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|  | Memo |
| To:  | Laura T. Z. Montgomery |
| From:  | Cary Stewart, PE | Project:  | Washington Utilities and Transportation Commission – PSAP Crossings Closure Hearing |
| CC:  |  |
| Date:  | Sept 9, 2011 | Job No:  | 169560 |

**RE: Analysis of Proposed Railroad Crossing Closures**

The purpose of this memo is to document the analysis of the closure of railroad crossings in the City of Elma and County of Grays Harbor at the following locations:

|  |  |  |
| --- | --- | --- |
| Street or Road Name | DOT Crossing No. | Location |
| N. 2nd Street | 096525J | Elma |
| S. 5th Street | 096635U | Elma |
| S. 10th Street | 096638P | Elma |
| N. 17th Street | 096641X | Elma/Grays Harbor |
| Hewitt Street | 096649C | Grays Harbor |

The assumptions used for this analysis of all the railroad crossing closures were as follows:

1. There are eight (8) at-grade railroad crossings in the City of Elma at the following locations. Their location and proposed disposition are shown on Exhibit A:

|  |  |
| --- | --- |
| Street or Road Name | DOT Crossing No. |
| N. 2nd Street | 096525J |
| N. 3rd Street | 096634M |
| N. 5th Street | 096635U |
| N. 6th Street | 096636B |
| N. 10th Street | 096638P |
| N. 11th Street | 096639W |
| N. 13th Street | 096640R |
| N. 17th Street | 096641X |

1. There are two (2) at-grade railroad crossings in the County of Grays Harbor in Satsop at the following locations. Their location and proposed disposition are shown on Exhibit A:

|  |  |
| --- | --- |
| Street or Road Name | DOT Crossing No. |
| Hewitt Street | 096649C |
| Monte-Elma Road | 096650W |

1. No changes to the track or the grade of the track are proposed as part of the proposed railroad crossing closures.
2. Fire codes require that fire access roads longer than 150 feet have an all-weather access turnaround for emergency vehicles.

References used for analysis and for opinions used in this report include the relevant portions of the following documents:

1. U.S. DOT Crossing Inventory Information on the Federal Railroad Administration website.
2. City of Elma Municipal Code on the City website.
3. Transportation Research Board, “Highway Capacity Manual,” Fifth Edition 2010.
4. American Association of State Highway and Transportation Officials (AASHTO), “A Policy on Geometric Design of Highways and Streets”, 2004.
5. National Fire Protection Association Standards, 2010.
6. 24 hour traffic counts taken by Traffic Count Consultant, Inc. on November 15, 2010 through November 21, 2010 on N. 2nd Street, N. 5th Street, N. 10th Street, N. 11th Street and N. 17th Street.

Documents reviewed for this analysis:

1. WUTC Docket No. TR-110159, N. 2nd Street, DOT Crossing No. 096525J;
2. WUTC Docket No. TR-110160, N. 5th Street, DOT Crossing No. 096635U;
3. WUTC Docket No. TR-110161, N. 10th Street, DOT Crossing No. 096638P;
4. WUTC Docket No. TR-110162, N. 17th Street, DOT Crossing No. 096641X;
5. Letter from Puget Sound & Pacific Railroad Company, dated December 28, 2010, Re: Puget Sound & Pacific Railroad Crossing Closure and Improvement Project Application for Washington Utilities and Transportation Commission Crossing Closures, signed by Steve Hefley;
6. Letter from Glenn & Associates, PS, dated February 14, 2011, Re: TR-110159 through TR-110162 inclusive Petitions upon behalf of Puget Sound & Pacific Railroad Closure of four highway rail grade crossings in Elma, signed by Daniel O. Glenn;
7. Letter from Gibbs & Olson, Inc., dated March 7, 2011, Re: Four (4) Proposed Railroad Crossing Closures, signed by John A. Duncan, PE;
8. City of Elma Mitigated Determination of Non-Significance, SEPA Application 2011-03, dated March 9, 2011;
9. Memorandum from Glenn & Associates, PS, dated April 19, 2011, Re: TR-110159 through TR-110162 Request of Puget Sound & Pacific Railroad Request;
10. Letter from Puget Sound & Pacific Railroad Company, dated April 19, 2011, Re: TR-110159, North 2nd Street, DOT Crossing No. 096525J; TR-110160, North 5th Street, DOT Crossing No. 096635U; TR-110161, North 10th Street, DOT Crossing No. 096638P; TR-110162, North 17th Street, DOT Crossing No. 096641X, signed by Steve Hefley;
11. Letter from City of Elma, dated May 24, 2011, Re: Petition of Puget Sound & Pacific Railroad to Close Crossings UTC Dockets TR-110157, TR-110159, TR-110160, TR-110161 and TR-110162, signed by David Osgood;
12. Letter from Gleaves, Swearingen, Potter & Scott, LLP, dated June 8, 2011, Re: UTC Docket Nos. TR-110157, TR-110159, TR-110160, TR-110161 and TR-110162, signed by Laura T. Z. Montgomery;
13. Letter from H. Steward Menefee, Grays Harbor County Prosecuting Attorney, dated June 9, 2011, Re: UTC Docket Nos. TR-110157, TR-110159, TR-110160, TR-110161 and TR-110162, signed by James G. Baker;
14. Letter from Glenn & Associates, PS, dated August 16, 2011, Re: PSAP Docket No. TR-110159, TR-110160, TR-110161, signed by Daniel O. Glenn.

Cary Stewart has 35 years of experience in municipal public works management, planning, design, and construction. Thirty of those years were at municipal agencies including being a City Engineer for ten years. He is registered to practice in the States of Washington, Oregon, California, Idaho and Alaska. He has provided several expert testimonies through depositions and as a witness as a public agency representative.

Overall he has worked on private development, freeways, roadways, drainage, stormwater, wet and dry utilities, traffic signals and lighting, airports, light rail, landfills and other public works projects. His work on these projects includes state and federal environmental reviews, subdivision/development reviews, private/public improvement design, construction contract administration, and program management. Cary has coordinated projects with numerous local, state and federal agencies including FHWA, Army Corps of Engineers, Fish and Wildlife, Public Utilities Commissions, WSDOT and the DOTs in California, Idaho, Oregon, Utah, Nevada, Arizona, Hawaii, and Wyoming.

**OPINION #1 – Traffic Impacts of Railroad Crossing Closures**

Environmental impacts for traffic capacity issues are determined by reductions in Level of Service (LOS). LOS is a measure of the performance of an element of a transportation infrastructure. An intersection, a rural roadway, a freeway ramp, an arterial, or a freeway segment can all be graded on the adequacy of their performance under given traffic conditions.

Level of Service is a description of different operating conditions that occur on a roadway or at an intersection when accommodating various traffic volumes. It is a qualitative measure of the effect of traffic flow factors such as speed and travel time, interruptions and delays, freedom to maneuver, and driver comfort and convenience. The Highway Capacity Manual (HCM) and the AASHTO Geometric Design of Highways and Streets defines Levels of Service as follows:

LOS A Free traffic flow (0% –35% of capacity)

LOS B Reasonably free traffic flow (35% –50% of capacity)

LOS C Stable traffic flow (50% –62% of capacity)

LOS D Approaching unstable traffic flow (62% –75% of capacity)

LOS E Unstable traffic flow (75% –100% of capacity)

LOS F Forced or breakdown traffic flow (>100% of capacity)

For environmental considerations most transportation agencies consider a LOS C or better as acceptable. Many agencies even use LOS D as acceptable. A LOS E or F would be considered unacceptable. In most cases a project that generates no traffic, but has traffic changes that continue to maintain a LOS C or better, is considered to have no impacts.

The Highway Capacity Manual (HCM) establishes that a 30 mph Class IV 2-lane urban street has a LOS C, stable traffic flow, capacity of 540 vehicles per hour. A Class IV 2-lane urban street is identified as a minor collector/arterial. Since the streets in Elma at these railroad crossing are 25 mph and function more as local streets, this study for the purpose of being conservative will assume that these streets have a LOS C capacity of 350 vehicles per hour. Therefore, a volume of 350 vehicles over one hour would be an environmentally acceptable stable traffic flow.

Review of the traffic counts indicated that weekend traffic volumes were lower than weekday volumes. Averaging just the weekday volumes will result in higher volumes. To maintain a worst case conservative review only weekend volumes have been used for this analysis.

**Proposed North 2nd Street Railroad Crossing Traffic Impacts**

The weekday Average Daily Trips (ADT) on N. 2nd St. is 347 vehicles per day based on counts taken in October 2010. These same counts indicated that N. 2nd St. had an average weekday PM peak hour (3:00PM, highest volume hour of the day) volume of 36 vehicles. If N. 2nd St. is closed these vehicles would use N. 3rd St. and W. Pine St. as an alternate route. As stated above these streets would have a hourly capacity at LOS C is 350 vehicles per hour. Adding 36 vehicles during the PM peak hour to W. Pine Street and N. 3rd St. is unlikely to cause them to exceed this LOS C capacity.

**Proposed North 5th Street Railroad Crossing Traffic Impacts**

The weekday ADT on N. 5th St. is 65 vehicles based on counts taken in October 2010. These same counts indicated that N. 5th St. had an average weekday PM peak hour (3:00PM, highest volume hour of the day) volume of 7 vehicles. If N. 5th St. is closed these vehicles would use N. 3rd St. and W. Pine St. as an alternate route. As stated above these streets would have a hourly capacity at LOS C is 350. Adding 7 vehicles during the PM peak hour to W. Pine Street and N. 3rd St is unlikely to cause them to exceed this LOS C capacity.

**Proposed North 10th Street Railroad Crossing Traffic Impacts**

The weekday ADT on N. 10th St. is 136 vehicles based on counts taken in Oct 2010. These same counts indicated that N. 10th St. had an average weekday PM peak hour (3:00PM, highest volume hour of the day) volume of 18 vehicles. If N. 10th St. is closed these vehicles would use N. 11th St., Wakefield St. and W. Martin St. as an alternate route. As stated above these streets would have a hourly capacity at LOS C is 350. N. 11th St. has an average weekday PM peak hour 144 vehicles. Adding 18 vehicles during the PM peak hour to N. 11th St., Wakefield St. and W. Martin St. will not cause them to exceed this LOS C capacity.

At this location the City expressed a concern that the traffic counts were not representative of the peak use of the City park facilities. The peak use of these park facilities would occur on weekends, not during the weekday PM peak hour. There are six baseball fields at these park facilities. If there are 25 children playing on each field and they each arrived in one vehicle that would equal 150 vehicles. The average weekend hourly traffic flow between 8:00AM and 8:00PM is 97 vehicles. Assuming worst case, that all 150 vehicles arrive during the same hour, the total hourly volume is 247 vehicles in an hour. This does not exceed the LOS C capacity of 350 vehicles per hour.

**Proposed North 17th Street Railroad Crossing Traffic Impacts**

The ADT on N. 17th St. is 90 vehicles based on counts taken in October 2010. These same counts indicated that N. 17th St. had an average weekday PM peak hour (3:00PM, highest volume hour of the day) volume of 10 vehicles. If N. 17th St. is closed these vehicles would use N. 13th St., W. Bailey Rd. and W. Martin St. as an alternate route. As stated above these streets would have a hourly capacity at LOS C is 350. Adding 17 vehicles during the PM peak hour to N. 13th St., W. Bailey Rd. and W. Martin St. is unlikely to cause them to exceed this LOS C capacity.

**Proposed Hewitt Street Railroad Crossing Traffic Impacts**

The ADT on Hewitt St. is 95 vehicles based on counts taken in October 2010. These same counts indicated that Hewitt St. had an average weekday PM peak hour (4:00PM, highest volume hour of the day) volume of 10 vehicles. If Hewitt St. is closed these vehicles would use Monte-Elma Road as an alternate route. As stated above these streets would have a hourly capacity at LOS C is 350. Adding 17 vehicles during the PM peak hour to N. 13th St., W. Bailey Rd. and W. Martin St. is unlikely to cause them to exceed this LOS C capacity.

**Conclusion**

This analysis indicates that all of these streets operate better than an acceptable LOS C of 350 vehicles per hour. The closure of the four railroad crossings does not generate any new traffic. The network of streets north of the railroad tracks will continue to operate in an acceptable manner.

The conclusion of this analysis is that the closure of the railroad crossings at N. 2nd Street, N. 5th Street, N. 10th Street, N. 17th Street and Hewitt Street do not result in any significant traffic impacts within the City of Elma or Grays Harbor County.

**OPINION #2 – Nexus of Improvement Requirements for the Railroad Crossing Closures**

When implementing the Washington State Environmental Policy Act (SEPA), a determination needs to be made of how a reasonable relationship exists between the proposed action’s impacts and the type of mitigation that is imposed. As discussed above, the small amounts of traffic being rerouted from the proposed railroad crossings closures are not a significant impact. The only identifiable impact is that the proposed railroad crossings closures will create dead-end streets of longer than 150 feet. The required mitigation for this is to provide an all-weather access turnaround for emergency vehicles at the end of each street. A hammerhead (T-shaped turnaround) is sufficient for emergency vehicle turnaround.

The condition of the pavement in the City of Elma streets is determined by the level of effort of the City’s maintenance program. The existence of a railroad crossing in a street bears no relationship to the overall condition of the street. The small amounts of traffic being rerouted from the proposed railroad crossings closures will not make the condition of the streets worse. A mitigation requiring an overlay or reconstruction of the streets has no reasonable relationship to the proposed railroad crossings closures.

The grade of the street on each side of the railroad tracks was created by the design and construction of the street. The railroad is not proposing to make any grade changes to the track. Any mitigation to correct drainage issues that result from the design of the roadway has no reasonable relationship to the proposed railroad crossing closures. The major drainage issues raised by the City were along the streets, unrelated to the railroad crossing.

The existing streets that dead-end at the railroad track, N. 1st Street, N. Division Street, N. 9th Street, N. 14th Street, N. 15th Street and N. 16th Street, are all longer than 150 feet. No formal turnaround such as a hammerhead or cul-de-sac exists at the end of the street at any of these locations. On the south side of the railroad tracks alleys exist less than 150 feet from the end of the road at all of the above streets that provides for emergency vehicle turn around. County of Grays Harbor property records indicate that these alleys also exist south of the railroad track at the proposed crossings closures at N. 2nd Street, N. 5th Street, 10th Street and 17th Street. No turnarounds would be necessary on the south side of the railroad tracks at these four locations because the alleys are less than 150 feet from the proposed end of the street. Attached is Exhibit D that shows where these public alleys exist. Also attached are photographs of the alleys’ locations.

Additionally, the mitigation cost estimates presented by the City include betterments to the streets that do not exist today such as new sidewalk, curb & gutter, paved driveways, new water main, new sewer main and utility relocations that bear no reasonable relationship to the proposed railroad crossings closures.

**Conclusion**

The conclusion of this analysis is that the appropriate mitigation for the proposed railroad crossings closures is the construction of all-weather turnarounds, hammerheads, at both ends of each street at the railroad tracks and installation of the appropriate signage (except where existing alleys provide for adequate emergency vehicle turnaround). The appropriate signage would include notification to drivers that the street is not a through street and to restrict parking at the turnarounds. Only appropriate signage would be needed at N. 2nd Street, N. 5th Street, 10th Street and 17th Street south of the railroad tracks where alleys exist that provide for adequate emergency vehicle turnaround.

**OPINION #3 – Emergency Response Impacts from Railroad Crossing Closures**

The primary responsibility of a fire department is the delivery of fire and emergency medical services. The delivery of these services normally originates from fire stations located throughout the area to be protected. To provide effective service, crews must respond in a minimum amount of time after the incident has been reported and with sufficient resources to initiate fire, rescue, or emergency medical activities. For the purpose of this analysis it is assumed that the City of Elma and surrounding area, including Satsop is served by three fire stations. Three stations have been assumed because it is typical to have mutual-aid agreements between agencies for emergency services.

This analysis reviews the emergency response routes within the City of Elma, the impact of the changes from the proposed railroad crossing closures on these routes and the potential changes in response times. The three fire stations mentioned above include one City of Elma volunteer station and two Grays Harbor Fire District No. 5 (GHFD5) staffed stations. These stations are located as follows:

 City of Elma Fire Station 112 N. 2nd Street

 GHFD5 Station 51 428 Stamper Road

 GHFD5 Station 53 1003 Monte Elma Road

Based on these fire station locations and the proposed railroad crossing closure locations, four worst case response locations were identified. These locations are shown on Exhibit B. It is assumed that all three fire stations would access these locations by the same routes. The shortest current route and the longest potential route have been identified to each location. Assuming a conservative speed of 25 mph for the emergency vehicles, the distances and times are shown in the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Location | Current Distance (ft) | Proposed Distance (ft) | Differential (ft) | Current Response Time (sec) | Proposed Response Time (sec) | Differential (sec) |
| 1 | 5760 | 8020 | 2260 | 156 | 217 | 61 |
| 2 | 3580 | 5320 | 1740 | 97 | 144 | 47 |
| 3 | 2050 | 2620 | 570 | 56 | 71 | 15 |
| 4 | 1150 | 2220 | 1070 | 31 | 60 | 29 |

This part of the analysis reviews the emergency response routes within the community of Satsop, the impact of the changes from the proposed railroad crossing closure on these routes and the potential changes in response times. The fire stations mentioned above serve this area also. The closest station is GHFD5 Station 53. All of these fire stations would access Satsop from Monte-Elma Road. Based on these fire station locations and the proposed railroad crossing closure locations, one worst case response locations were identified. This location is shown on Exhibit C. The shortest current route and the longest potential route have been identified to each location. Assuming a conservative speed of 25 mph for the emergency vehicles, the distances and times are shown in the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Location | Current Distance (ft) | Proposed Distance (ft) | Differential (ft) | Current Response Time (sec) | Proposed Response Time (sec) | Differential (sec) |
| 1 | 6065 | 7245 | 1180 | 164 | 196 | 32 |

The National Fire Protection Association (NFPA) standards provides for time requirements for response of fire and emergency medical services. The response time is the time that begins when units are en route to the emergency incident and ends when units arrive at the scene. The NFPA standard states that the fire department shall meet its established response objectives no less than 90 percent of the incidents responded to.

The NFPA standard for fire response time is four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or eight minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident. The standard for a first responder or higher emergency medical response time is four minutes (240 seconds) or less for the arrival of a unit with first responder or higher-level capability at an emergency medical incident.

**Conclusion**

The travel time identified for all of the longest potential routes meets the NFPA standard requirement of 240 seconds. Also, the first responders will travel as fast as safely possible arriving at the incident even sooner than the times shown.

The conclusion of this analysis is that the closure of the railroad crossings at N. 2nd Street, N. 5th Street, N. 10th Street, N. 17th Street and Hewitt Street do not result in unsafe conditions with respect to emergency response.