



American Public Works Association Public Works Project of the Year Award

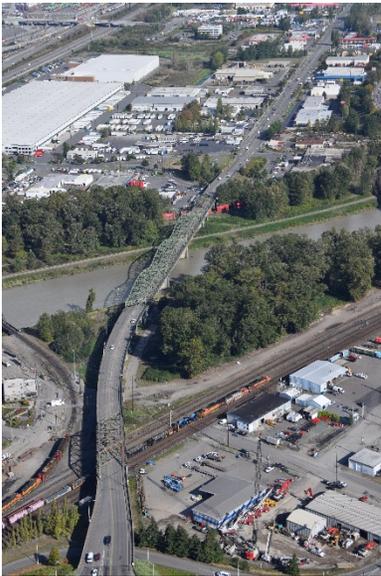
FISHING WARS MEMORIAL BRIDGE
(AKA: PUYALLUP RIVER BRIDGE REPLACEMENT F16A&B)

Nominated for: Structures of \$25 to \$75 Million | January 15, 2020

Fishing Wars Memorial Bridge Replacement

PROJECT INTRODUCTION

The Fishing Wars Memorial Bridge (formerly the Puyallup River Bridge) links Tacoma to the City of Fife to its east. It opened in 1927 as one of Washington's last segments of the famous Pacific Highway, also known as State Route 1 and in later years, Highway 99. The bridge is comprised of seven steel-truss spans linked by reinforced concrete sections. It was financed in approximately equal measure by the federal and state governments, took barely more than a year to build, and was finished early and within budget. The bridge lost much of its daily traffic load when the first Washington segment of Interstate 5 opened in Tacoma in December 1960, but it has remained an important commercial arterial, linking Fife to Tacoma's industrial area and the facilities of the Port of Tacoma.



Fishing Wars Bridge Corridor



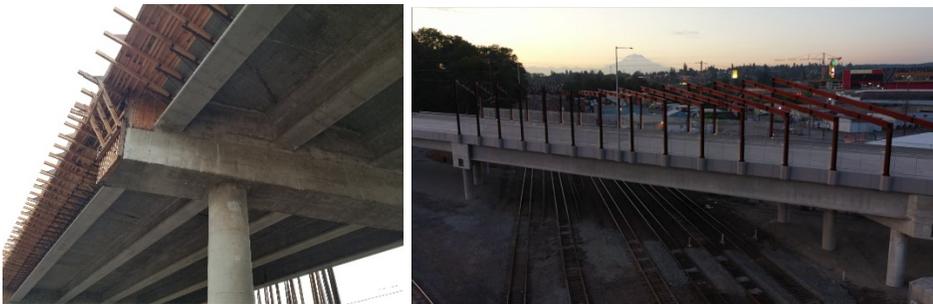
Spans supported by timber beams due to age

In 2013, after more than 85 years of nearly trouble-free service, age and the elements were catching up with the Fishing Wars Memorial Bridge, and the City of Tacoma was well along with plans to replace 950 feet of the span on the Tacoma side of the river with a cable stay bridge. Primary funding for this work included two Federal grants. The two programs involved were the Bridge Replacement Advisory Committee (BRAC) and the Surface Transportation Program (STP). The funding was provided to replace two sections of the bridge west of the Puyallup River over the BNSF and Union Pacific Main Lines through Tacoma and also included a partial replacement of a third span, which connected the structure to the western approach. Augmenting the Federal funding were two State grants from the State Department of Commerce and the Freight Mobility Strategic Investment Board. The project required extensive coordination and right of way acquisition from both railroads and the Puyallup Tribe. Both railroads required design

submittal review and approval prior to any work being completed over their mainlines. WSDOT and FHWA were integral in providing oversight on the project and helping move it forward as challenges arose. The project was originally planned as a design bid build project and stalled around 2013 due to lengthy negotiations with all parties involved and the length of time needed to secure the project funding. At that time a cable stay design had been completed for the bridge with an estimated cost of \$36 million.

The design work and estimated cost for a cable stay bridge underwent further review and it was determined that costs would actually be significantly higher to construct the cable stay. The time line required for obligation of the federal funds was nearing and caused the City and WSDOT to further evaluate the viability of the project. In February 2016 an Alternative Assessment Workshop was completed with WSDOT and other agencies and professionals to determine if the project should move forward. The Workshop determined that the project was of value to the area and the bridge should be replaced. Following the workshop, the design-build procurement process was found to be the only way to keep the Federal funding secure prior to the 2016 obligation deadline.

The design-build selection process started in mid-2016 with advertisement of the RFQ. Ten statements of qualification received and scored in November of 2016. The City issued the RFP in January 2017 to the three finalists selected. The design-build teams submitted their preliminary designs for scoring in April 2017. The submittals received represented three different steel and concrete girder bridge designs. Atkinson Construction was found to be the best value proposer with a design of a continuous span precast concrete girder bridge replacing F16 A&B (spans west of the river and over the railroads) and all of the F22 span (the span connecting the approach).



New concrete girder bridge resulting from the design build process.

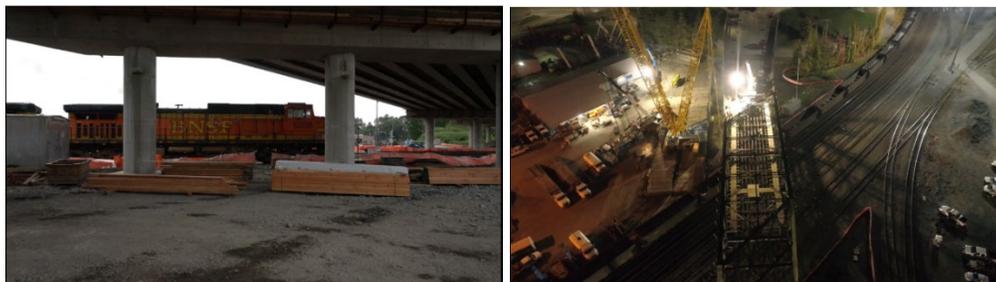
Utility relocation work began in March 2018 to shift existing utilities to accommodate the new bridge's footprint. Right of way acquisition was phased to allow work to begin on property already acquired for the project and initiate construction as scheduled. Demolition work started on May 21, 2018 east of the railroad tracks as work at this time could not be performed over the mainlines. Negotiations and final certification of the railroad right of way needs extended into the fall of 2018. While this delayed the start of the demolition work over the tracks and to the west, construction of the new structure east of

the railroad continued as the City worked closely with both the Union Pacific and BNSF railroads to schedule removal of the old steel truss on the busy rail corridor. The truss removal occurred in early November 2018 and the project reached completion in August 2019.

Project Complexities:

Bridge construction complexities included:

- Construction over two active rail lines.
- Project significance to Puyallup Tribe.
- Matching geometry of remaining sections of the bridge while widening the new sections for future capacity improvements.
- Matching geometry of the remaining sections of the bridge to meet not only two active rail lines with clearance requirements for six active tracks and three additional potential rail line clearances.
- Working adjacent to an active business.
- Two-phased Federal right of way certification process required to allow the project to start construction and utilize grant funding.
- Working under active power lines. These lines are the backup for the Fife Industrial area and downtown Tacoma. These lines could only be de-energized for short periods of time and only at certain times of the year.
- The lifting of the truss over six tracks and two rail lines within a short work window provided by the railroads. The rail lines were only able to provide two work windows within which the lift had to be successful or the project would have been delayed until a new work window could be provided.
- Demolition of the existing truss and concrete span over an active rail corridor that has over 42 train movements a day.



Work over six active tracks separately operated by BNSF and Union Pacific.

Project Data:

Total Project Budget: \$42M

Design Build Project Contract Budget: \$34M including a 5% contingency

Scheduled Completion Date: January 14, 2019

Actual Completion Date: August 1, 2019

Role of other Design Team Members:

Atkinson Construction: Design Build Lead and Contractor

Jacobs: Design Build Designer

Lochner: Design Build Support to the City of Tacoma

O'Neill Service Group: Quality Assurance

1. COMPLETION DATE CONTAINED IN CONTRACT. ANY TIME EXTENSIONS GRANTED ADDRESSED IN THE SUBMITTAL.

Contract completion date: January 14, 2019

Calendar days: 542

Calendar days added: 235

Total revised calendar days: 777

2. CONSTRUCTION SCHEDULE, MANAGEMENT AND CONTROL TECHNIQUES USED. USE OF ALTERNATIVE MATERIALS, PRACTICES OF FUNDING THAT DEMONSTRATES A COMMITMENT TO SUSTAINABILITY.

Below is a project timeline for the City of Tacoma's design build project for the Fishing Wars Memorial Bridge.

Design build start date: June 21, 2017

Calendar days: 542

Contract completion date: January 14, 2019

Calendar days added: 235

Substantial completion date: August 1, 2019

CONSTRUCTION MANAGEMENT

The City of Tacoma, its support team (Lochner and O'Neill Services Group), and its design build contractor (Atkinson Construction and Jacobs) all worked closely together to handle Quality assurance, quality verification, schedule and cost management, and stakeholder outreach/coordination. The City, O'Neill Services Group and Atkinson were co-located during construction of the project. This allowed the project team to effectively mitigate the impacts of delays and associated schedule modifications, address construction issues and change orders, and manage stakeholder issues.

Weekly owners meeting were held to discuss schedule impacts and project issues and how best to address them. These meetings were vital for coordinating the work around the restrictions put in place by the right of way agreement negotiations and kept the team members aware of decision points needed to avoid greater impacts. As a result, the project while delayed significantly still came in under the original design build budget and contingency.

Project Delays

The project extended seven months beyond the planned baseline schedule due to extended agreement negotiations with Union Pacific and BNSF railroads. There were two major causes for this. The first railroad agreement delay was caused by the time needed for Tacoma Power to secure the required permit to complete their aerial line relocation above the rail mainlines. This delayed the project three months as the relocation of the Tacoma Power lines prevented several private utilities from being able to move their infrastructure. The relocations of these utilities was required prior to bridge construction as the infrastructure conflicted with the new bridge piers.

The second delay was complicated and unexpected as it stemmed from an unknown right of way issue resulting from a former billboard, whose owner still had rights in place with Union Pacific Railroad that the City was unaware. The City had to work with Union Pacific to identify the former billboard owner and bring them into right of way discussions. Until this issue could be resolved and damages paid to the former billboard owner, the final right of way certification could not be completed. This impacted the project timeline by approximately four and half months.

SUSTAINABILITY

This City encouraged the use of recycled materials in its Request for Proposals for this project. Atkinson recycled the bridge debris to provide a firm base for construction of the bridge piers. This material was left in place under the bridge and removed outside the dripline later to accommodate plantings for the project. Additional sustainability

measures included protecting two nearby wetlands on the north side of the bridge. They were marked and secured by fencing to ensure that all work was conducted from the south side of the structure thus keeping equipment and manpower from entering the wetlands.

3. SAFETY PERFORMANCE INCLUDING NUMBER OF LOST-TIME INJURIES PER 1000 MAN-HOURS WORKED AND OVERALL SAFETY PROGRAM EMPLOYED DURING THE CONSTRUCTION PHASE.

Atkinson and its subcontractors implemented a site specific safety program for the project to address numerous potential safety hazards as listed below. The program involved Atkinson conducting daily morning safety meetings that included a stretch & flex program with all crews on site. The program encouraged all workers on site to report near miss situations. These reports were discussed at the safety meetings along with the hazards identified for the day's work. Due to the heavy impacts of the railroad, both BNSF and Union Pacific safety requirements were incorporated into the program and all workers were required to check in daily with the rail flaggers to get the days information concerning track protection and issues of the day from the railroads perspective.

HAZARDS INCLUDED:

Working over and around two active rail lines which handle approximately 42 train movements a day through the project site.

Working adjacent to and on the property of an operating business.

Working under Tacoma power transmission lines.

Constructing the bridge immediately adjacent to active power distribution lines which crossed the river parallel to and within feet of the bridge deck.

Protecting active utility lines attached to the river section of the bridge during demolition.

Working next to an active Tacoma sewer pump station that required continual access for maintenance.

An active transient population.

Contaminated soil and groundwater.

Operating a 660 ton crawler crane on an active business' property in a tightly confined space.

The project was successfully completed with zero lost time injuries and an incident rate of 2.02. These statistics are a credit to the contractor, who was able to manage multiple tasks and crews working simultaneously around and over a very active rail corridor. These difficult conditions included lifting the truss over the rail mainlines at night within the short work window provided by the railroads.

4. ENVIRONMENTAL CONSIDERATIONS INCLUDING SPECIAL STEPS TAKEN TO PRESERVE AND PROTECT THE ENVIRONMENT, ENDANGERED SPECIES ETC. DURING THE CONSTRUCTION PHASE.

Several environmental reports and groups were involved in managing environmental issues on the project. These included the project team, the Washington State Department of Ecology, the Puyallup Tribe, the City of Tacoma's permitting department and the City of Tacoma's Environmental Services group. All played a part in securing the environmental permits required for the project.

Permitting work included an update to the Environmental Classification Summary associated with the original design bid build's cable stay bridge design. The design build team also prepared a Stormwater Pollution Plan (SWPPP) as part of the temporary erosion control plan, a National Pollutant Discharge Elimination System (NPDES) Construction Permit and a Special Approved Discharges (SAD) permit with the City of Tacoma.

The project team also met with the Puyallup Tribe to determine if the Tribe's water quality discharge criteria would need to be met as part of the project's environmental criteria. Through discussion it was finally determined that the project would not need to meet the requirements as any discharging of groundwater was going through the City of Tacoma's treatment plant approved under the SAD permit.

There was a high likelihood of encountering contaminated soils on site due to the historic industrial uses of the area. The project scope included testing of all excavated soils and disposal at appropriate facilities. Testing was required for every 200 cubic yards of materials excavated and on each drilled shaft. Contaminated soils were stockpiled on site until material acceptance was received from an appropriate disposal facility. Stormwater not infiltrated directly on site was stored in baker tanks and tested for contaminants. Testing results indicated the collected stormwater was acceptable for discharge into the City's sanitary sewer system.

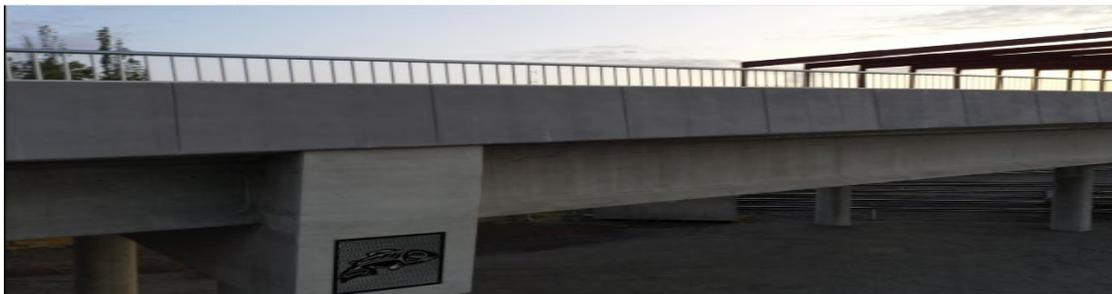
During the design phase, two wetlands were identified as being potentially impacted by the project. Both wetlands were located to the north of the bridge structure. Work was planned accordingly to be well outside the limits of the wetlands and wetland buffer area boundaries were delineated with silt fencing. Additional protection included staging all

work with heavy equipment on the south side of the bridge to further ensure no impacts to the wetland areas.

5. COMMUNITY RELATIONS – A SUMMARY OF THE EFFORTS BY THE AGENCY, CONSULTANT AND CONTRACTOR TO PROTECT PUBLIC LIVES AND PROPERTY, MINIMIZE PUBLIC INCONVENIENCE AND IMPROVE RELATIONS.

The City of Tacoma Public Works Department utilized all means available to notify the traveling public and the adjacent businesses and community members of the project schedule for closing of the bridge and progress of the project. Postcards were sent out to notify businesses affected by major events on the project. These included road closures and the associated detour route changes throughout the project. Press releases were coordinated via the City’s media relations group. Announcements were coordinated to occur in concert with messages sent to the trucking community by utilizing the Port of Tacoma’s communication network. The City’s website also hosted a project specific webpage regularly updated with detour routes and project information concerning significant advancements and milestones achieved by the project.

The City maintained contact with the Puyallup Tribe throughout the project as the project was located next to a sensitive Tribal Property occasionally used for Tribal events. Coordination was important to allow access to the property and the Puyallup River for the Tribe’s First Fish Ceremony held in May. As the project neared completion, the Tacoma City Council in conjunction with the Puyallup Tribe passed Resolution No. 40333 renaming the Puyallup River Bridge the Fishing Wars Memorial Bridge. Fishing Wars Memorial Bridge Dedication held on August 9, 2019. The Tribe’s Planning, Language and Historic Preservation departments worked with the City’s Landmarks Preservation Commission to rename the bridge and commemorate its significance.



The Puyallup Tribes logo placed on each pier of the new structure.

6. UNUSUAL ACCOMPLISHMENTS UNDER ADVERSE WEATHER SOIL OR SITE CONDITIONS OR OTHER OCCURRENCES WHICH THERE WAS NO CONTROL.

This challenging project had many unusual accomplishments under adverse conditions. Following is a summary of the major ones.

This project's initial challenge was to secure construction funding within a very short timeline. Once the stakeholder charrette determined that the project was worthwhile, the City had to complete several tasks in less than a year to secure the construction funding. These tasks included:

- Selecting a consultant to assist in writing the RFQ and RFP for the design build project.
- Develop the RFQ and RFP from a very draft set of documents under development by WSDOT to be used for the first time by a local jurisdiction under FHWA rules.
- Update the NEPA.
- Advertise and narrow down the field to the final three qualified respondents.
- Issue the RFP.

Following the selection of the finalists, the final step required to secure the construction funds for the project was the advertisement of the Request for Proposals. The City and its consultant Lochner were successfully able to complete all of these tasks allowing the project to go forward with its Federal funding intact.

Design was challenged by the span length, over the railroad mainlines and the clearance requirements of the existing and future track alignments. To stay under budget, the team had to come up with a concrete girder design to span the six tracks and the extra 25' off of centerline for each outside track so the piers could meet the clearance requirements. The final bridge was designed with center to center spacing of the piers being 212' 6-3/8". The girders spanning the railroad tracks were 203' 7-5/8" long and the span contained 10 each WF100G girders. The girders were set on three consecutive Saturday nights under four hour work windows provided by the railroads.

The demolition phase was also a challenge. Preparation for lifting the steel truss was complicated as the concrete deck had to be removed from the truss first to reduce the weight so the crane could lift the truss. Concrete deck removal, by necessity, was performed over active rail lines and was constantly interrupted to allow train traffic to pass. The frequent train movements through the site made this work challenging to finish in time for the pre-determined truss removal work windows.

Railroad's limited work windows such that the use of a 660TN crawler crane was needed to lift the 315 TN structure in a single pick. The work windows were negotiated with difficulty in that the team would only be ready to remove the structure in the fourth quarter of the year, the railroads busiest time of the year. The windows were only four hours long and if the truss was not lifted off its supports within the first hour the work would need to be called off per BNSF requirements. Further complicating matters was the fact that the truss removal was only given two opportunities to succeed based on the frequent train movements through the site. Due to the pick being made in November, weather was also a concern as winds above 10 mph would also cause cancellation of the work. If the pick was not made in November the project would have been delayed until spring when the rail activity was anticipated to clear and it was allowable to de-energize the power lines as they could not be taken off line over the winter months.

Finally, during the project a bridge inspection of the spans over the river and to the east indicated that eight bearings were in need of replacement. The City let a separate contract to replace the bearings prior to the bridge opening. Two of the bearings were at the connecting pier between the old and new structure requiring close coordination between the City and the two contractors to ensure both projects would complete at the same time.

7. ADDITIONAL CONSIDERATIONS YOU WOULD LIKE TO BRING TO THE ATTENTION OF THE PROJECT REVIEW PANEL, SUCH AS INNOVATIONS IN TECHNOLOGY OR AND OR MANAGEMENT APPLICATIONS DURING THE PROJECT.

Selection of the design build process for this project provided many benefits including obligation of construction funding on time, close coordination of the project team, focus on building the best bridge for the available level of funding, and developing the required innovative design to build a bridge that was within the height restrictions put in place by the railroads. Additionally, the design had to meet clearance requirements for three potential future new railroad spurs coming off the mainline.

Design of the new structure was very complicated spatially as it had to tie into the existing structure over the river that was to remain until it could be replaced and widened in the future.

This project was intended to provide a gateway entrance to the City of Tacoma. Design build scoring included an evaluation of the architectural component proposed. Atkinson provided an architectural feature on the new structure that can be replicated on future spans and the City felt tied well to the industrial area.