



INFORMATIONAL MEMORANDUM

TO: **Transportation and Infrastructure Committee**
FROM: **Robin Tischmak, Acting Public Works Director** RRT
BY: **Steve Carstens, Senior Program Manager**
CC: **Mayor Ekberg**
DATE: **January 19, 2018**
SUBJECT: **Ordinance for Truck Only Speed Reduction 42nd Ave S**
Posting Load Limits on 42nd Ave S in Allentown
Bridge Load Rating Review and Update

ISSUE

Approve an ordinance to reduce the speed limit across the 42nd Avenue South Bridge in Allentown, for trucks only, from 25 mph to 15 mph. The bridge also requires a load restriction posting in accordance with National Bridge Inspection Standards (NBIS), 23 CFR 650c.

BACKGROUND

A load rating for the 42nd Avenue South Bridge has been performed and the resulting report indicates that a load restriction is required for certain truck weights using the bridge. There are multiple options for implementing a suitable load restriction in this case: 1) reduction in the load limits for two truck categories; 2) the limitation to one-truck-at-a time on the bridge; or 3) a reduction in truck speeds while crossing the bridge.

ANALYSIS

TranTech Engineering, LLC performed the necessary load ratings for the 42nd Avenue South Bridge. Based on that information, options to provide the legally required load restrictions were discussed. The option to limit truck loads from the BNSF Intermodal yard would not be feasible from a business perspective as this facility is an important supplier to the entire region. It would also not be feasible to expect compliance with the restriction to allow only one truck on the bridge at a time. The least impactful option is to reduce the speed of the trucks crossing the bridge. The speed reduction would be in place until such time as improvements are made to the bridge structure or until the structure is replaced. Either option to repair or replace the bridge are dependent upon funding by the City and/or other grant sources that may be available in the future.

FINANCIAL IMPACT

The costs related to this change are internal only and are limited to staff time to make and install the new speed signs.

RECOMMENDATION

Council is being asked to approve an Ordinance for a speed reduction of trucks crossing the 42nd Avenue South Bridge in Allentown and consider this item at the February 12, 2018 Committee of the Whole and subsequent February 20, 2018 Regular Meeting.

Attachments: Draft Ordinance
TranTech Engineering, LLC August 2017 42nd Avenue South Bridge Structural Assessment
Bridge Rating Summary - Low Speed Option
Bridge Rating Summary – One Truck at a Time Option

DRAFT

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF TUKWILA, WASHINGTON, ESTABLISHING NEW REGULATIONS TO ACCURATELY DEFINE THE PORTION OF 42ND AVENUE SOUTH BETWEEN 124TH STREET SOUTH AND TUKWILA INTERNATIONAL BOULEVARD WHERE THE SPEED LIMIT IS TO BE REDUCED FROM 25 MPH TO 15 MPH FOR AASHTO TYPE 1, 2, AND 3 TRUCKS ONLY; REPEALING ORDINANCE NO. 1801, AS CODIFIED AT TUKWILA MUNICIPAL CODE SECTION 9.16.060; PROVIDING FOR SEVERABILITY; AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, American Association of State Highway Officials (AASHTO) defines a Type 1 truck as a three-axle truck limited to 25 tons; and

WHEREAS, AASHTO defines a Type 2 truck as a three-axle truck with a two-axle single trailer limited to 36 tons; and

WHEREAS, AASHTO defines a Type 3 truck as a three-axle truck with two, double-axle trailers limited to 40 tons; and

WHEREAS, Title 23 Code of Federal Regulations (CFR) subpart c, *National Bridge Inspection Standards (NBIS) Section 650.313 (c)* states: "Post or restrict the bridge in accordance with the AASHTO Manual or in accordance with State law, when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the operating rating or equivalent rating factor"; and

WHEREAS, *AASHTO Manual for Bridge Evaluation 2nd Edition 2011 – with 2016 Interim Revisions*, Section 6A.8.1 and Section 6B.7.2, states, "When the maximum legal load under state law exceeds the safe load capacity of a bridge, restrictive posting shall be required"; and

WHEREAS, the bridge crossing the Duwamish River on 42nd Avenue South, also known as Tukwila-14, structure ID 08109700, has been determined to require a restriction to the legal truck loads for AASHTO truck Type 3, which includes a reduction to the speed limit from 25 MPH to 15 MPH for all AASHTO truck types; and

WHEREAS, RCW 46.61.415 authorizes the City to alter speed limits on the basis of engineering and traffic investigations; and

WHEREAS, an engineering investigation was conducted in the form of a load rating analysis of 42nd Avenue South between South 124th Street and Tukwila International Boulevard; and

WHEREAS, based upon the load rating analysis, the City has determined that 15 miles per hour is a reasonable and safe maximum limit for AASHTO Type 1, 2, and 3 trucks traveling on 42nd Avenue South between South 124th Street and Tukwila International Boulevard;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF TUKWILA, WASHINGTON, HEREBY ORDAINS AS FOLLOWS:

Section 1. Repealer. Ordinance No. 1801, as codified at TMC Section 9.16.060, “South 124th Street, 42nd Avenue South, and 50th Place South,” is hereby repealed.

Section 2. TMC Section 9.16.060 Reenacted. Tukwila Municipal Code Section 9.16.060 is hereby reenacted to read as follows:

9.16.060 South 124th Street, 42nd Avenue South, and 50th Place South

A 25 MPH speed limit is established on certain collector arterials as follows:

- 1 South 124th Street from 42nd Avenue South to 50th Place South.
2. 42nd Avenue South from Interurban Avenue to South 115th Street; except that Type 1, Type 2, and Type 3 trucks, as defined by the American Association of State Highway Officials (AASHTO), shall be restricted to a maximum speed of 15 MPH.
3. 50th Place South from South 124th Street to the east City limit.

Section 3. Signs to be Posted. The Public Works Department is hereby directed to post appropriate speed limit signs reflecting the speed limits established in Section 2 of this ordinance.

Section 4. Corrections by City Clerk or Code Reviser. Upon approval of the City Attorney, the City Clerk and the code reviser are authorized to make necessary corrections to this ordinance, including the correction of clerical errors; references to other local, state or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering.

Section 5. Severability. If any section, subsection, paragraph, sentence, clause or phrase of this ordinance or its application to any person or situation should be held to be invalid or unconstitutional for any reason by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of the remaining portions of this ordinance or its application to any other person or situation.

Section 6. Effective Date. This ordinance or a summary thereof shall be published in the official newspaper of the City, and shall take effect and be in full force five days after passage and publication as provided by law.

PASSED BY THE CITY COUNCIL OF THE CITY OF TUKWILA, WASHINGTON, at a Regular Meeting thereof this _____ day of _____, 2018.

ATTEST/AUTHENTICATED:

Christy O'Flaherty, MMC, City Clerk

Allan Ekberg, Mayor

APPROVED AS TO FORM BY:

Filed with the City Clerk: _____
Passed by the City Council: _____
Published: _____
Effective Date: _____
Ordinance Number: _____

Rachel B. Turpin, City Attorney



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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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**

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

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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.

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

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		

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**

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	

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**

Inspections Performed and Resources Required (Continued)

<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>	
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 Infr	Flood Control	Scour Hist	Strmbd Matr	Strmbd Stability	Substr Stability	Wtrwy 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				

Inspection Report Types



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>	<u>Yielding in member L2U1</u>
AASHTO-2	<u>0.54</u>	<u>0.90</u>	<u>Yielding in member L2U1</u>
AASHTO-3	<u>0.50</u>	<u>0.84</u>	<u>Yielding in member L2U1</u>
NRL	<u>0.44</u>	<u>0.73</u>	<u>Yielding in member L2U1</u>
OL-1	<u>0.39</u>	<u>0.65</u>	<u>Yielding in member L2U1</u>
OL-2	<u>0.20</u>	<u>0.34</u>	<u>Yielding in member L2U1</u>

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

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

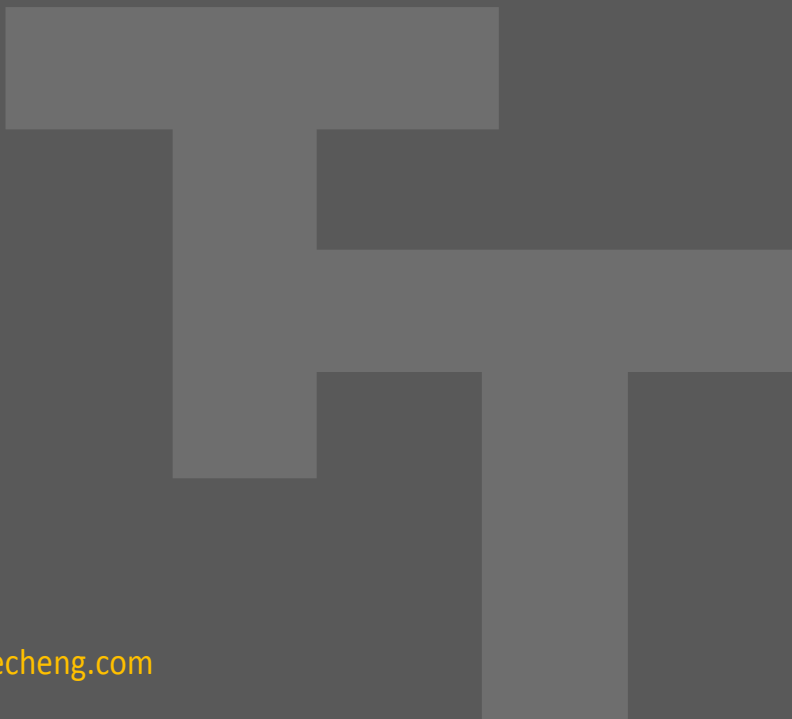


City of Tukwila-Tukwila 14-42nd Avenue Bridge Replacement Cost Estimate August 1, 2017

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, Reolation 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



www.trantecheng.com



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/

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	0.81	1.35	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	0.42	0.70	Yielding in member L2U1
OL-2	0.22	0.37	Yielding in member L2U1

NBI Rating	RF	Controlling Point
Inventory (HS-20)	0.44	Yielding in member L2U1
Operating (HS-20)	0.73	Yielding in member L2U1

Remarks: Bridge requires load posting. This rating scenario requires lowering the speed limit over the bridge to 10 MPH.

Operating Rating	RF	Ton	Controlling Point
SU4 (GVW = 54 K)	1.24	33.48	Yielding in member L2U1
SU5 (GVW = 62 K)	1.09	33.79	Yielding in member L2U1
SU6 (GVW = 69.5 K)	0.99	34.40	Yielding in member L2U1
SU7 (GVW = 77.5 K)	0.90	34.88	Yielding in member L2U1
EV2 (GVW = 57.5 K)	1.14	32.78	Yielding in member L2U1
EV3 (GVW = 86.0 K)	0.78	33.54	Yielding in member L2U1

BRIDGE RATING SUMMARY

Bridge Name: 42ND AVENUE SOUTH BR
 Bridge Number: TUKWILA-14
 Span Types: Steel Through Truss Bridge & Approach Slabs
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EXPIRES 5/18/

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 load posting. This rating scenario requires posting the bridge for one truck at a time.

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