elevations from city for bridge file.	4/16/2013		

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Br. No. TUKWILA-14 **SID** 08109700 **Br. Name** 42ND AVENUE SOUTH BR
Carrying 42ND AVE SO **Route On** 01037 **Mile Post** 1.04
Intersecting DUWAMISH RIVER **Route Under** **Mile Post**

Repairs (Continued)						
Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified
13475	2	B	STRUCTURAL SUBSTRUCTURE: (RPH Revised 4/8/13) Concrete columns supporting sliding bearings at Piers 2 and 3 have horizontal cracks at cap interface, exposed rusty rebar, spalls and delaminations. Pier 2 - Cap has spall, with rusted rebar and open cracks up to .05mm. Pier 3 - heavily abraded at waterline. Pier 4 - columns 4A-C have horizontal cracks. Abutment backwall is undermining along west half. West wing wall has large open crack and spalls. REPAIRS: P2 and P3 bearing columns - recommend design seismic retrofit steel collar and construct around bearing columns, anchored to cap, then fill tight with epoxy. Pier 2 - cap clean exposed rebar and patch spalls, epoxy inject cracks. Pier 3 - clean and patch abraded areas of pier wall Pier 4 - FRP wrap columns 4 A-C. Reinforce west wingwall. Add quarryspall along abutment 4 and under span 3 to retain fill and discourage transient activity.	4/16/2013		
13476	2	B	SCOUR: (RPH Revised 7/22/2014) Small scour scallops in left bank armor in front of Pier 2. Riprap is sparse and scattered through mudbar in front of Pier 3. Monitor the downstream inside face of Pier 3 at low water. REPAIR - Replace missing riprap along banks and in front of piers.	4/17/2013		
13478	1	B	SWAY BRACES: Heat straighten south portal and sway E-M3/W-M2. Sway bracing measures 15'-0" three inches from curb. Vertical clearance signs are required for measured clearances less than or equal to 15'-3" Install warning signs at both portals with posted height 3" less than lowest measured clearance. Recommend raising portals and sways due to the high volume of truck traffic and existing damage to sway members.	4/10/2015		
13479	2	B	BEARINGS: Main span rocker bearings at pier 2 are frozen in expanded position, fixed bearing at pier 3 are offset. Clean and reset main span bearings. Approach span bearings - slide bearing at pier 2 and 3 are corroded - possibly frozen. Replace sliding plates with elastomeric dynamic isolation bearings.	4/10/2015		
13480	2	B	DECK SOFFIT - widespread honeycombed areas, spalls with exposed rebar east side of soffit. SURFACE - worn to aggregate, spalling along joints. Patches of light scaling. REPAIR: Chip any delaminated concrete from exposed rebar, clean and seal exposed bar and patch spalls. Sack honeycombed areas throughout soffit. Shotblast deck surface, patch spalled areas and apply epoxy overlay.	4/10/2015		

Inspections Performed and Resources Required									
Report Type	Date	Freq	Hrs	Insp	CertNo	Coinsp	Note		
Routine	4/26/2017	12	6.0	ZZ	G1414	TTT			
Fracture Critical	4/26/2017	24	6.0	ZZ	G1414	TTT			
Resources	Hours	Min	Pref	Max	Freq Date	Need Date	Override	Notes	
UBIT	6.00							SDOT UBIT 60 USED	

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Intersecting DUWAMISH RIVER		Route Under	Mile Post	

Inspections Performed and Resources Required (Continued)

Report Type	Date	Freq	Hrs	Insp	CertNo	Coinsp	Note
Flagging	6.00						LOCAL AGENCY Flagging provided by City of Tukwila - contact Steve Carstens at 206-431-2446
Interim	2/26/2016	24	1.0	MAH	G1103	BLR	Inspect short concrete columns supporting bearings at piers 2 and 3. See Monitor Note 695 for details
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date Override Notes
Special Equipment							Bring ladder to reach columns and bearings.
Equipment	4/26/2017	24	6.0	ZZ	G1414	TTT	
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date Override Notes
UBIT	4.00						SDOT UBIT-60 USED
Flagging	4.00						Flagging provided by City of Tukwila - contact Steve Carstens 206-431-2446.
Informational	7/27/2017			GDG	G0014		Updated load rating information with 2017 rating results. Downgraded Deck Overall to account for loose deck panels and floor system noise under traffic. These issues have been noted in inspections since 2014 were not noted. This change was made with the concurrence of the previous bridge inspector.

1001	2009	2132	1019	1286	1021	2023	1156	2181	2183	2185	1188	1196
Structure ID	Bridge Number	Bridge Name	Owner	Cust	County	City	Location	Section	Township	Range	Latitude	Longitude
08109700	TUKWILA-14	42ND AVENUE SOUTH BR	04	4	17	1320	.03 MI N OF INTERURBAN AV	10	23	04E	47° 29' 23.10"	122° 16' 49.00"

1232	1256	1274	7281	7283	1276	1285	1288	1289	1293	1292	2295	7296
Feature Intersected	Facilities Carried	Region	Leg1	Leg2	FIPS	Toll	Para	Temp	OPC	NRHP	HAER	LRHP
DUWAMISH RIVER	42ND AVE SO	NW	11	0	72625	3	N		A	4		

Printed Date
8/17/2017

Sufficiency Rating:
**7.56
SD**
High Risk

Item 2710 SR
Item 2711 SD/FO

1332	1336	1340	2346	1348	1352	1356	1360	1364	1367	1310	1312	1370	1374	1378	1379	1382	1383	1386	1387	1390	1394	1291	1397
Year Built	Year Rebuilt	Bridge Length	NBIS Length	Maximum Span Length	Lanes On	Curb to Curb Deck Width	Out to Out Deck Width	Sidewalk Left	Sidewalk Right	Skew	Flared	Min Vert Over Deck	Min Vert Under	Vert Code	Min Lat Under Right	Lat Code	Min Lat Under Left	Nav Ctl Code	Nav Vert Clear	Nav Horiz Clear	Nav Vert Lift Clear	Median	Appr Rdwy
1949	0	284		220	2	24.0	30.0	0.0	3.5	38	N	15' 00"	00' 00"	N	0.0	N	0.0	0	0	0	0	0	36

1432	1433	1434	1435	2440	1445	1451	1453	1457	1463	1467	1477	1469	2410	7479	1483	1484	1485	1486	1487	1489	1490	1354	1491	1495	1499	1413	2441
On Under	Hwy Class	Service Level	Route Number	Milepost	ADT	Truck %	Year of ADT	Future ADT	Future ADT Year	Linear Referencing System	LRS Sub	LRS Milepost	NBI Bridge	Fed Aid Route #	NHS	BHS	STRAH	FLH	Funct. Class	NTN	Lane Use Direction	Lanes Under	Horizontal Clearance Route Dir	Horizontal Clearance Reverse Dir	Max Vert Clearance Route	Detour	Speed Limit
1	5	1	01037	1.04	10000	20	2014	11000	2034	01037			Y	1037	0	0	0	0	17	N	2	0	24' 00"		15' 00"	2	25

1532	1533	1535	1536	1538	1541	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1585	1588	1590	7565	7557	
Main Span Material	Main Span Design	Appr Span Material	Appr Span Design	Number Main Spans	Number Appr Spans	Service On	Service Under	Deck Type	Wearing Surface	Membrane	Deck Protect	Design Load Code	Oper Rating Method	Oper Rating Tons	Oper Rating Factor	Inv Rating Method	Inv Rating Tons	Inv Rating Factor	Border State Cd	Border Pct	Border	Border Structure ID	Fed Aid Project No	Design Exemption
3	10	1	04	1	2	5	5	1	1	0	0	4	6	27	0.77	6	16	0.46						
														23	0.65		14	0.39						

2587	2588	2589	2590	2591	2592	2593	2594	2595	2596
Type 3	Type 3S2	Type 3-3	NRL	SHV 4	SHV 5	SHV 6	SHV 7	OL 1	OL 2
1.21	0.90	0.84	0.73	1.11	0.98	0.88	0.81	0.65	0.34

7832	7833	7834	7835	7836	7837	7838	7839	7840	7841	1844	1846	1847	2853	2860	1867	1873	2870	1861	1879	2883	
Water Type	Flood Pin Inrt	Flood Control	Scour Hist	Strmbd Matr	Strmbd Stability	Substr Stability	Wrtwy Obstr	Strmbd Stability	Strmbd Anabnd	Strmbd In Wait	Piers Work	Work Math	Stru Imp Length	Roadway Width	Cost Per SF	Struct Cost	Rdwy Cost	Engr Cost	Total Cost	Estmt Year	Prop Imp Cost Calc
B	A	N	H	2	3	N	A	N	2	31	1	294	38	800	4469	894	3575	8938	2014	Y	

2920	1990	2646	2649	2654
Inspection	Date	Inspector	Cert No	Co-Inspector
Routine				
Fracture Critical				
Special Feature				
Underwater				

Inspection	Date	Inspector	Cert No	Co-Inspector
UW Interim				
Interim				
In Depth				
Damage				

Inspection	Date	Inspector	Cert No	Co-Inspector
Safety				
Short Span				
Geometric				
Info	7/27/2017	GDG	G0014	
Inventory				



APPENDIX B | Current Load Rating Summary



BRIDGE RATING SUMMARY

Bridge Name: 42ND AVENUE SOUTH BR
 Bridge Number: TUKWILA-14
 Span Types: Steel Through Truss Bridge & Approach Slabs
 Bridge Length: 280' (220' Truss + 2x30' Approach Slab)
 Design Load: HS20-44
 Rated By: VP
 Checked By: KN
 Date: 8/1/2017



EXPIRES 5/18/19

Inspection Report Date	4/26/2017	Substructure Condition	4
Rating Method	LFR	Deck Condition	6
Overlay Thickness	0"/Truss & 2"/Approach	Superstructure Condition	5

Truck	RF (INV)	RF (OPR)	Controlling Point
AASHTO-1	<u>0.72</u>	<u>1.21</u>	Yielding in member L2U1
AASHTO-2	<u>0.54</u>	<u>0.90</u>	Yielding in member L2U1
AASHTO-3	<u>0.50</u>	<u>0.84</u>	Yielding in member L2U1
NRL	<u>0.44</u>	<u>0.73</u>	Yielding in member L2U1
OL-1	<u>0.39</u>	<u>0.65</u>	Yielding in member L2U1
OL-2	<u>0.20</u>	<u>0.34</u>	Yielding in member L2U1

NBI Rating	RF	Controlling Point
Inventory (HS-20)	<u>0.39</u>	Yielding in member L2U1
Operating (HS-20)	<u>0.65</u>	Yielding in member L2U1

Remarks: Bridge requires posting. The single unit and FAST Act vehicles rating factors are:

Operating Rating	RF	Ton	Controlling Point
SU4 (GVW = 54 K)	1.11	29.97	Yielding in member L2U1
SU5 (GVW = 62 K)	0.98	30.38	Yielding in member L2U1
SU6 (GVW = 69.5 K)	0.88	30.58	Yielding in member L2U1
SU7 (GVW = 77.5 K)	0.81	31.39	Yielding in member L2U1
EV2 (GVW = 57.5 K)	0.62	17.83	Yielding in member L2U1
EV3 (GVW = 86.0 K)	0.42	18.06	Yielding in member L2U1

APPENDIX C | Bridge Replacement Estimate

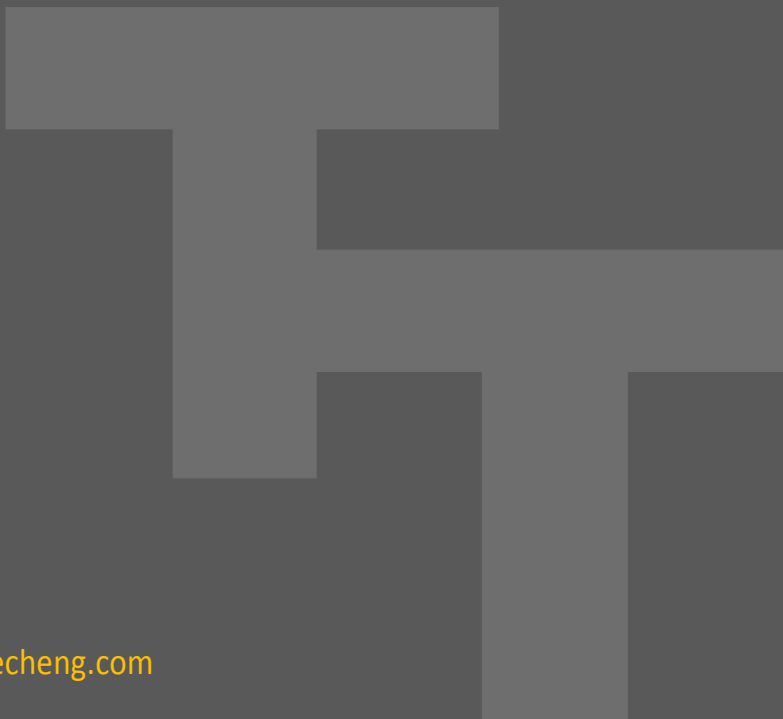


City of Tukwila-Tukwila 14-42nd Avenue Bridge Replacement Cost Estimate August 1, 2017

285 foot simple span with angled bearings.

STD. ITEM	ITEM DESCRIPTION	MEAS. UNIT	QUANTITY	UNIT PRICE	COST
130	REMOVING ASPHALT CONCRETE SIDEWALK	SY	10	\$ 150	\$ 1,500
170	REMOVING GUARDRAIL	LF	40	\$ 25	\$ 1,000
1085	QUARRY SPALLS	CY	500	\$ 40	\$ 20,000
4006	STRUCTURE EXCAVATION CLASS A INCL. HAUL	CY	200	\$ 150	\$ 30,000
4010	SPECIAL EXCAVATION	CY	100	\$ 200	\$ 20,000
4013	SHORING OR EXTRA EXCAVATION CLASS A - SHAFT	LS	1	\$ 25,000	\$ 25,000
4007	SOIL EXCAVATION FOR SHAFT INCL HAUL	CY	450	\$ 450	\$ 202,500
4008	FURNISH AND PLACE TEMP CASING FOR 60" DIAM SHAFT	LF	600	\$ 200	\$ 120,000
	FURNISH PERM CASING FOR 60" DIAM SHAFT	LF	600	\$ 450	\$ 270,000
	PLACING PERM CASING FOR 60" DIAM SHAFT	EA	6	\$ 3,000	\$ 18,000
	CONC CL 4000P FOR SHAFT	CY	450	\$ 300	\$ 135,000
	ST REINF BAR FOR SHAFT	LBS	540,000	\$ 1.70	\$ 918,000
	CSL ACCESS TUBES	LF	600	\$ 15	\$ 9,000
	REMOVING SHAFT OBSTRUCTIONS	LS	1	\$ 100,000	\$ 100,000
	REMOVING EXISTING BRIDGE SUPERSTRUCTURE	LS	1	\$ 300,000	\$ 300,000
	REMOVING EXISTING BRIDGE FOUNDATION	LS	1	\$ 300,000	\$ 300,000
	REMOVING EXISTING BRIDGE APPROACHES	LS	1	\$ 100,000	\$ 100,000
	TEMPORARY DETOUR BRIDGE	LS	1	\$ 1,250,000	\$ 1,250,000
	PRESTRESSED CONCRETE GIRDERS, WATER XING WITH PILING	LF	1,750	\$ 300	\$ 525,000
	BRIDGE APPROACH SLAB	SY	280	\$ 250	\$ 70,000
	REINFORCED CONC RETAINING WALL	SF	2,000	\$ 90	\$ 180,000
	CONC CL 4000 FOR BRIDGE	CY	550	\$ 575	\$ 316,250
	STRUCTURAL SURVEYING	LS	1	\$ 30,000	\$ 30,000
4438	EXPANSION JOINT SYSTEM COMPRESSION SEAL - SUPERSTRUCT.	LF	160	100	\$ 16,000
4339	EXPANSION JOINT SYSTEM STRIP SEAL	LF	160	800	\$ 128,000
4410	BRIDGE RAILING	LF	600	120	\$ 72,000
6403	ESA LEAD	DAYS	280	120	\$ 33,600
6416	SEEDING, FERTILIZING, AND MULCHING	LS	1	3,000	\$ 3,000
6455	BIODEGRADABLE EROSION CONTROL BLANKET	SY	250	4	\$ 1,000
6470	STREET CLEANING	HR	120	200	\$ 24,000
6471	INLET PROTECTION	EA	6	100	\$ 600
6488	EROSION CONTROL AND WATER POLLUTION PREVENTION	LS	1	2,000	\$ 2,000
6630	HIGH VISIBILITY FENCE	LF	300	4	\$ 1,200
6806	PAINT LINE	LF	-	5	\$ -
6869	PEDESTRIAN TRAFFIC CONTROL	LS	1	10,000	\$ 10,000
6899	BRIDGE MOUNTED SIGN	EA	2	1,000	\$ 2,000
6903	TEMPORARY ILLUMINATION SYSTEM	LS	1	10,000	\$ 10,000
6913	PORTABLE TEMPORARY TRAFFIC CONTROL SIGNAL	LS	1	30,000	\$ 30,000
6971	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	100,000	\$ 100,000
6974	TRAFFIC CONTROL SUPERVISOR	LS	1	10,000	\$ 10,000
6982	CONSTRUCTION SIGNS CLASS A	SF	200	20	\$ 4,000
7003	TYPE B PROGRESS SCHEDULE	LS	1	5,000	\$ 5,000
7052	BRIDGE END SIDEWALK RAMP	EA	2	1,000	\$ 2,000
7400	TRAINING	HR	500	20	\$ 10,000
7480	ROADSIDE CLEANUP	EST	1	10,000	\$ 10,000
7500	FIELD OFFICE BUILDING	LS	1	20,000	\$ 20,000
7570	HEALTH AND SAFETY PLAN	LS	1	10,000	\$ 10,000
7736	SPCC PLAN	LS	1	2,000	\$ 2,000
	APPROACH @15% OF BRIDGE COST	LS	1	817,148	\$ 817,148
	WILDLIFE MANAGEMENT	LS	1	5,000	\$ 5,000
	SUBTOTAL				\$ 6,269,798
	CONTINGENCY (15%)				\$ 940,470
	MOBILIZATION			\$ 626,980	\$ 626,980
	RIGHT OF WAY COSTS				\$ 500,000
	PRELIMINARY ENGINEERING (25% CONSTRUCTION COST)				\$ 1,567,449
	CONSTRUCTION MANAGEMENT (18% CONSTRUCTION COST)				\$ 1,128,564
	INFLATION FACTOR (5%/YEAR BASED ON PROJECTED AD DATE)				\$ 1,351,181
	TOTAL				\$ 12,384,440

PE Costs (approximately 25% of Total)	
(Soils, Environmental, Desig Docuemnts, Plan Preparation, etc.)	\$ 1,567,449
Right of Way Costs	
(Purchases, Reolooation and Construction Easement)	\$ 500,000
Construction Costs	
(Environmental mitigation, approach costs (15%), structure costs, etc)	\$ 6,269,798
Construction engineering (18%)	\$ 1,128,564
contingency (15%)	\$ 940,470
Mobilization (10%)	\$ 626,980
Inflation Factor (5% per year based on project Ad Date below)	\$ 1,351,181
Total Rehabilitation/Replacement/Preventative Maitnenance Project Costs	\$ 12,384,440



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Comments

BRIDGE INSPECTION REPORT

Status: Released
 CD Guid: 2cd4f851-bd4d-4895-8829-00f308c515a9

Printed On: 4/22/2019
 Release Date: 4/22/2019

Agency: TUKWILA
 Program Mgr: Roman G. Peralta

Br. No. TUKxNx14 **SID** 08109700 **Br. Name** 42ND AVENUE SOUTH BR
Carrying 42ND AVE SO **Route On** 01037 **Mile Post** 1.04
Intersecting DUWAMISH RIVER **Route Under** **Mile Post**

Inspector's Signature MAG Cert # G1103 Cert Exp Date 5/12/2021 Co-Inspector's Signature HP

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BMS Elements

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
12	Concrete Deck	6,840	SF	6,835	0	5	0
35	Concrete Deck Soffit	6,840	SF	6,836	0	4	0
110	Concrete Girder	256	LF	256	0	0	0
113	Steel Stringer	1,100	LF	1,050	0	50	0
126	Steel Thru Truss	440	LF	286	0	154	0
133	Truss Gusset Plates	40	EA	20	0	20	0
152	Steel Floor Beam	351	LF	331	0	20	0
205	Concrete Pile/Column	18	EA	10	0	8	0
212	Concrete Submerged Pier Wall	80	LF	77	3	0	0
215	Concrete Abutment	80	LF	70	0	10	0
234	Concrete Pier Cap/Crossbeam	84	LF	84	0	0	0
266	Concrete Sidewalk & Supports	1,482	SF	1,482	0	0	0
311	Moveable Bearing (roller, sliding, etc)	10	EA	2	0	0	8
313	Fixed Bearing	2	EA	2	0	0	0

BRIDGE INSPECTION REPORT

Status: Released
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Printed On: 4/22/2019
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Agency: TUKWILA
 Program Mgr: Roman G. Peralta

Br. No. TUKxNx14	SID 08109700	Br. Name 42ND AVENUE SOUTH BR
Carrying 42ND AVE SO		Route On 01037 Mile Post 1.04
Intersecting DUWAMISH RIVER		Route Under Mile Post

BMS Elements (Continued)

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
330	Metal Bridge Railing	570	LF	458	100	12	0
340	Metal Pedestrian Railing	285	LF	285	0	0	0
357	Pack Rust	50	EA	46	4	0	0
361	Scour	4	EA	2	2	0	0
402	Open Concrete Joint	216	LF	0	0	216	0
408	Steel Sliding Plate	72	LF	24	48	0	0
901	Red Lead Alkyd Paint System	17,000	SF	13,200	0	3,300	500

Notes

0	<p>ORIENTATION Beginning of bridge at south is abutment 1 (nearest traffic signal at Interurban Ave). Green River Pedestrian Trail located under span 1. Duwamish River flows east to west - note river tidal influence. Old King County Bridge ID No. 3175</p>
1	<p>FRACTURE CRITICAL INSPECTION Includes visual inspection of truss tension members: bottom chords, floor beams, diagonal and vertical members. See Fracture Critical Report in Files Tab. See bridge nomenclature for feature ID on skewed truss.</p>
3	<p>UBIT 62 INSPECTION UBIT can deploy through both sides of truss. Truss openings are narrow, bridge deck is narrow with low portals and sways. Suggest closing the bridge for UBIT inspections due to the bouncing motion of the UBIT boom caused by the high volume of truck traffic on the bridge during the inspection. Police presence is required during inspection at the intersection of Interurban Ave S and 42nd Ave S 100' south of the bridge.</p>
11	<p>LOAD RATING Gusset Plate at L2U1-East controls. Load rating performed (August 2017) and the bridge requires load posting for AASHTO 2 and 3, SHV 5,6,&7, and EV 2 and 3. An additional analysis was performed for a low speed posting option, see the Low Speed Posting Memo under the Records/Load Rating tab and posting sign photos under the Photos tab.</p>
12	<p>CONCRETE DECK (SURFACE) Open joints at floorbeam. Exposed aggregate in wheel lines and slight rutting. Moderate scaling, pop-outs and mudball voids scattered throughout surface. Longitudinal cracks concentrated near ends of bridge, some porosity. North bound lane: 4"-6" pavement spall. South bound lane: 6" loose pavement near double yellow line.</p>
35	<p>CONCRETE DECK SOFFIT All spans - Many short exposed rebar in edge overhangs due to lack of cover and poor consolidation of concrete. Span 2 - Diagonal hairline leaching cracks near steel stringers. Deck fillets are spalled in several locations along top flanges of floorbeams. Scattered hairline transverse rusty leaching cracks in soffit. Moderate sized pockets of poor consolidation - truss spans 2-4 thru 2-7. Span 3 - Diagonal leaching cracks between girders 3A/B near Pier 3.</p>
110	<p>CONCRETE GIRDER Four lines of CIP concrete T-beams in Spans 1 and 3. Webs have hairline vertical and diagonal cracks. Span 1 1A - Vertical crack near Pier 2 Span 3 End diaphragm @ Pier 3 - hairline vertical leaching cracks. All girders are covered with soot.</p>
113	<p>STEEL STRINGER Five lines of stringers. Square cope at connection to floorbeams, rust blisters on some copes - no cracks observed. Areas of corrosion top flanges. Mud staining on outside stringers.</p>

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Carrying 42ND AVE SO			Route On 01037	Mile Post 1.04
Intersecting DUWAMISH RIVER			Route Under	Mile Post

Notes (Continued)

126 STEEL THRU TRUSS GENERAL:
 See attached Fracture Critical Report for detail on fracture critical members.
 Lower and upper panel points and those connecting members are covered in bird guano, active nests in upper chords and in lower panel points on gusset plates. Also see note 133 Gusset Plates for details.

PACK RUST:
 Diagonals (compression): pack rust in seams, warping between rivet heads up to 1/8".
 Verticals (tension): visible seam rust - no deformation at rivets.
 Lower Chords: both consist of two channel beams from L2 to L8; addition plates riveted to interior webs, pack rust forming between channel webs and plates, plates are distorting up to 1/8" between rivets.
 Gusset Plates: Pack rust between bottom lateral gusset plates and bottom chord, plates are bulging up to 3/8" at all chord joints. Pack rust between interior cover plates and bottom chord channel has caused warping of cover plate up to 1/4". Bottom laterals have seam rust and pack rust up to 3/8" along tops of members.
 Upper Chords: minor seam rust along channel/plate seams throughout.

IMPACT DAMAGE:
 Traffic impact damage to truss south portal and sway members.

PORTALS:
 South Portal:
 U1W-U1E: High load traffic damage to south portal and sway frame. North flange of south portal is bent north 3" over length of 2 ft. Bottom flange of sway is bent upward 2" over 8" in length. Top flange of sway has a sine-wave shaped crimp, 1" over 7" in length. Center of sway is bent 1'-0" to north.

SWAYS:
 Seam rust between angle plates and webs.
 M1W-M2E: Impact damage to sway, bent 5" to north; bottom flanges buckled center.
 M2W-M3E: Minor impact damage bottom flange. Slightly out of plane.
 Most sways have scrape marks across bottom flanges - typically northbound lane.

LOWER CHORD:
 L7W: 2 rusty rivet heads on bottom plate.
 L7-L8W: Pack rust on lower chord.
 L8W: Pack rust 1/8" on bottom plate.
 L9W-U9W: Pitting up to 1/8" near top of bottom gusset plate.
 L9W: Gusset plate 7/16" thick. Pack rust 1/8" on bottom plate and 1/4" vertical plate.

UPPER CHORD:
 Rust along riveted seams most sections.
 Interior upper flange has widespread peeling paint.
 Interior lower flange has excessive amounts of bird guano.

133 STEEL GUSSET PLATES
 20 gusset node points per truss line.
 Low Chord Plates:
 Lateral gusset plates have pack rust, plates bulging up to 3/8" at most chord joints.
 Interior cover plates at chord channel have pack rust; warping of cover plate up to 1/4".
 Interior rivet heads have blistered or failed paint, many are heavily rusted.
 All bottom Low chord plates have excessive guano and active pigeon nests.
 5LE bottom plate has two deformed rivet heads.
 Upper Chord Plates:
 Lateral interior cover plates have pack rust at connections, no warping noted.
 Exterior upper plates have peeling paint; pack rust at connections.
 Upper interior plates have excessive bird guano.

152 STEEL FLOOR BEAM
 Two skewed end floor beams and ten transverse floor beams. Diagonal beams are EL0-WL0 and EL10-WL10.
 Dirt and mud at connections to truss. Laminar rust along top flange with minor section loss (<2%).

BRIDGE INSPECTION REPORT

Status: Released
 CD Guid: 2cd4f851-bd4d-4895-8829-00f308c515a9

Printed On: 4/22/2019
 Release Date: 4/22/2019

Agency: TUKWILA
 Program Mgr: Roman G. Peralta

Br. No. TUKxNx14	SID 08109700	Br. Name 42ND AVENUE SOUTH BR	
Carrying 42ND AVE SO		Route On 01037	Mile Post 1.04
Intersecting DUWAMISH RIVER		Route Under	Mile Post

Notes (Continued)

205 CONCRETE PILE
 Ten octagonal concrete piles, five at each abutment.
 All columns have rough finish concrete and a few hairline cracks at cap interface.
 1C: 10" spall with exposed rebar.
 4A, 4B, 4C: Hairline horizontal cracks at about 1 ft. spacing.

CONCRETE BEARING PEDESTALS
 Eight 28" tall concrete columns support sliding plate bearing, four each at Piers 2 & 3.
 2A: Horizontal crack at cap interface, south face, exposed rusty rebar, corners are spalled off, NW corner spall is 2"+ deep . NW corner of bearing is unsupported.
 2B: Horizontal crack at cap interface, south face, exposed rusty rebar, large spalls in NW corner of column. NW corner of bearing is unsupported.
 2C: Horizontal crack at cap interface, south face, exposed 4" section of rusty rebar
 2D: Hairline crack at cap interface south face, with D-spalls and delaminated areas. SE corner is spalled off (18" high by 4" deep) at the base. South face has two spalls, easterly spall has 10' of exposed rusted rebar.
 3A: Horizontal cracks with delaminated D-spalls and open spalls at cap interface, full length of north face. Column is tilted south at 2.2°
 3B: Horizontal cracks at cap interface, north face. Column is tilted to the south at 0.5°. NW corner of bearing grout pad is spalled.
 3C: D-spall crack below cap interface north face. Spall with 12" of horizontal rebar exposed on south face. NW corner of bearing grout pad is spalled.
 3D: No defects

MONITOR NOTES 4/1/2019:
 Pier 2 concrete bearing pedestals - no change noted from previous inspection.
 Pier 3 concrete bearing pedestals - column 3A; north face - open cracks at base along interface with pier cap, full width, many small spalls and delaminated areas along the crack line. Column is tilted to the south 2.2 degrees.

212 CONCRETE SUBMERGED PIER WALL
 Hairline vertical cracks in pier walls. Many 1-1/2" shallow form tie holes in both walls.
 Pier 2: water abrasion along north face. Several spalls with exposed rebar north face.
 Pier 3: Three 12" x 12" x 1" deep areas of abrasion in south face.

215 CONCRETE ABUTMENT
 Both abutments have a few hairline vertical cracks in concrete backwalls.
 Abutment 1 - Void at backwall between column 1C and 1D measures 2" vert x 13" horiz x 6' long. Pedestrian trail under span 1 near abutment. Metal pedestrian rail between trail and abutment.
 Abutment 4 - gap under backwall from pile 4A through 4D, minor erosion/sloughing. Heavy blackberry growth between 4A - 4C.
 Wingwalls at Abutment 4
 NW - abut/wingwall interface; open diagonal crack above top of cap to ground line (2.0" gap at top) with 2 ft x 8" x 6" deep spall with 5" of exposed rebar.
 NE - wingwall: 8" x 6" x 3" deep spall. Two steel plates attached on the east side of north abutment wall at the NE corner bridge rail.

234 CONCRETE PIER CAP
 Piers 2 and 3 only.
 Both have hairline vertical cracks in perimeter, tops are covered with mud, moss and transient debris. Caps have open form tie holes.
 Pier 2 - Several small spalls north and south face.

266 CONCRETE SIDEWALK & SUPPORTS
 Surface: Transverse cracks at panel points, cracks are open up to 1/8", some small spalls starting to form.
 Soffit: Many hairline transverse cracks leaching on underside. Form anchors still in place on soffit along channel web.
 Supports: Steel knee braces support sidewalk in Span 2, top clips at truss are separating due to pack rust.

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Carrying 42ND AVE SO **Route On** 01037 **Mile Post** 1.04
Intersecting DUWAMISH RIVER **Route Under** **Mile Post**

Notes (Continued)

311 MOVEABLE BEARING

Rocker Bearings: Pier 2 -Truss bearings 2-1A & 2-1B are tipped 5.6° expanded, temperature 43° F. Bearing display signs of recent movement and are not considered frozen.

Rocker Bearings - support approach spans: Eight skewed steel bearings, each bearing has two hinge bars. Bearings are mounted on concrete bearing pedestals at Piers 2 and 3. Pack rust between sole plates and hinge bars on all bearings.
 Hinge bars at bearings 2A, 2D, 3-1A and 3-1D, are bulging up to 1/8" from pack rust, all eight bearings are frozen. See Note 205 CONCRETE COLUMNS - for details on the concrete bearing pedestals.

313 FIXED BEARING

Pier 3 - Two pinned shoe bearings 3A and 3B support truss - minor rust on edges.

330 METAL BRIDGE RAILING

Retrofit thrie beam rail has minor traffic scrapes throughout. Loose rail connection at U5L5 east truss, rattles under traffic loads. Tack welds broken on west rail, widespread.

340 METAL PEDESTRIAN RAILING

Rail panel section loose at bottom tube connection to post, east sidewalk north of center line of the river, between EL4 and EL5.

357 PACK RUST

Seam rust and pack rust - most 1/4" or less on built-up members throughout truss.

361 SCOUR, FIELD

Pier 2 is located on the outside of a sharp meander bend in the Duwamish River.
 Pier 2: Riprap along left bank has a scour scallop, approximately 8 to 10 feet in diameter at the center of pier, two relic piles are exposed in the scalloped area. During inspection flow increased velocity with the changing tide; back eddies were noted along the center and downstream face of pier, the thalweg flow is near the left bank at Pier.
 Pier 3: Riprap is scattered and missing along the downstream half of pier. Aggradation is visible upstream right bank to mid channel.

SOUNDINGS: are taken from upstream rail at truss panel points:

YEAR	L0	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
2019	17.5	29.5	40.0	42.0	42.8	31.5	28.0	27.5	25.9	23.5	15.3
2015	18.5	30.5	36	23.5	42	28	30.2	35	23.8	43.5	28.5
2014	19	41.5	29.7	16	39.5	26.5	41	30	16	43	27
2013	18.8	44.5	28.5	34	34	23.5	42	27.5	30.5	37.5	25.5
2007	18.5	40.5	26.5	39	28.5	15	42	26	40	31	15

Update soundings every two years or more often if lateral migration is suspected. Monitor riprap at low tide and low flow periods.

402 OPEN CONCRETE JOINT

Open joints over 8 floorbeams of main span have felt seals, most of the seal is worn away. Visible water and mud intrusion onto floorbeam top flanges noted many locations. See Repair No. 12306.

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Carrying 42ND AVE SO **Route On** 01037 **Mile Post** 1.04
Intersecting DUWAMISH RIVER **Route Under** **Mile Post**

Notes (Continued)

408 STEEL SLIDING PLATE
 Located at Piers 2 and 3.
 Both joints are full of sandy debris. Chips and D-spalls along edges of both joints. Water leaks through the joint onto truss main piers.
 MEASUREMENTS: taken at center-line perpendicular to each joint.

YEAR	TEMP	PIER 2 (WEST)	PIER 3 (EAST)
2019	55°	1-0"	1-1/2"
2018	60°	1-0"	1-1/2"
2016	62°	1-0"	1-1/2"
2015	48°	7/8"	1-1/2"
2013	48°	15/16"	1-3/8"
2011	50°	15/16"	1-3/8"
2009	65°	1-0"	1-5/8"
2007	50°	1-1/2"	1-5/8"
2005	65°	1-0"	1-3/8"

901 RED LEAD ALKYD PAINT SYSTEM
 Top coat of paint on upper chord is chalky and has pealed on the upper chord top flange, top sways, upper gusset plates and around gusset connections. Widespread peeling paint inside upper chord top flange.
 Rust bloom common at many floorbeams/stringer/gusset/sway connections. Seam rust between riveted flanges of upper chord and compression diagonal members.
 Moss and algae on lateral low chord members and floor system.

1660 OPERATING LEVEL NOTE:
 Bridge is posted.
 Truck speed is limited to 15 MPH.

1663 DECK OVERALL
 The code was downgraded based on deck and floor system deterioration. The deck panels are non-composite and are loose and banging on the floor system under traffic. In addition, the floor system is creaking and groaning under load. These problems are not revealing themselves in recordable damage but the loose deck panels and lack of continuity was taken into account in a new load rating update.

1671 SUPERSTRUCTURE CONDITION
 Coded 5 due to impact damage at south portal and pack rust throughout steel truss members.

1676 SUBSTRUCTURE CONDITION
 Code reduced to 4 due to condition of concrete bearing pedestals under rocker bearings at piers 2 and 3.

1680 SCOUR , OFFICE
 Scour analysis completed in 2014.
 Intermediate piers are founded on timber piles, tip elevations are not available, the scour code = "U".
 The channel is centered under L3-East,
 Calculated contraction scour is 0.6 feet, local pier scour ranges between 6 feet and 13 feet depending on angle of attack.
 Plans indicate bottom of footing at -7.0, top of rail is estimated per plans at 28.0.
 Channel aggradation upstream of bridge from right bank to center of channel.

1685 TRANSITION
 Bridge rail transition at Abutment 1, west side, is missing approach guard rail.

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Notes (Continued)

- 1686 GUARDRAILS
SE Traffic impact damage to approach rail flex beam. NW Approach rail is below standard height at settlement area, 18in to top of rail.
- 1687 TERMINAL
Terminals not slotted. Attenuator located at NE corner.
- 2675 NO. OF UTILITIES
Two utilities are suspended from east edge under sidewalk:
One 12" diameter steel waterline with mechanically restrained joints. One 6" diameter gas pipe.
- 2694 CLEARANCES
Vertical clearance at portals and Mid level sway braces, measured 3" from curb:
East truss: E-M1 - W-M2 = 15'-3 1/8" E-M2 - W-M2 = 15'-0 1/4" E-M3 - W-M3 = 15'-0" E-M4 - W-M4 = 15'-0" E-M5 - W-M5 = 15'-0 7/16" E-M6 - W-M6 = 15'-0 3/8" E-M7 - W-M7 = 15'-1 3/8" E-M8 - W-M8 = 15'-0 1/8" E-M9 - W-M9 = 15'-0 1/8" E-M9 - W-M10 = 15'-0 1/4"
- 7664 DRAIN CONDITION
Deck drains are plugged throughout.
- 7672 CURB CONDITION
Cracks open 1/8" over truss floorbeams.
- 7681 APPROACH ROADWAY
South approach - Cracking along center line ACP seam. No settlement.
North approach - Smooth approach not settlement.
- 7682 RETAINING WALL
Sheet pile wall to retain NW approach fill, no defects noted.

Repairs

Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified
12306	1	B	JOINTS SPAN 2: (MAH Revised 4/10/2015) Open Joints: Clean out open joints over floor beams thoroughly and fill with a flexible sealant, priority 1 due to corrosion at top flanges of floorbeams from leaking joints.	3/25/1998		
12316	1	B	SIDEWALK: North approach - rework the sliding plate expansion joint so it is smooth with sidewalk. SURFACE - patch spalls near panel points, seal open cracks.	4/12/2007		4/1/2019
13469	1	B	RAIL: SW transition is missing approach guard rail and terminal. SE guardrail is bent and deformed. NW guardrail has settled below acceptable standards. REPAIR - replace missing guard rail and terminal at SW corner, replace damaged rail at SE corner, reset NW rail and posts to bring rail up to standard height.	4/8/2013		
13471	1	B	PAINT: Paint has failed in many locations on top of top chords of truss. Pack rust is forming in seams of all built-up members. Moist soil and pigeon guano are trapped in truss panel points excellerating paint failure. Algae and moss growing on many members. REPAIR - Thoroughly pressure wash clean truss of all dirt/algae/guano, prepare surface, paint bridge to encapsulate pack rust and protect truss members. Add bird deterrent at all panel points, upper and lower chords.	4/8/2013		

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Repairs (Continued)						
Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified
13473	1	B	EXPANSION JOINT: Steel sliding plate expansion joints allows water and debris onto top of caps and bearings at Piers 2 and 3. The concrete edges at joints are chipped and spalled. REPAIR - Replace steel sliding plate expansion joints with either a strip seal with steel header or modular joint to eliminate water intrusion onto steel bearings.	4/8/2013		
13474	S	S	SCOUR: (Updated in 2019) Current scour code is coded "U" unknown due to the lack of pile tip elevation records. Check City bridge files for pile tip elevations at intermediate piers.	4/16/2013		
13475	2	B	STRUCTURAL SUBSTRUCTURE: (RPH Revised 4/8/13): Concrete columns supporting sliding bearings at Piers 2 and 3 have horizontal cracks at cap interface, exposed rusty rebar, spalls and delaminations. Pier 2 - Cap has spall, with rusted rebar and open cracks up to .05mm. Pier 3 - heavily abraded at waterline. Pier 4 - columns 4A-C have horizontal cracks. Abutment backwall is undermining along west half. West wing wall has large open crack and spalls. REPAIRS: P2 and P3 bearing columns - recommend design seismic retrofit steel collar and construct around bearing columns, anchored to cap, then fill tight with epoxy. Pier 2 - cap clean exposed rebar and patch spalls, epoxy inject cracks. Pier 3 - clean and patch abraded areas of pier wall Pier 4 - FRP wrap columns 4 A-C. Reinforce west wingwall. Add quarryspall along abutment 4 and under span 3 to retain fill and discourage transient activity.	4/16/2013		
13476	2	B	SCOUR: (RPH Revised 7/22/2014): Small scour scallops in left bank armor in front of Pier 2. Riprap is sparse and scattered through mudbar in front of Pier 3. Monitor the downstream inside face of Pier 3 at low water. REPAIR - Replace missing riprap along banks and in front of piers.	4/17/2013		
13478	1	B	SWAY BRACES: Heat straighten south portal and sway E-M2/W-M2. Sway bracing measures 15'-0" clearance at three inches from curb. Vertical clearance signs are required for measured clearances less than or equal to 15'-3" Install warning signs at both portals with posted height 3" less than lowest measured clearance. Recommend raising portals and sways due to the high volume of truck traffic and existing damage to sway members.	4/10/2015		
13479	2	B	BEARINGS: Approach span bearings - slide movable bearing at pier 2 and 3 are corroded - and appear frozen. Replace sliding plates with elastomeric dynamic isolation bearings.	4/10/2015		
13480	2	B	DECK: SOFFIT - widespread consolidation pockets, spalls with exposed rebar east side of soffit. SURFACE - worn to aggregate, spalling along joints. Patches of light scaling. REPAIR: Chip any delaminated concrete from exposed rebar, clean and seal exposed bar and patch spalls. Sack honeycombed areas throughout soffit. Shotblast deck surface, patch spalled areas and apply epoxy overlay.	4/10/2015		

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Intersecting DUWAMISH RIVER		Route Under Mile Post

Inspections Performed and Resources Required

<u>Report Type</u>	<u>Date</u>	<u>Freq</u>	<u>Hrs</u>	<u>Insp</u>	<u>CertNo</u>	<u>Coinsp</u>	<u>Note</u>		
Routine	4/1/2019	24	7.0	MAG	G1103	HP			
Fracture Critical	4/1/2019	24	7.0	MAG	G1103	HP			
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date	Override	Notes
UBIT	6.00								WSDOT UBIT 62 USED
Flagging	6.00								LOCAL AGENCY Flagging provided by City of Tukwila - contact Steve Carstens at 206-431-2446
Interim	4/6/2018	24	2.5	MAG	G1103	BSM	Inspect concrete bearing pedestals supporting approach span bearings at piers 2 and 3. See Note 205 for pedestal details.		
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date	Override	Notes
Special Equipment									Ladder required to reach columns and bearings.
Equipment	4/1/2019	24	7.0	MAG	G1103	HP			
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date	Override	Notes
UBIT	4.00								WSDOT UBIT-60 USED
Flagging	4.00								Flagging provided by City of Tukwila - contact Steve Carstens 206-431-2446.
2 Man UBIT	4/1/2019	24	7.0	MAG	G1103	HP			
Resources	Hours	Min	Pref	Max	Freq	Date	Need Date	Override	Notes
UBIT									WSDOT UB-62 used for 2019 inspection
Informational	1/25/2018			MAG	G1103		Added Load Posting Sign Photos.		

1001	2009	2132	1019	1286	1021	2023	1156	2181	2183	2185	1188	1196	
Bridge ID	Structure ID	Bridge Number	Bridge Name	Owner	Cust	County	City	Location	Section	Township	Range	Latitude	Longitude
	08109700	TUKxNx14	42ND AVENUE SOUTH BR	04	04	17	1320	.03 MI N OF INTERURBAN AV	10	23	04E	47° 29' 23.10"	122° 16' 49.00"
								0.04 MI E OF SR-599					

1232	1256	1274	7281	7283	1276	1285	1288	1289	1293	1292	2295	7296	Printed Date	Sufficiency Rating:
Feature Intersected	Facilities Carried	Region	Leg1	Leg2	FIPS	Toll	Para	Temp	OPC	NRHP	HAER	LRHP	4/22/2019	7.56 SD High Risk
DUWAMISH RIVER	42ND AVE SO	NW	11	0	72625	3	N		P	4				Item 2710 SR Item 2711 SD/FO

1332	1336	1340	2346	1348	1352	1356	1360	1364	1367	1310	1312	1370	1374	1378	1379	1382	1383	1386	1387	1390	1394	1291	1397
Year Built	Year Rebuilt	Bridge Length	NBIS Length	Maximum Span Length	Lanes On	Curb to Curb Deck Width	Out to Out Deck Width	Sidewalk Left	Sidewalk Right	Skew	Flared	Min Vert Over Deck	Min Vert Under	Vert Code	Min Lat Under Right	Lat Code	Min Lat Under Left	Nav Ctl Code	Nav Vert Clear	Nav Horiz Clear	Nav Vert Lift Clear	Median	Appr Rdwy
1949	0	284		220	2	24.0	30.0	0.0	3.5	38	N	15' 00"	00' 00"	N	0.0	N	0.0	0	0	0		0	36

1432	1433	1434	1435	2440	1445	1451	1453	1457	1463	1467	1477	1469	2410	7479	1483	1484	1485	1486	1487	1489	1490	1354	1491	1495	1499	1413	2441
On Under	Hwy Class	Service Level	Route Number	Milepost	ADT	Truck %	Year of ADT	Future ADT	Future ADT Year	Linear Referencing System	LRS Sub	LRS Milepost	NBI Bridge	Fed Aid Route #	NHS	BHS	STRAH	FLH	Funct. Class	NTN	Lane Use Direction	Lanes Under	Horizontal Clearance Route Dir	Horizontal Clearance Reverse Dir	Max Vert Clearance Route	Detour	Speed Limit
1	5	1	01037	1.04	10000	20	2014	11000	2034				Y	1037	0	0	0	0	17	N	2	0	24' 00"		15' 00"	2	25
					10300	30	2018	12000	2038																		15

1532	1533	1535	1536	1538	1541	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1585	1588	1590	7565	7557	
Main Span Material	Main Span Design	Appr Span Material	Appr Span Design	Number Main Spans	Number Appr Spans	Service On	Service Under	Deck Type	Wearing Surface	Membrane	Deck Protect	Design Load Code	Oper Rating Method	Oper Rating Tons	Oper Rating Factor	Inv Rating Method	Inv Rating Tons	Inv Rating Factor	Border State Cd	Border Pct	Border	Border Structure ID	Fed Aid Project No	Design Exemption
3	10	1	04	1	2	5	5	1	1	0	0	4	6	23	0.65	6	14	0.39						

2587	2588	2589	2590	2591	2592	2593	2594	2597	2598	2595	2596
Type 3	Type 3S2	Type 3-3	NRL	SHV 4	SHV 5	SHV 6	SHV 7	EV 2	EV 3	OL 1	OL 2
1.21	0.90	0.84	0.73	1.11	0.98	0.88	0.81	0.62	0.42	0.65	0.34

7832	7833	7834	7835	7836	7837	7838	7839	7840	7841	1844	1846	1847	2853	2860	1867	1873	2870	1861	1879	2883
Water Type	Flood Pin Infr	Flood Control	Flood Hist	Scour Matrl	Strmbd Stablr	Substr Stablr	Wtrwy Obstr	Strmbd Stablr	Strmbd Anabrn	Piers In Watr	Work Meth	Stru Imp Length	Roadway Width	Cost Per SF	Struct Cost	Rdwy Cost	Engr Cost	Total Cost	Estmt Year	Prop Imp Cost Calc
B	A	N	H	2	3	N	A	N	2	31	1	294	38	800	4469	894	3575	8938	2014	Y

2920	1990	2646	2649	2654
Inspection	Date	Inspector	Cert No	Co-Inspector
Routine	4/1/2019	MAG	G1103	HP
Fracture Critical	4/1/2019	MAG	G1103	HP
Special Feature				
Underwater				
UW Interim				

Inspection	Date	Inspector	Cert No	Co-Inspector
Interim				
In Depth				
Damage				
PRM Safety				
SEC Safety				

Inspection	Date	Inspector	Cert No	Co-Inspector
Condition				
Short Span				
Geometric				
Info				
Inventory				

Unrestricted Load Rating

BRIDGE RATING SUMMARY

Bridge Name: 42ND AVENUE SOUTH BR
 Bridge Number: TUKWILA-14
 Span Types: Steel Through Truss Bridge & Approach Slabs
 Bridge Length: 280' (220' Truss + 2x30' Approach Slab)
 Design Load: HS20-44
 Rated By: VP
 Checked By: KN
 Date: 8/1/2017



EXPIRES 5/18/19

Inspection Report Date	4/26/2017	Substructure Condition	4
Rating Method	LFR	Deck Condition	6
Overlay Thickness	0"/Truss & 2"/Approach	Superstructure Condition	5

Truck	RF (INV)	RF (OPR)	Controlling Point
AASHTO-1	0.72	1.21	Yielding in member L2U1
AASHTO-2	0.54	0.90	Yielding in member L2U1
AASHTO-3	0.50	0.84	Yielding in member L2U1
NRL	0.44	0.73	Yielding in member L2U1
OL-1	0.39	0.65	Yielding in member L2U1
OL-2	0.20	0.34	Yielding in member L2U1

NBI Rating	RF	Controlling Point
Inventory (HS-20)	0.39	Yielding in member L2U1
Operating (HS-20)	0.65	Yielding in member L2U1

Remarks: Bridge requires posting. The single unit and FAST Act vehicles rating factors are:

Operating Rating	RF	Ton	Controlling Point
SU4 (GVW = 54 K)	1.11	29.97	Yielding in member L2U1
SU5 (GVW = 62 K)	0.98	30.38	Yielding in member L2U1
SU6 (GVW = 69.5 K)	0.88	30.58	Yielding in member L2U1
SU7 (GVW = 77.5 K)	0.81	31.39	Yielding in member L2U1
EV2 (GVW = 57.5 K)	0.62	17.83	Yielding in member L2U1
EV3 (GVW = 86.0 K)	0.42	18.06	Yielding in member L2U1

INFORMATIONAL MEMORANDUM

TO: Bridge File, 42nd Ave S Bridge (SID 08109700, TUKWILA – 03)
FROM: Grant D Griffin, Inspector Cert. No. G0014
DATE: March 20, 2018
SUBJECT: Temporary Load Rating for Load Posting Restrictions

ISSUE

Tukwila contracted a new load rating on the 42nd Avenue South Bridge in 2017 that included gusset plate, single unit vehicle, and Emergency Vehicle analysis. The load rating was also based on updated condition information from field inspections and structural analysis of field findings. This rating indicates that the bridges capacity was below legal for the AASHTO 2 and 3 and for the Single-Unit 5, 6, and 7 Trucks requiring load posting.

BACKGROUND

The 42nd Avenue South Bridge is a 284-foot-long Steel Through-Truss built in 1949. The bridge serves Tukwila's Allentown neighborhood, the BNSF Intermodal Facility, and Baker Commodities, an animal by-products recycler. The two industries contribute to a high percentage of trucks crossing the bridge daily with the majority of the trucks of the AASHTO-2 configuration. The Bridge was cleaned in 2013 and again in 2014 to ensure a thorough inspection for an accurate load rating. The bridge has been well maintained by Tukwila and was repainted in the mid 1990's. The bridge is the only feasible truck access to a major regional freight hub making restricting the bridge an issue requiring careful consideration. Tukwila has been working toward a new route into the BNSF Intermodal Facility for nearly twenty years and is working proactively to repair or replace the bridge.

DISCUSSION

The load rating indicates that the bridge's capacity is deficient for the AASHTO 2 and 3 trucks with a rating factor (multiplier) of 0.90 and 0.84 respectively. In addition, the bridge has insufficient capacity for the Single-Unit 5, 6, and 7 trucks with rating factors of 0.98, 0.88, and 0.81 respectively. The bridge must be load posted for the operating level for each of these legal trucks. The City of Tukwila is actively working towards a bridge replacement project and based on existing traffic analysis, the City has determined the clear majority of the trucks crossing the bridge are AASHTO-2 container haulers serving the BNSF Intermodal Yard. In addition, the inspection frequency duration has been reduced to 12 months with interim inspections of specific deficiencies at 6 months.

RECOMMENDATION

Tukwila has asked TranTech to provide structural analysis of additional posting options to determine a restriction plan that will cause the smallest negative impact to the BNSF Intermodal yard operations as possible. Analysis has determined that a reduced speed limit posted for trucks on the bridge will allow the AASHTO-2, SU4, and SU5 legal loads to cross the bridge. The bridge will be load posted for the AASHTO-3 as well as SU7 and SU7 trucks. This posting is based on a load rating requiring a speed restriction that is lower than normal for the corridor and can therefore be considered temporary, the load rating listed in the inventory will reflect the normal unrestricted speed limit for the roadway.

Load Rating for Speed Restriction and Load Posting

BRIDGE RATING SUMMARY

Bridge Name: 42ND AVENUE SOUTH BR
 Bridge Number: TUKWILA-14
 Span Types: Steel Through Truss Bridge & Approach Slabs
 Bridge Length: 280' (220' Truss + 2x30' Approach Slab)
 Design Load: HS20-44
 Rated By: KM
 Checked By: KN
 Date: 11/1/2017



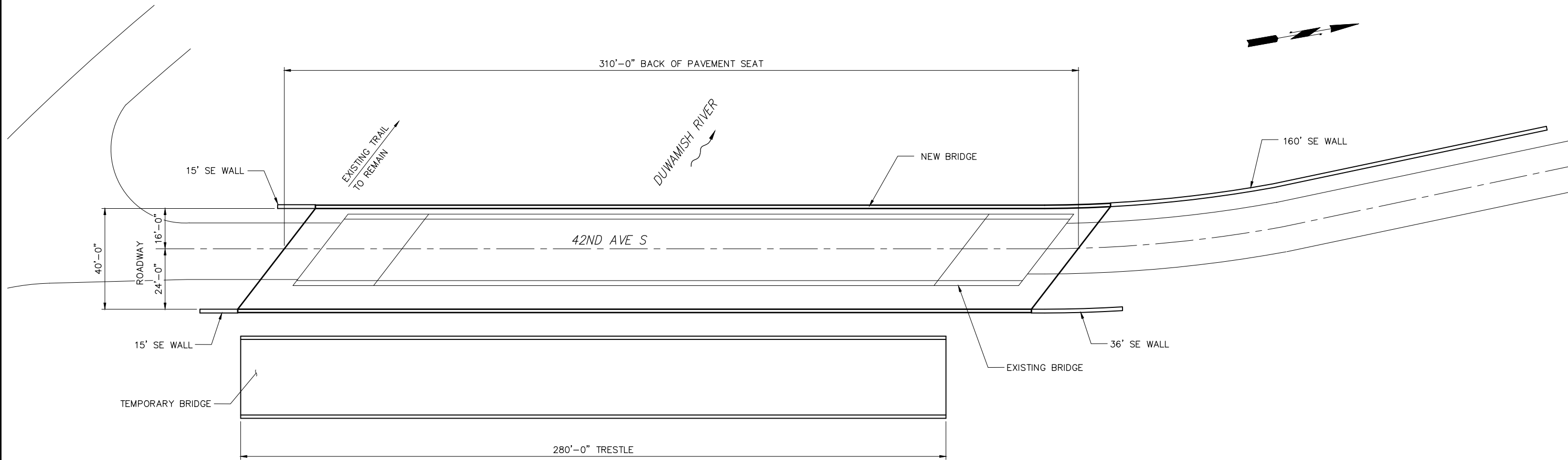
Inspection Report Date	4/26/2017	Substructure Condition	4
Rating Method	LFR	Deck Condition	6
Overlay Thickness	0"/Truss & 2"/Approach	Superstructure Condition	5

Truck	RF (INV)	RF (OPR)	Controlling Point
AASHTO-1	0.80	1.34	Yielding in member L2U1
AASHTO-2	0.60	1.00	Yielding in member L2U1
AASHTO-3	0.56	0.94	Yielding in member L2U1
NRL	0.49	0.82	Yielding in member L2U1
OL-1	0.45	0.75	Yielding in member L2U1
OL-2	0.24	0.40	Yielding in member L2U1

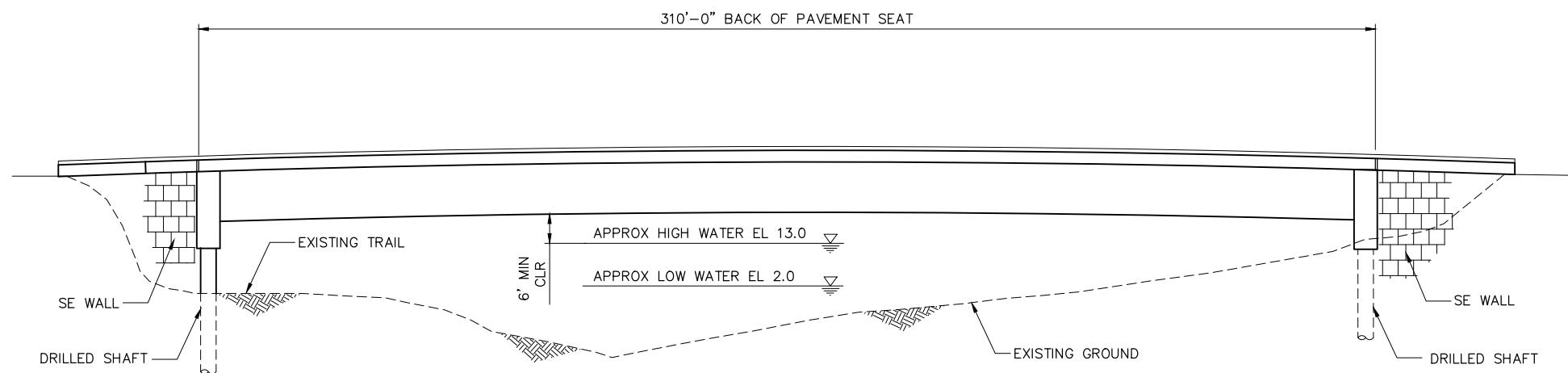
NBI Rating	RF	Controlling Point
Inventory (HS-20)	0.47	Yielding in member L2U1
Operating (HS-20)	0.79	Yielding in member L2U1

Remarks: Bridge requires posting. Truck speed shall be limited to 15 MPH. The single unit and FAST Act vehicles rating factors are:

Operating Rating	RF	Ton	Controlling Point
SU4 (GVW = 54 K)	1.23	33.21	Yielding in member L2U1
SU5 (GVW = 62 K)	1.08	33.48	Yielding in member L2U1
SU6 (GVW = 69.5 K)	0.98	34.06	Yielding in member L2U1
SU7 (GVW = 77.5 K)	0.90	34.88	Yielding in member L2U1
EV2 (GVW = 57.5 K)	1.08	31.05	Yielding in member L2U1
EV3 (GVW = 86.0 K)	0.88	37.84	Yielding in member L2U1



BRIDGE PLAN



BRIDGE ELEVATION

CALL 48 HOURS BEFORE YOU DIG COMMON GROUND ALLIANCE 811

mschafer 04/23/19 3:46pm - P:2019/2019004 - Tukwila 2019 Annual Bridge Inspections - Bridge Engineering Services\000 CAD\010 Drawing\C-Structural Sheet\PLN & EL & SEC.dwg



PUBLIC WORKS DEPT.

ENGINEERING* STREETS* WATER* SEWER* PARKS* BUILDING

	By	Date
Designed	JDK	
Drawn	DJJ	
Checked		
Proj Eng		
Proj Dir		
Field Bk #		

TRANTECH
Engineering LLC
365 118th Ave. SE, Suite 100
Bellevue, Washington 98005
Phone: 425.453.5545

CITY OF TUKWILA
DUWAMISH RIVER - 42ND AVE S
BRIDGE PLAN AND ELEVATION

No.	Date	Revisions

S1

1 of 1

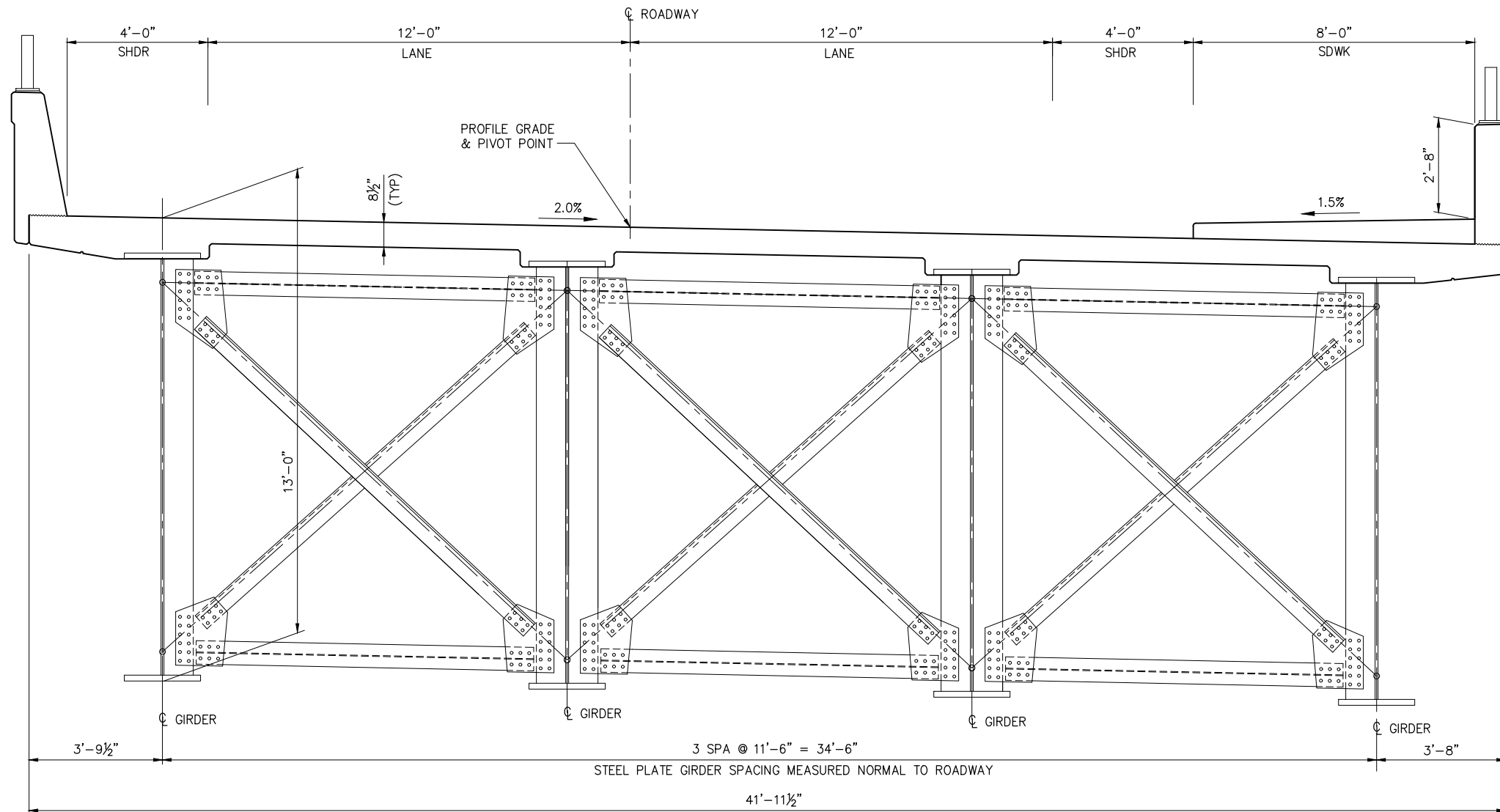
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Scale 1"=40'

Date APRIL 2019

CITY OF TUKWILA

mschafer 04/23/19 3:46pm - P:2019/2019004 - Tukwila 2019 Annual Bridge Inspections - Bridge Engineering Services\00 CAD\010 Drawing\C-Structural Sheet\PLN & EL & SEC.dwg



TYPICAL SECTION
LOOKING NORTH

CALL 48 HOURS
BEFORE YOU DIG
COMMON GROUND
ALLIANCE
811



PUBLIC WORKS DEPT.

ENGINEERING STREETS* WATER* SEWER* PARKS* BUILDING*

	By	Date
Designed	JDK	
Drawn	DJJ	
Checked		
Proj Eng		
Proj Dir		
Field Bk #		



365 118th Ave. SE, Suite 100
Bellevue, Washington 98005
Phone: 425.453.5545

CITY OF TUKWILA
DUWAMISH RIVER - 42ND AVE S
TYPICAL BRIDGE SECTION

No.	Date	Revisions

S2
1 of 1

File No. PLN & EL & SEC.dwg

Scale 1/2"=1'-0"

Date APRIL 2019

CITY OF TUKWILA



42nd Ave Bridge Replacement
New Steel Plate Girder Superstructure on Exist Alignment

ITEM DESCRIPTION	QUANTITY	MEAS. UNIT	UNIT PRICE	COST
MOBILIZATION				\$ 875,967
NEW BRIDGE	12,600	SF	500	\$ 6,300,000
SE WALLS	4,520	SY	100	\$ 452,000
TEMP WALLS	5,000	SF	30	\$ 150,000
TRAFFIC CONTROL	1	LS	250,000	\$ 250,000
APPROACH SLAB	222	SY	300	\$ 66,667
APPROACHS TEMP REALIGNMENT	1	LS	500,000	\$ 500,000
EXIST BRIDGE REMOVAL	8,400	SF	50	\$ 420,000
TEMP BRIDGE	9,800	SF	45	\$ 441,000
SURVEYING	1	LS	80,000	\$ 80,000
MISC.	1	LS	100,000	\$ 100,000
CONSTRUCTION TOTAL				\$ 8,759,667

CITY OF TUKWILA CAPITAL PROJECT SUMMARY

2019 to 2024

PROJECT: 42nd Ave S Bridge Replacement

Project No. 91810404

DESCRIPTION: Design and construct a replacement structure for the existing 42nd Ave S Bridge near the Tukwila Community Center.

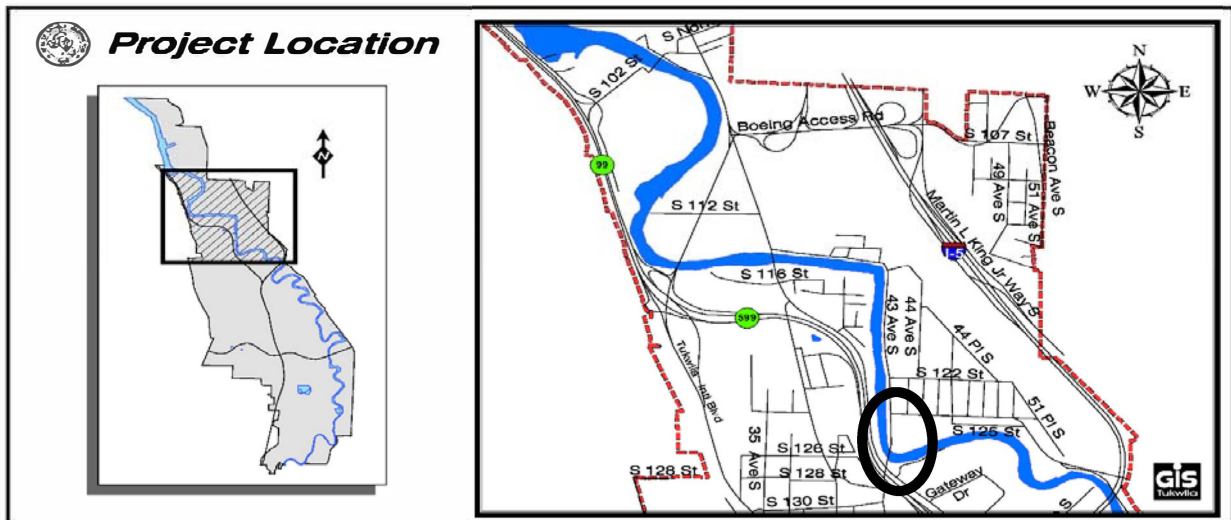
JUSTIFICATION: The current bridge has a sufficiency rating of 7.6 (out of 100), is load restricted for AASHTO Type 3 trucks and is structurally deficient. Truck speed was reduced to 15 mph in 2018.

STATUS: New project for 2019 - 2024 CIP. In 2017, Local Bridge Program funding was requested, but not awarded. If there is a Local Bridge Program Call for Projects in 2019, staff will apply for those grant funds.

MAINT. IMPACT: New bridge.

COMMENT: BRAC funding would be at 80% match for up to \$12.5 million. Project partners may include BNSF Railroad as they have over 1,800 trips a day on the 42nd Ave S Bridge and it is the only ingress/egress available for their intermodal yard.

FINANCIAL (in \$000's)	Through 2017	Estimated 2018	2019	2020	2021	2022	2023	2024	BEYOND	TOTAL
EXPENSES										
Design				1,600						1,600
Land (R/W)					1,000					1,000
Wetland Mitigation/Monitoring					250	250	250			750
Const. Mgmt.						750	750			1,500
Construction						5,500	5,400			10,900
TOTAL EXPENSES	0	0	0	1,600	1,250	6,500	6,400	0	0	15,750
FUND SOURCES										
Awarded Grant										0
Proposed Grant				1,280	800	5,000	4,920			12,000
Fund Balance-Bond					450	1,500	1,480			3,430
Mitigation										0
City Oper. Revenue	0	0	0	320	0	0	0	0	0	320
TOTAL SOURCES	0	0	0	1,600	1,250	6,500	6,400	0	0	15,750



GENERAL INFORMATION

Structure ID	Bridge Number	Bridge Name	Waterway	Owner	
08109700	TUKxNx14	42ND AVENUE BRIDGE	DUWAMISH RIVER	City of Tukwila	
Year Built	Year Rebuilt	Structure Type	Length	Width	Foundation Type
1949	NA	Steel Through Truss	284	30	Pile cap
ADT	ADT Year	Truck%	Does bridge provide access to emergency facilities or an evacuation route?		
10,300	2018	30%	No, residential neighborhood.		

RESPONSIBILITY FOR P.O.A

Author of POA				
Name	Title	Organization	Phone	Email
Hari Ponnekanti	City Engineer	City of Tukwila Public Works	(206) 431-2455	Hari.Ponnekanti@TukwilaWA.gov
Concurrence of POA				
Name	Title	Organization	Phone	Email
Hari Ponnekanti	City Engineer	City of Tukwila Public Works	(206) 431-2455	Hari.Ponnekanti@TukwilaWA.gov

SCOUR VULNERABILITY	SCOUR CODE	U
Scour Evaluation	NAVD88: Thalweg elevation of -13 feet is centered under panel point L3. Bottom of pile caps are -13.4 @ P2 and -8.5 @P3. Scour depths range between 7 and 14 feet. If river migrates into either main piers, the bottom of pile caps could be undermined. The timber piles supporting the pile caps have unknown tip elevations.	
Scour History	History of scallops/pockets forming in riprap revetment along both banks.	

RECOMMENDED ACTIONS

	Recommended	Implemented
Increased Inspection Frequency		
Fixed Monitoring Device		
Flood Monitoring Program	X	X
Hydraulic or Structural Countermeasures	X	

NBI CODING INFORMATION

	Previous	Current
Inspection Date	11/20/2014	2/13/2019
Item 113 Scour Code	U	U
Item 60 Substructure Code	6	4
Item 61 Channel Protection Code	5	5
Item 71 Waterway Adequacy Code	8	8

MONITORING PROGRAM REQUIRED?				YES
Routine Inspection	Items to Watch	Exposure of pile cap		
	Frequency	24 month	Soundings	Yes
Interim Inspection	Items to Watch			
	Frequency	After every flood	Soundings	
Underwater Inspection	Items to Watch			
	Frequency	NA		

FLOOD MONITORING PROGRAM REQUIRED?					YES
Flood Monitoring Event Defined	Discharge	Stage	Rainfall	Forecast	Warning System
	10,000 cfs				
	Frequency of Monitoring		Post Flood Monitoring		
	Every 6 hours		check thoroughly within 1 day of flood recedance		

AGENCY / DEPARTMENT RESPONSIBLE FOR MONITORING				
Name	Title	Organization	Phone	Email
Margaret Holwegner	Bridge Engineer	King County Roads Division Bridge Unit	(206) 477-3539	margaret.holwegner@kingcounty.gov

By Agreement

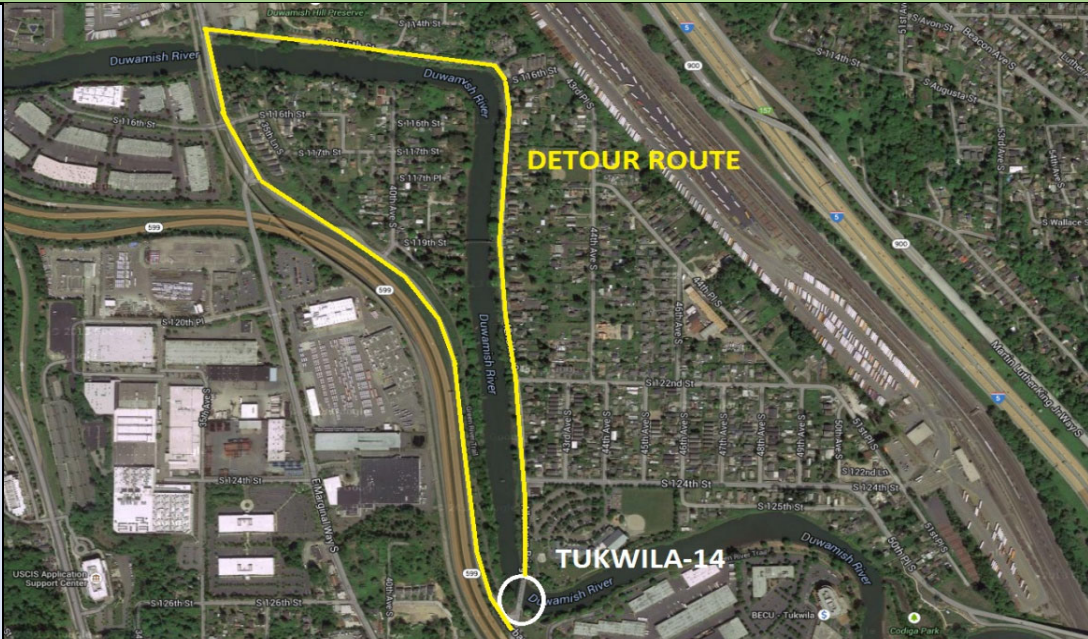
COUNTERMEASURE RECOMMENDATIONS		
Priority	Countermeasure Description	Estimated Cost
1	Maintain solid blanket of riprap along both banks to protect.	\$ 250,000
2		
3		

COUNTERMEASURE FUNDING SOURCES						
Agency	WSDOT	FHWA	FEMA	EMD	Contractor	Other
Design Completion Tagent Date		Construction Completion Target Date			Construction Completed	

BRIDGE CLOSURE PLAN			
Scour monitoring criteria for consideration of bridge closure:			
	Water surface elevation reaches		at
	Overtopping road or structure		
	Scour measurement results		
X	Observed structure movement or settlement		
X	Discharge	20,000	cfs
	Flood forecast		
	Debris Accumulation		
	Movement of riprap		
	Loss of road embankment		

DETOUR ROUTE

Detour route description



Traffic Control Description

News Release, Point of Contact

Bridge Number	Bridge Name	Waterway	Sufficiency Rating	Scour Code
TUKWILA-09	East Marginal Way	Duwamish	90.07	8

ATTACHMENTS

Attachment A:	Boring logs and/or subsurface information
Attachment B:	Channel cross sections
Attachment C:	Bridge elevation showing streambed, foundation depths, and calculated scour depths
Attachment D:	Plan view showing scour holes, cut banks, and debris accumulation
Attachment E:	Map showing detour route
Attachment F:	Scour countermeasures supporting design calcs, estimates, conceptual design drawings
Attachment G:	Photos
Attachment H:	Other information

FFY2019 LOCAL BRIDGE AWARDS

Program	Bridge Name	Owner	Funds Awarded
Replacement	CLALLAM SLOUGH BRIDGE	Clallam County	\$ 4,492,050
Replacement	ALLENDER RD BRIDGE	Cowlitz County	\$ 1,867,000
Replacement	HOLLINGSWORTH ROAD	Franklin County	\$ 739,020
Replacement	IRONWOOD ROAD	Franklin County	\$ 1,714,320
Replacement	MUSE DRIVE	Franklin County	\$ 1,397,622
Replacement	DRAINAGE BRIDGE	Grays Harbor County	\$ 1,456,600
Replacement	BOISE X CONNECTION	King County	\$ 2,286,280
Replacement	FIFTEEN MILE CREEK	King County	\$ 4,057,900
Replacement	NIAWIAKUM BR.	Pacific County	\$ 888,400
Replacement	JORDAN CREEK	Snohomish County	\$ 5,779,358
Replacement	SWAMP CREEK #503	Snohomish County	\$ 4,027,742
Replacement	LITTLE SPOKANE DR OVER LITTLE SPOKANE RIVER	Spokane County	\$ 3,032,447
Replacement	SUNSET HWY OV N FK DP CR	Spokane County	\$ 292,251
Replacement	ARCH	Walla Walla County	\$ 1,361,440
Replacement	DELL SHARPE	Walla Walla County	\$ 6,285,000
Replacement	ANDERSON CR	Whatcom County	\$ 4,019,952
Replacement	LAKE SAMISH	Whatcom County	\$ 8,997,306
Replacement	JAMES ST/WHATCOM CREEK	BELLINGHAM	\$ 3,768,453
Replacement	MEADOR AVE/WHATCOM CREEK	BELLINGHAM	\$ 3,768,453
Replacement	10TH AVENUE SOUTH # 475	UNION GAP	\$ 1,298,926
Rehabilitation	DRUMHELLER	Walla Walla County	\$ 865,000
Rehabilitation	MADDEN	Snohomish County	\$ 915,266
Scour	ROCKCUT	Stevens County	\$ 610,240
Seismic	UPPER FINNEY CREEK BR.	Skagit County	\$ 3,000,000
Paint	TAYLOR ROAD NELSON	Kitsap County	\$ 1,001,433
Paint	ROCK CR., OLD 8	Klickitat County	\$ 370,000
Paint	N THORP HWY-YAKIMA RIVER	Kittitas County	\$ 2,486,250
Paint	ABERNATHY CREEK BRIDGE 2	Cowlitz County	\$ 272,500
Deck Repair	SULLIVAN RD OC UP RR	SPOKANE VALLEY	\$ 337,625
Deck Repair	HARSTINE ISLAND BRIDGE	Mason County	\$ 3,000,000
Deck Repair	LEE HILL BRIDGE	AUBURN	\$ 547,850
Deck Repair	CASCADE ORCHARD	Chelan County	\$ 794,600
Deck Repair	WAIKIKI RD OVER L SPO R	Spokane County	\$ 784,814
Bundle	ADDY-GIFFORD	Stevens County	\$ 519,000
	BLUE CREEK		
Bundle	3RD ST SW	AUBURN	\$ 523,538
	3RD ST SW/BNSF OXING		
	3rd St SW/SB Off Ramp		
Bundle	LACAMAS CREEK	Pierce County	\$ 1,071,880
	S FORK MUCK CRK (304th St)		
	DINGLE BASIN		
Bundle	GIBBONS CREEK	Clark County	\$ 983,400
	MATNEY		
	MORGAN		
Bundle	FLATWOOD	Clark County	\$ 1,505,440
	LANDON		
	LUCIA FALLS		
	ROCK CREEK		
	MORGAN CREEK/NE 167TH		
	VENERSBORG		