2017 APWA Professional Awards:
Public Works Project of the Year Award
Port of Tacoma Road Rehabilitation
Tacoma, Washington
Port of Tacoma Road Rehabilitation

Owners

City of Tacoma – Lead Agency
Port of Tacoma

Design

City of Tacoma
David Evans & Associates, Inc.
Landau & Associates
SCJ Alliance

Construction

Gary Merlino Construction Company
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Overview / Introduction / Reason for Project

**Preservation of a Critical Freight Corridor**

Port of Tacoma Road is a principal arterial in the Tacoma Tideflats and provides access to numerous private businesses, as well as three of the Port of Tacoma’s container terminals and its automobile terminal. An estimated 9,510 jobs statewide are connected to the cargo that passes through those terminals. Port of Tacoma Road is the “first and last” mile connector to rail facilities, shipping terminals and the Interstate Highway system. The road, designated as a Heavy Haul Corridor and classified as a T-1 city street, carries over 10,000,000 tons of freight annually.

Over time and with the high volume of loaded truck traffic, the pavement had experienced significant deterioration and failures causing truck traffic delays, safety concerns as truck drivers and commuters swerved to avoid problem areas, and damage to trucks and cargo. The Port completed a survey of trucking companies regarding the condition of the road and received responses regarding damage to trucks due to the pavement condition including front end damage, broken springs, bent rims, flat tires and more frequent replacement of shocks and bearings needed.

Truckers also commented on safety hazards due to vehicles swerving to miss potholes. These roadway conditions adversely impacted the reliability and efficiency of the Port of Tacoma’s core arterial connection between marine terminals, intermodal facilities, and the regional roadway network of SR509 and Interstate 5.

The City of Tacoma (City) and Port of Tacoma (Port) partnered on the Port of Tacoma Road Rehabilitation with the City serving as the lead agency and managing the project. The initial project included improvements from East 11th Street to Marshall Avenue. Additional funding added a second phase to the project and extended the improvements from Marshall Avenue to the SR 509 interchange. The project included replacing the existing failing asphalt pavement curb to curb with concrete pavement designed to heavy haul corridor standards, providing a continuous sidewalk to safely separate pedestrians from truck and rail traffic, improving three rail crossings, installing a permanent traffic signal to direct trucks in the off-road queuing yard into the Washington United Terminal (WUT), and installing infrastructure for an Intelligent Transportation System (ITS). These improvements were completed to improve the roadway to heavy haul standards, increase both current and future capacity, and increase the efficiency of freight movement to, from and within the Port while at the same time reducing emissions.
within the Port which is currently an air quality nonattainment area.

**Project Funding**

The City and Port explored alternatives to funding replacement of the road surface and jointly applied to funding agencies to optimize scoring on grant applications. The project ultimately received funding from several granting agencies as well as private partners. Grants were received from the Surface Transportation Program (STP), the Freight Mobility Strategic Investment Board (FMSIB), and the Transportation Improvement Board (TIB). The City and Port provided matching funds. The Port provided additional funding to replace the temporary traffic signal with a permanent signal at Washington United Terminal’s (WUT) truck queuing location.

### Project Funding

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During the January 2016 Port of Tacoma Road Appreciation Lunch for those impacted by construction, the Executive Director of TIB, who was in attendance, expressed that he was impressed with the project but noted the ruts in the asphalt between Marshall Avenue and the SR 509 interchange and suggested the possibility of additional TIB funds to continue the project from Marshall to the interchange. City staff estimated the additional design and construction costs to replace this pavement with concrete and TIB agreed to provide funding along with additional match from the City and Port of Tacoma.

1. **Completion Date**

The key to keeping the Port of Tacoma Road Rehabilitation project on schedule during construction was proactive and effective communications with stakeholders impacted by the project, maintaining vehicle access and alternate routes, and keeping truck traffic flowing to the Port terminals and businesses. During construction, traffic was limited to 2 lanes of the 5 lane roadway. This provided one lane for a safety barrier and staging, and allowed the contractor to perform work in the remaining 2 lanes.

Design and permitting schedules were also critical before construction began, in particular with multiple funding source, both federal and state, and associated review and approval periods.

A traffic consultant was hired by the City, as part of the design team, to complete a Traffic Operational Analysis and develop alternatives for traffic control and detour routes during the project. In addition, the contractor and City construction staff
continuously coordinated with the local businesses on a daily basis.

Detour routes, schedules and construction notices were posted on the City and Port’s websites, posted on signs and reader boards, and communicated through email updates and through a weekly trucking update sent out by the terminals and the Port of Tacoma through social media, text alerts and newsletters. Updates were also provided to City council, the Port Commission, and granting agencies.

Due to the favorable weather conditions throughout the early part of the project there were no major delays. The project team met regularly and were able to coordinate a majority of possible delays to keep the impacts to a minimum to help stay on schedule. Construction of the first phase began in May 2015 and was completed in March 2016. There was a limited “shut down” period between Phase 1 and Phase 2 allowing the contractor to procure materials and prepare for Phase 2 and also serving well to avoid a period of inclement weather.
2. Construction Schedule, Management, Control Techniques, and Sustainability

Construction Schedule

The project's construction was to begin in May 2015 and was slated to be completed in late 2015/early 2016. The majority of the major concrete work was to be completed in the summer months to avoid weather delays. The project was designed to allow use of the slip form paving construction method. This is unusual for a City project, however, the length and width of the Port of Tacoma roadway to be paved with 10” concrete made this construction method possible.

There was a significant amount of preparation that needed to be completed before slip form paving could be performed. This included but was not limited to water main installation, curb and gutter removal and replacement, electrical conduit crossings, (3) railroad crossing removal and replacements, and driveway removal and replacements. The key to the success of the schedule was to coordinate with the businesses to allow for the removal and replacement of their driveways while still maintaining access to their business.

This was achieved by utilizing accelerates in the concrete to allow the concrete to cure faster so traffic could be allowed back on it in one day as opposed to 3 to 4 days.
City staff and contractor personnel worked diligently to coordinate this work with the affected businesses.

The contract specifications required the contractor to provide a progress schedule that detailed the critical path work and the total time allowed to complete the work. They were also required to submit at the weekly progress meeting a 3-week look-ahead schedule detailing all upcoming work activities that were to take place during that period. The City strongly encouraged businesses along Port of Tacoma Road and businesses effected by the detours to attend the weekly meeting to help convey the upcoming activities so they could alert their customers of potential access issues. The schedule was also used to update the City’s website and provide the weekly trucking update through social media and text alerts. These alerts were very instrumental in alerting the trucking community and ILWU Local 23 on the best way to access the terminal or business that they were trying to access.

Toward the completion of the project, TIB granted additional funds to complete an additional portion of Port of Tacoma Road from SR 509 to Marshall Ave. With the additional funds Port of Tacoma Road is now concrete from SR 509 to the end located at S 11th St for a total distance of 1.8 miles. The project was temporarily suspended through the late winter months to allow Gary Merlino Construction time to plan and procure materials and also to wait for more favorable weather to perform the work. The additional work started in early May 2016 and was completed in early June. The same team effort was used during the Phase 2 portion which allowed for a successful project completion.

Gary Merlino Construction worked with City of Tacoma project management, construction and engineering staff to modify the roadway design. Grade adjustments were made along the existing gutter line outside of wheel path allowing for a greatly improved ride smoothness profile. Modifications were made to the Portland Cement Concrete Pavement (PCPP) jointing allowing the elimination of the proposed centerline longitudinal joint. Gary Merlino Construction crews subsequently paved the center lane with an integral crown. Additionally, at intersections and high volume truck crossings, dowel bars were used in lieu of tie bars along longitudinal joints to support the heavy cross traffic.

Management and Control Techniques

Prior to any major change in access to businesses on Port of Tacoma Road, Gary Merlino Construction Company and the City’s on-site construction inspector visited every business that would be affected and assured them that access would remain open at all times for customers and emergency services. The project team coordinated small detours and access paths to accommodate these businesses and made
Outreach like this had many benefits for the project. On several occasions we were notified on a delivery or a unique circumstance that we could prepare for prior to placement of concrete instead of the situation showing up and causing disruption or unaccounted for delays. Gary Merlino Construction made sure to be consistent and responsive to the concerns of the local businesses and treated it as an opportunity to foresee any unknown events so they could control the progress and outcome of the construction.

The City’s engineering staff reviewed and approved all material submittals to ensure that the materials to be incorporated into the project conformed with the project specifications. Upon delivery to the site or prior to being installed the inspection staff would confirm and document the materials were in fact the materials that the City approved for use.

Due to the large amount of concrete that was required on this project, the City contracted a third party testing agency, Construction Testing Laboratories, Inc. (CTL) to perform the concrete testing. CTL was responsible to ensure that the concrete was in conformance with the concrete mix design that was approved by the City.

**Sustainability**

All of the demolished existing paved surfaces along the project limit were taken to a local recycling facility for processing and repurposing or reused onsite. The low level contaminated materials encountered during construction were directed to an appropriate receiving facility and repurposed.

A fully actuated traffic signal was installed at the entrance to the Washington United Terminals container yard. The design had to accommodate a large volume of heavy truck traffic turning from Port of Tacoma Road as well as trucks crossing from the staging area on the west side of Port of Tacoma Road. Pole placement was critical to comply with all regulations, including ADA requirements, while still allowing sufficient clearance for truck turning movements. The actuated design allowed the traffic signal to be responsive to

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**Traffic Signal with LED at Washington United Terminals container yard and last weekend paving the intersection.**
fluctuating vehicle volumes, thus reducing vehicle idling times and unnecessary greenhouse gas emissions. The use of LED traffic signal indications further enhanced the sustainable design.

3. Safety Performance

Gary Merlino Construction is dedicated to their safety program. It is their goal to ensure that all of our employees return home safely every day. As a self-insured company, Gary Merlino Construction’s success is predicated on the safe performance and execution of our projects. During the execution of the Port of Tacoma Road Rehabilitation Project Gary Merlino Construction Company crews expended nearly 40,000 man hours with zero lost-time injuries.

Work areas were separated during construction to allow for a safe work zone. The 5 lane roadway was reduced to 2 lanes allowing the contractor 2 lanes to perform work and keeping one lane for a safety barrier and staging.

The City of Tacoma worked closely with the Port of Tacoma, Tacoma Rail, Tacoma Police and Fire Departments, Washington United Terminal, Husky Terminal, Olympic Container Terminal and ILWU Local 23 to ensure that emergency access was our top priority. The fire department chief who oversees safety compliance in the City attended the weekly construction progress meetings. During these meetings, the chief would be informed of the next three weeks’ work schedule, planned roadway closures, and planned detour routes. This was a key component in helping the first responders know emergency routes in advance and keeping emergency response times manageable for the businesses in this industrial area.

4. Environmental Considerations

Storm water discharge was a major environmental concern related to the Port of Road Rehabilitation Project as the contract time required a major portion of the project to be completed during fall and winter months. Gary Merlino Construction worked with the City of Tacoma and business owners along the alignment to modify the project phasing to allow roughly 80% of the project to be Slipform paved. This significantly reduced the amount of time that exposed soils were vulnerable to inclement weather.

Another environmental consideration of the project involved coordination with a Department of Ecology remediation project as it extended into the Port of Tacoma Roadway Rehabilitation project area. The Washington State Department of Ecology and US Oil Inc. have an Agreed Order (AO DE 8914) in which US Oil was required to cleanup a Level 5 contaminated area where a pipe line had leaked gasoline-range petroleum hydrocarbons. Remediation
construction was coordinated with our project schedule and construction activities so that curb, gutter and sidewalk were replaced by the remediation project and the Port of Tacoma Road project replaced the pavement, driveways and curb ramps in the area. This coordination effort minimized impacts to businesses and traffic.

Additionally, historical data indicated that there may be pre-existing contaminated soils within the limits of the construction project. The historical data indicated that the Port of Tacoma is located in the Asarco Smelter plume area for potential contamination as well as several business activities that included petroleum hydrocarbons. With the cooperation of the City of Tacoma and Pierce County Health Department Gary Merlino Construction developed an in-place soil and analysis testing plan. This process allowed for soils to be classified for disposal at an appropriate facility prior to excavation. Soils were tested for heavy metals and petroleum hydrocarbons. The lengthy testing process was completed well in advance of construction. Based upon sampling results, soil handling and disposal locations were predetermined. The predetermination of soil classification allowed for construction to proceed more efficiently.

5. Community Relations

Prior to design beginning the project manager and engineer met with businesses on Port of Tacoma Road to discuss the project and how it may impact daily business, if driveway access can be temporarily closed for construction, if another access to the business was available, and any other information that business was aware of that would impact the design such are unusual working schedules, and large shipments.

The Weekly Construction Meeting invitee list was broadened to include terminal operators, emergency services, rail partners and neighboring businesses.

In sharing project accomplishments, the City’s Project Manager stated, “And most important, I only got a couple of calls over a 13 month construction project from upset business owners/roadway users and we were able to address their concerns in a timely fashion.”

One stakeholder also shared in an email, “I can complain loudly, but I can also say thank you.” regarding his parking strip.
Tacoma Rail worked to minimize the duration of trains blocking detour routes. Tacoma Fire anticipated alternate response routes. Terminal operators were integral to truck queueing and routing to keep construction work zones clear and safe.

Following are some of the tools, messages, educational opportunities and outreach conducted with various groups.

**Terminals and Private Businesses**

There are approximately one hundred businesses on Port-owned and privately-owned land within the Tideflats. Not all of these companies are in the maritime industry and it was a priority to assist the employees, vendors and customers with business access. A cross-department team was created to help create the communication plan and tools, and then implement the plan and disseminate the messages to facilitate effective communication during the project.

Examples of project modifications and communication tools included:

- Designed special truck queue areas and routes for terminals.
- Reached out to trucker organizations, employee groups and longshore to disseminate information.
- Electronic reader boards at key intersections.
- Email newsletters and email updates with project phase updates and detour route modifications during construction sent to more than 1,300 subscribers.
- Created dedicated Port and City websites that were updated and maintained throughout the construction period.
- Created a text message system that linked to the dedicated Port website. Trucking companies, drivers, dispatch services, area businesses, area employees, longshore workers and regular area vendors and customers were encouraged to voluntarily register for the timely text updates (1,300 subscribers).
- Met with multiple businesses to explain the project benefits and modify routes to lessen impacts, educate and share resources.
- In one case, the Port helped a testing laboratory open a satellite sample offices so their clients would not have to navigate the temporary truck queues and detours.
- 70 web posts that triggered emails and texts to subscribers.
- Sent approximately 50 Tweets and 20 Facebook updates.
- Held Open House meetings.
- Held an Appreciation Lunch for stakeholders, businesses, truckers, employees and others.
- Disseminated over 1,000 handbills to drivers entering terminal facilities.

**Port Employees**

Approximately 250+ Port of Tacoma employees use Port of Tacoma Road for commuting purposes and navigating through the area. To keep employees updated on the project, and help with the commute:

- Provided approximately 24 (two/month) email updates to Port of Tacoma staff.
• Quarterly project updates at Port-wide employee meetings.
• Port employees received updates in our monthly (printed and emailed) newsletter.
• To lessen the number of commuters, we urged carpooling and created satellite offices and meeting spaces so outside guests would not have to navigate the detour routes and add to the number of vehicles in the Tideflats.
• Stressed safety on video messages boards located throughout our three employee office facilities.
• Employees could also sign-up for text message updates.

6. Unusual Accomplishments Under Adverse Conditions

For the Port of Tacoma Road Rehabilitation project, the most challenging aspect of the project during construction was traffic control including maintaining vehicle access to businesses and keeping truck traffic flowing to the Port terminals and local businesses within this economic hub. With Port of Tacoma Road reduced down to one lane in each direction, terminal traffic had to be detoured to other ingress, egress and queuing locations.

If one of the major arterials into the Port is blocked such as Port of Tacoma Road, it causes a ripple effect of congestion to the surrounding arterials. Trying to perform construction under these conditions was extremely difficult. The City worked closely with Garey Merlino Construction to schedule work that required a significant amount of trucking such as the slip form paving to be performed during non-peak hours (i.e. nights and weekends). To make slip form paving cost effective the goal was 1,000 cubic yards of concrete placed per slip form day. This required a significant amount of preparation and limited the slip form paving to very few weekends.
There were many factors that contributed to access issues including the rail lines surrounding and crossing Port of Tacoma Road that are frequently blocked due to unpredictable train movements.

Three of the rail crossings were replaced with concrete tubs to accommodate heavy truck traffic as part of the project.

Another design and construction challenge was the coordination between a remediation project and the City’s roadway reconstruction project. The Washington State Department of Ecology and US Oil Inc. have an Agreed Order (AO DE 8914) in which US Oil was required to cleanup a Level 5 contaminated area where a pipe line had leaked gasoline-range petroleum hydrocarbons.

In order to minimize impacts to businesses and traffic, it was determined that the remediation construction would take place before but in conjunction with the City’s contractor’s work in the area. The work was coordinated so that the City’s contractor would repave the roadway to ensure continuity in construction methods and final surfacing, and due to the depth of the remediation excavation the roadway would need to be closed entirely to traffic. Closing the roadway for a onetime event would minimize the overall traffic impact and
lessen the potential for confusion to the public.

Ultimately, the remediation project removed and replaced 7,333 CY of material, replaced curb and gutter and sidewalk, and the City replaced the removed asphalt pavement with cement concrete pavement, replaced and added concrete driveways and added curb ramps in this area. The total time the roadway was closed to do all these construction items was six weeks; four weeks for the remediation and two additional weeks to construct the cement concrete pavement surfacing.

7. Additional Considerations

During design of the project, the project manager and design engineer reached out to representatives of the American Concrete Pavement Association, the Puget Sound Concrete Specification Council, and several concrete contractors for input relating to the construction methods best suited for this project. The overall consensus was that if a contractor used a slip form method it could reduce the construction schedule and provide superior roadway with a smoother driving surface and overall appearance. Due to these discussions, the design was modified to take into account the width of the standard slip form equipment and specifications were developed that required contractors to have experience with larger projects the size of Port of Tacoma Road. The City was excited to use the slip form construction because it is rare to see this method used in an urban setting as normally hand paving is used for city projects and tight working spaces. By using the slip form method the contractor was able to shift traffic to one side of the road and pave the northbound side then flip-flop the traffic pattern to pave the southbound side. When the contractor needed to pave the center of the road the traffic was moved to the two outside lanes that had been paved and slip formed the center area. Being able to slip form pave a majority of the roadway in three passes saved time and produced a smooth and consistent roadway surface.

An additional, unplanned benefit that resulted from the traffic control study and recommendations was the creation of a new, better performing queuing area that will become permanent.
Once design began, the City hired a traffic consultant to assess the truck and traffic use on the road. As a part of this assessment the consultant met with businesses and property owners along Port of Tacoma Road and affected side streets including Thorne Lane to the west of the project area. The leg work performed before design started and by the consultant helped develop a detour plan, closure plan, traffic control plans, and two truck queuing areas that were utilized during construction.

One of the queuing areas was in the right-of-way on East 11th Street where three north lanes of the five lane street were used as a queuing area for two terminals. This was accomplished by restriping the street, placing directional signage and using the two south side lanes for normal two-way traffic.

This configuration turned out to be very popular with the abutting businesses on East 11th because before the reconfiguration trucks would park in the center of the street essentially blocking ingress and egress from the businesses (all the businesses are located on the south side as the north side has a rail road track and those businesses are accessed from the Port of Tacoma Road intersection).

Once the new configuration was in place the businesses did not need to cross the queuing area to use East 11th Street. This resulted in many businesses requesting this configuration remain permanent. The City and Port are currently working on an occupancy permit to make this queuing area permanent.