BNSF Cherry Point Subdivision Meet/Pass Siding
Valley View Road Grade Crossing Traffic Impact Study

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1) Introduction and Description

The purpose of the BNSF Cherry Point Subdivision Meet/Pass Siding and Valley View Road Grade Crossing Traffic Impact Study is to analyze the impacts to vehicular traffic on the surrounding roadways if the Valley View Road/Cherry Point Subdivision at-grade crossing is closed.

1.1) Description of Proposed Project

BNSF is proposing to make improvements to the existing Cherry Point Subdivision. The existing meet/pass siding would be extended on the south side of the BNSF Cherry Point Subdivision starting from the wye near the Bellingham Subdivision and ending just east of Ham/Arnie Road. The meet/pass siding would be long enough to provide a holding area for a full length train and avoid blockage of the mainline. The meet/pass siding construction would include expansion of the existing rail embankment near Ham Road, on the south side of the existing embankment, and closure of the Valley View Road grade crossing.

The proposed meet/pass siding extension is necessary to accommodate efficient rail services in this region of the BNSF rail network. The Cherry Point Subdivision serves existing industrial facilities and the proposed meet/pass extension minimizes the holding of Cherry Point Subdivision trains on meet/pass sidings on the Bellingham Subdivision or the Seattle Subdivision.

2) Existing Conditions

The existing railway and roadway conditions were compiled to determine how the proposed project would impact the surrounding transportation network. The study area is shown in Figure 1.

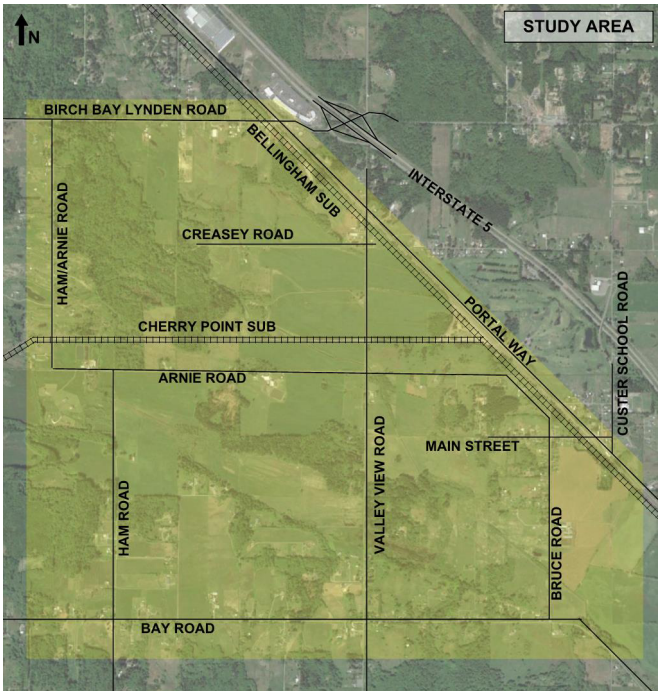

Figure 1: Study Area

2.1) Existing Rail Facilities

The Cherry Point Subdivision runs east/west through the study area, but eventually terminates south of the study area at the BP Cherry Point Facility and the Phillips 66 Refinery. The east terminus of the subdivision is the junction with the Bellingham Subdivision, just east of the Valley View Road crossing. There is a mainline with 5000' of siding on either side between Ham Road and Valley View Road; otherwise, the subdivision is a single track facility. The Bellingham Subdivision is a single track facility that runs northwest/southeast with a siding through the study area.

There are five at-grade, railroad crossings within the study limit. They include:

1. Birch Bay Lynden Road and Bellingham Subdivision (084845A),
2. Main Street and Bellingham Subdivision (084843L),
3. Valley View Road and Bellingham Subdivision (084844T),
4. Valley View Road and Cherry Point Subdivision (096110B), and
5. Ham/Arnie Road and Cherry Point Subdivision (096119M).

There have not been any reported crashes at any of these locations within the last ten years per the Federal Railroad Administration (FRA) Database.

Birch Bay Lynden and Bellingham Subdivision

The Bellingham Subdivision intersects Birch Bay Road approximately 150 feet west of the intersection of Birch Bay Road and Portal Way. The highway intersection is signalized with storage behind the rail road crossing. There are cross buck pavement markings, stop bars, and gates with preempted flashing beacons. The Bellingham Subdivision carries approximately 12 trains per day. In the existing condition, Birch Bay Lynden Road has an ADT of 11,277.

Main Street and Bellingham Subdivision

The Bellingham Subdivision intersects Main Street approximately 200 feet west of the intersection of Main Street and Portal Way. The Main Street approaches are stop controlled at the roadway intersection. There are cross buck pavement markings, stop bars, and gates with preempted, flashing beacons. The Bellingham Subdivision carries approximately 12 trains per day. In the existing condition, Main Street has an ADT of 964.

Valley View Road and Bellingham Subdivision

The Bellingham Subdivision intersects Valley View Road approximately 120 feet south of the intersection of Valley View Road and Portal Way. The Valley View Road approaches are stop controlled at the roadway intersection. There are cross buck pavement markings, stop bars, and gates with preempted, flashing beacons. The Bellingham Subdivision carries approximately 12 trains per day. In the existing condition, Valley View Road has an ADT of 364.

Valley View Road and Cherry Point Subdivision

The Cherry Point Subdivision intersects Valley View Road approximately 600 feet north of the intersection of Valley View Road and Arnie Road. Valley View Road is stop controlled at the

roadway intersection with Arnie Road. There are cross buck pavement markings, stop bars, and gates with preempted, flashing beacons. The Cherry Point Subdivision currently carries 8 trains per day. In the existing condition, Valley View has an ADT of 364.

Ham/Arnie Road and Cherry Point Subdivision

The Cherry Point Subdivision intersects Ham/Arnie Road approximately 600 feet north of a 90 degree curve in Ham/Arnie Road. There are cross buck pavement markings, stop bars, and preempted, flashing beacons. This crossing does not have gates. The Cherry Point Subdivision currently carries 8 trains per day. In the existing condition, Ham/Arnie Road has an ADT of 211.

2.2) Existing Roadway Facilities

Valley View Road

Valley View Road is a low volume local road which runs north/south between Grandview Road and a residential cul-de-sac just north of Portal Way. Valley View Road crosses the Cherry Point Subdivision of BNSF approximately 600 feet north of the intersection with Arnie Road. The ADT at the rail crossing was counted in 2015 at 364 vehicles. The pavement is approximately 20 feet wide.

Portal Way

Portal Way is an arterial road that runs parallel to Interstate 5 through the area. It runs northwest/southeast and is signalized at the intersection with Birch Bay Lynden Road. The 2015 ADT was estimated at 2,459. The pavement is approximately 20 feet wide.

Birch Bay Lynden Road

Birch Bay Lynden Road is an arterial that runs east/west on the north side of the study area. The 2015 ADT was estimated at 11,277. Birch Bay Lynden Road has interchange access to Interstate 5 to the east of the intersection with Portal Way. Birch Bay Lynden Road crosses the Bellingham Subdivision of BNSF approximately 150 feet west of the signalized intersection with Portal Way

Main Street

Main Street is a minor collector that runs east/west between Bruce Road and Custer School Road. The 2015 ADT was estimated at 823. The pavement is approximately 16 feet wide. Main Street crosses the Bellingham Subdivision of BNSF approximately 200 feet west of the intersection with Portal Way.

Ham/Arnie Road

Ham/Arnie Road is a low volume local road. Ham Road intersects Arnie Road at a T-intersection. The roadway to the west of the intersection and north to Birch Bay Lynden Road is referred to as Ham/Arnie Road. The roadway has a 90 degree bend approximately 1200 feet west of the T-intersection of Ham Road and Arnie Road. Ham/Arnie Road connects Birch Bay Lynden Road to the intersection of Ham Road and Arnie Road. Ham/Arnie Road crosses the

Cherry Point Subdivision of BNSF approximately 600 feet north of the bend. The ADT at the rail crossing was counted in 2015 at 211 vehicles. The pavement is approximately 20 feet wide.

Arnie Road

Arnie Road is a low volume local road which runs east/west between Ham Road and Bruce Road. The 2015 ADT was estimated at 171. The pavement is approximately 18 feet wide.

Ham Road

Ham Road is a local street that runs north/south between Bay Road and Arnie Road. The pavement is approximately 20 feet wide. Whatcom Council of Governments Traffic Count Manual does not have ADT data for this section on roadway.

Bay Road

Bay Road is an arterial that runs east/west on the south side of the study area. The 2015 ADT was estimated at 2,139. The pavement is approximately 20 feet wide.

Bruce Road

Bruce Road is a local road the runs north/south between Bay Road and Arnie Road. The 2015 ADT was estimated at 686. The pavement is approximately 24 feet wide.

3) Proposed Project Impacts

3.1) Closure of Valley View Road and Cherry Point Subdivision Crossing

BNSF Railway is proposing to lengthen an existing siding and construct an additional track across the Valley View Road crossing in order to create a meet and pass siding of adequate length. This would allow long trains to store on the siding and other trains to pass. This would require the closing of the Valley View Road crossing at the Cherry Point Subdivision.

The following paragraph is from "Guidance on Traffic Control Devices at Highway-Rail Grade Crossings," published by the U.S. Department of Transportation Federal Highway Administration in November, 2002.

"… The crossing should be closed to vehicular and pedestrian traffic when railroad operations will occupy or block the crossing for extended periods of time on a routine basis and it is determined that it is not physically or economically feasible to either construct a grade separation or shift the train operation to another location. Such locations would typically include:

1. *Rail yards;*
2. *Passing tracks primarily used for holding trains while waiting to meet or be passed by other trains;*
3. *Locations where train crews are routinely required to stop their trains because of cross-traffic on intersecting rail lines or to pick up or set out blocks of cars or switch local industries en route;*

4. *Switching leads at the ends of classification yards;*
5. *Where trains are required to "double " in or out of yards and terminals;*
6. *In the proximity of stations where long distance passenger trains are required to make extended stops to transfer baggage, pick up or set out equipment or be serviced en route; and*
7. *Locations where trains must stop or wait for crew changes."*

The meet/pass siding track is needed to provide a safe area to perform mandated, regulatory inspections and to avoid blockage of BNSF Railway's mainline. The proposed siding would result in Valley View Road being blocked for extended periods of time on a regular basis.

The mobility benefits from keeping Valley View Road open would not outweigh the cost of constructing a grade separated facility. Access to the surrounding crossings require less than 2.0 miles of adverse travel and using standard published cost for vehicle miles traveled and vehicle hours traveled, the detoured traffic would not result in enough added costs to support the construction and maintenance of a grade separated facility. Additionally, the ADT, train volumes, and exposure factors are below the threshold for requiring grade separation according to "Guidance on Traffic Control Devices at Highway-Rail Grade Crossings." The recommended thresholds for rural crossings include: ADT of 25,000, train volume of 150 trains per day, and an exposure factor of 125,000.

The Cherry Point Subdivision is an economically feasible location for the meet/pass siding because the BNSF Railway can take advantage of the existing track and right-of-way, the ground is relatively flat, and the impacts to the surrounding land uses are relatively minor. Constructing the same siding somewhere else could have more impacts to the transportation network, surrounding land uses, and cost more money.

3.2) Stakeholder Involvement

Stakeholder involvement is essential to understand how emergency responders and school buses move through a study area. The study area is served by two fire protection districts, Whatcom County Fire District 7 and North Whatcom Fire and Rescue. The dividing boundary between these districts is Bay Road.

A representative from Whatcom County Fire District 7, Polly Linville, was contacted to discuss the implications to fire and rescue service. Kurt Bialobreski from Hanson spoke on the phone with Ms. Linville on August 24, 2015. Ms. Linville stated that the study area is a mutual aid area with North Whatcom Fire and Rescue. The closest manned fire station that would respond from Whatcom County Fire District 7 is located at 4047 Brown Road (Station 42) in Ferndale and the closest responding medic unit is located at 1886 Grandview Road (Station 45). Ms. Linville didn't expect any changes or delays to emergency response from Whatcom County Fire District 7 if the Valley View Road crossing is closed.

A representative from North Whatcom Fire and Rescue, Henry Hollander, was contacted to discuss the implications to fire and rescue service. Kurt Bialobreski from Hanson spoke on the phone with Mr. Hollander on August 25, 2015 and followed up on September 1, 2015. Mr. Hollander stated that he had written a letter opposing the closure of the Valley View Road crossing because the closure would cause delayed response to some addresses along Valley View

Road between the crossing and Bay Road. Additional information provided by Mr. Hollander included:

- The fire station located at 7625 Custer School Road (Station 64) is up for sale and closed. Responses from this station would no longer exist and all responses would come from either the station at 4581 Birch Bay-Lynden Road (Station 63) or the station at 9408 Odell Road in Blaine (Station 61).
- For emergencies that are responded to from Station 63, Ham Road is not an ideal route to serve the Valley View Road area because of the curves and bends in the roadway alignment. Fire and rescue to the area would use Kickerville Road.
- Existing response times to the Valley View Road area (between the crossing and Bay Road) are approximately 8-10 minutes, and expectations would be that the response time would increase to 10-12 minutes with the Valley View Road crossing closure. The proposed 10-12 minute response time is not uncommon for the fire district as some response times are as long as 15 minutes.

A representative from the Ferndale School District, Ms. Lori Apana, was contacted to determine the impacts to school bus service if the Valley View Road crossing was closed. Kurt Bialobreski from Hanson spoke on the phone with Ms. Apana on August 24, 2015 and via email on August 31, 2015. Ms. Apana noted that existing service would not be affected by the closure because current residents do not require service on Valley View Road. The crossing at Ham/Arnie Road is of concern to the school district as they do currently use the crossing and report being stopped at the crossing with students on the bus for 2.5 hours last spring. Hanson explained to Ms. Apana that the closure of the Valley View crossing would allow for improvements to the railroad tracks that would keep stopped trains from queuing across the Ham/Arnie Road crossing.

3.3) Traffic Impact Study

A traffic impact study (TIS) was performed to understand what effects closing the Valley View Road and Cherry Point Subdivision crossing would have on the existing traffic patterns and the surrounding crossings. The TIS included:

1. Data Collection
2. Projecting Existing 2015 ADT
3. Determining Existing Peak Hour Counts
4. Redistributing Peak Hour Counts
5. Projecting Closure 2015 ADT
6. Determining Impacts and Severity of Impacts

Data Collection

ADT data was collected at the Valley View Road and Ham Road crossings with the Cherry Point Subdivision. Peak hour data was collected at the intersection of Arnie Road and Valley View Road. Historic ADT and growth rates were found using the Whatcom Council of Governments Traffic Count Manual. Roadway widths, existing traffic control, and existing railroad traffic control was collected at the intersection of Arnie Road and Valley View Road on the same date

as the traffic study. Other existing conditions were observed from aerial photography. Crossing information was verified with BNSF Railway. Historic ADT information is shown in Figure 2.

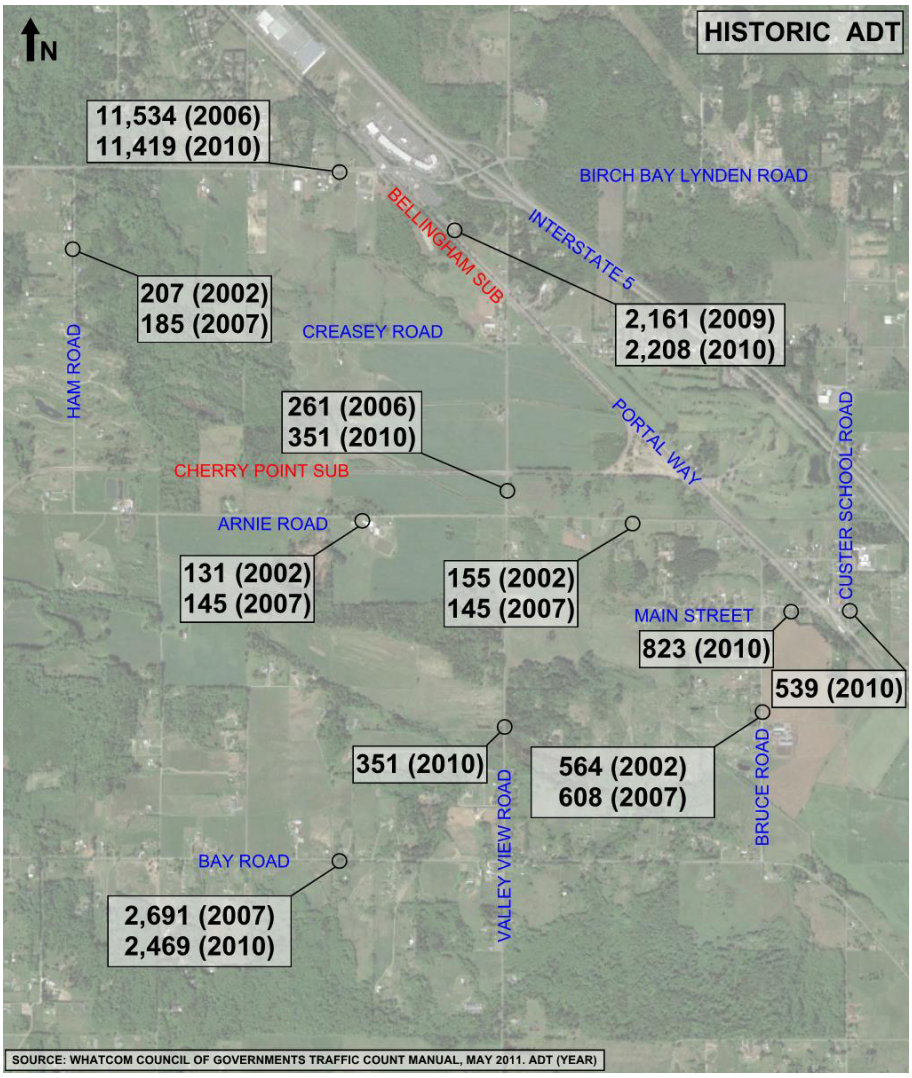

Figure 2: Historic ADT

Projecting Existing 2015 ADT

The existing 2015 ADT's that were outlined in the "Existing Road Way Facilities" section, were estimated using information from the Whatcom Council of Governments Traffic Manual. It has historic ADT counts for many of the roads in the study area. The collected ADT counts were used for Ham/Arnie Road and Valley View Road. For the surrounding roads where multiple years of ADT values were available, the historic annual growth rate was used and applied to determine the projected 2015 ADT. For Main Street and sections of Valley View Road, where only one year of ADT data was available, a growth rate was assumed. Main Street was assumed to grow at 2.00% annually because Bruce Road had a growth rate of 1.51% and an assumption slightly higher is conservative. The south segment of Valley View Road was assumed to grow at the same rate as the segment north of Arnie Road. The projected 2015 ADTs and the annual growth rates are shown in Figure 3.

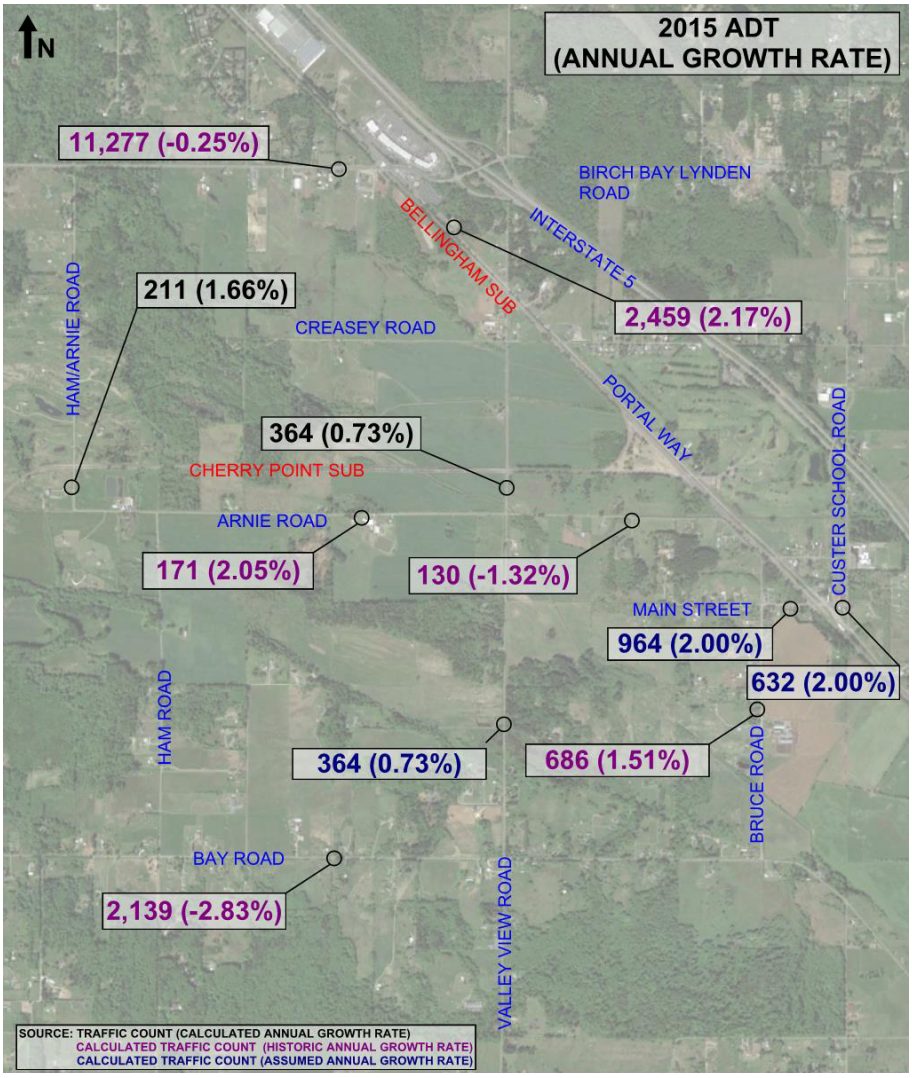

Figure 3: Projected 2015 ADT

Determining Existing Peak Hour Counts

Peak hour counts were taken at the intersection of Arnie Road and Valley View on an average day in August 2015. The PM peak had significantly higher volumes than the AM peak, so the remainder of the traffic study focused on the PM peak hour. The percent of ADT that occurred during the peak hour was 5.3% on the west leg of Arnie. This value was assumed to hold true for Ham/Arnie Road. The peak hours on the arterial and collector streets (Portal Way, Bay Road, Birch Bay Lynden Road, and Main Street) were assumed to be 12% of the ADT. This value is on the high end of the industry standard for PM peak hours. It is a conservative assumption. At the intersection of Arnie Road and Valley View Road, north/south and east/west splits were not directional. Therefore, a 50/50 split was applied to the arterials and collectors. With this information, intersection turning volumes were assumed based on likely travel patterns and potential origins and destinations. Most trips were assumed to be external to external, meaning the intersections balanced between each other. Aside from the area north of the Cherry Point

Subdivision crossing on Valley View Road, no trips were assumed to begin or end within the study area. Existing peak hour turning movements are shown in Figure 4.

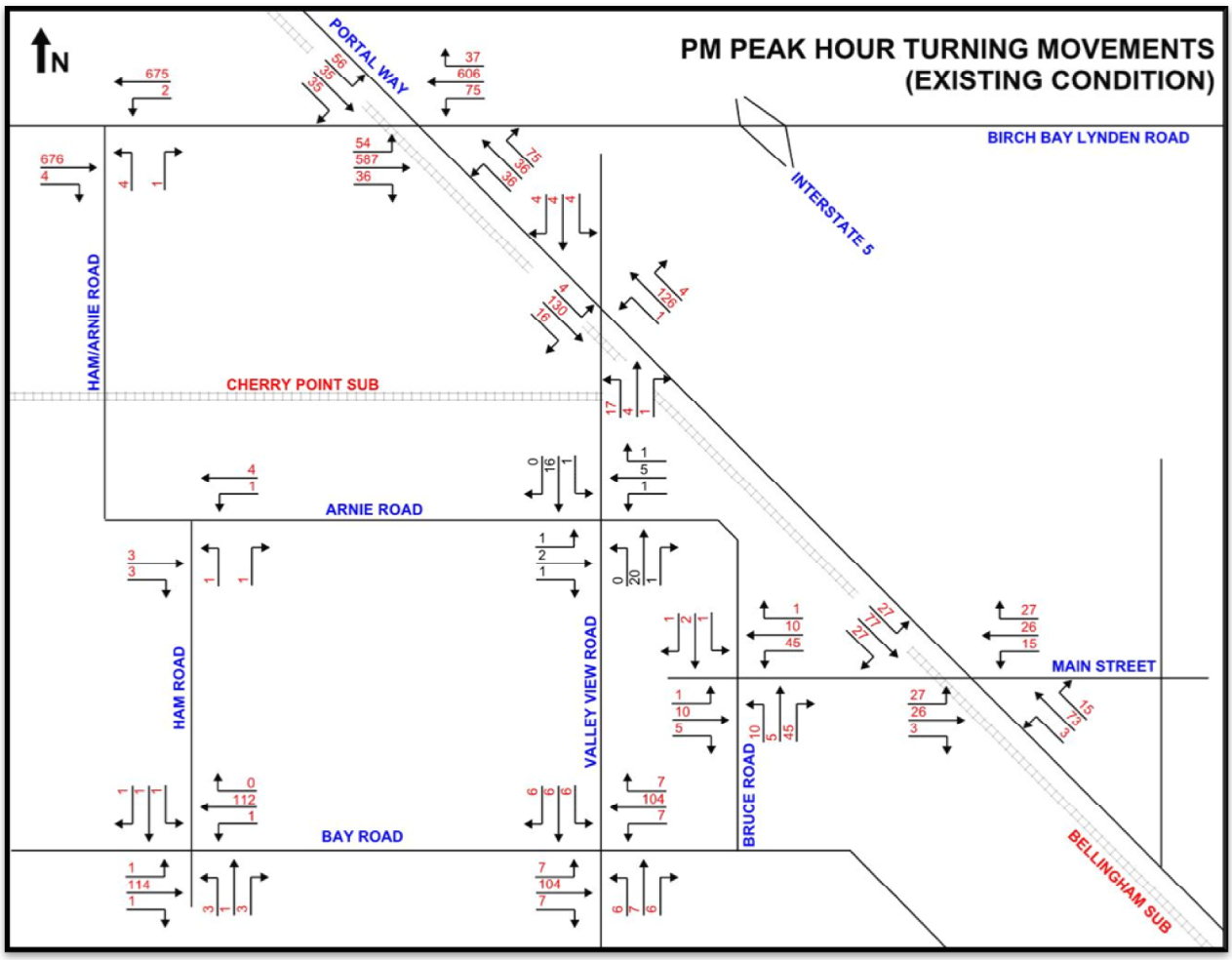

Figure 4: 2015 Peak Hour Counts - Existing Condition

Redistributing Peak Hour Counts

There are no existing access points between the Valley View Road and Cherry Point Subdivision at-grade crossing and the Arnie Road and Valley View Road intersection. Any vehicles that came from the north or went to the north during the PM peak hour crossed the tracks. Additionally, there would be no reason for vehicles to remain on the north leg of the intersection if the crossing is closed. In the PM peak hour, there were 17 southbound vehicles and 22 northbound vehicles using the crossing. These 39 vehicles were redistributed to alternate routes with the general direction of the trip remaining the same. For example, if a vehicle made a southbound left, then the detour route would end with it exiting the study area in the southeast. Redistributed peak hour turning movements are shown in Figure 5.

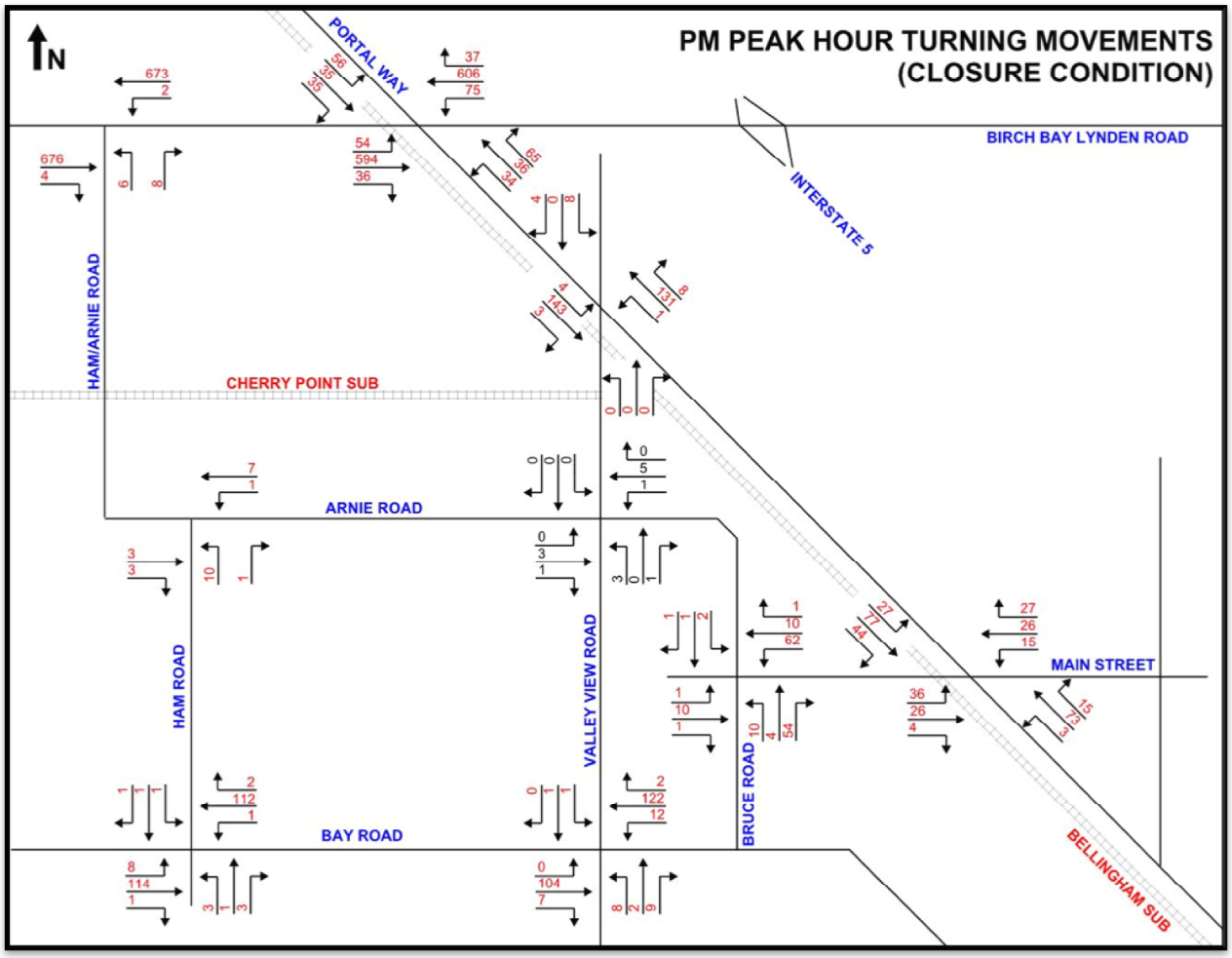

Figure 5: 2015 Peak Hour Turning Movements - Closed Condition

Projecting 2015 and 2020 Closure ADT

To determine how the daily crossing volumes would change at the remaining crossings, the redistributed peak hour was applied to the entire day. The ADT at the Valley View/Cherry Point crossing is 364 and 39 of those vehicles are in the PM peak hour. The remaining 325 vehicles were redistributed the same way as the 39 vehicles.

The 2020 ADT volumes were assumed using the historical growth rate outlined in Figure 3.

3.4) Sight Distance

Sight distance for an approaching train was checked at the Ham/Arnie crossing and the Main Street crossing. The train speed is 10 miles per hour on the Cherry Point Subdivision and up to 79 miles per hour on the Bellingham Subdivision. The Ham/Arnie Road crossing requires 105 feet of clear sight distance and the Main Street crossing requires 1,460 feet of clear sight distance from the stop bar for cars. At the Ham/Arnie Road crossing, the siding will begin far enough to the east to provide the required sight distance from a train that is stored on the siding. The Main Street crossing has the adequate sight distance from the stop bar. Additionally, preempted

flashing lights and gates can mitigate sight distance concerns. These lights and gates are proposed at the Ham/Arnie crossing and already exist at the Main Street crossing.

3.5) Impacts

The TIS identified impacts from the change in travel pattern created by closing the Valley View/Cherry Point crossing. They included:

- Changes in traffic volumes across the 5 crossings in the study area,
- Increased traffic at intersections, and
- Increased traffic on narrower roadways, and
- Changes in access to adjacent property

Traffic Volumes at Crossings

Table 1 shows the 2015 existing ADT and approximated closed condition ADT across the five crossings in the study area.

Table 1: 2015 Crossing ADT

Cross Street	BNSF Subdivision	Existing Condition ADT	Closed Condition ADT	Total Change
Birch Bay Lynden Road	Bellingham	11,277	11,324	+47
Main Street	Bellingham	964	1,216	+252
Valley View Road	Bellingham	364	50	-314
Valley View Road	Cherry Point	364	0	-364
Ham Road	Cherry Point	211	323	+112

The total volume of vehicles crossing railroad tracks within the study area is reduced by 267 vehicles per day. This is due to vehicles that were crossing at Valley View/Cherry Point were generally crossing at Valley View/Bellingham as well. Alternate routes for these vehicles did not require crossing as many tracks. However, the Bellingham Subdivision carries 12 trains per day while the Cherry Point Subdivision carries 8. The metric that can compare relative safety and delay across locations is the exposure factor. Exposure factor also helps indicate the appropriate level of crossing treatment at a given crossing. This value is calculated by multiplying the roadway ADT by the number of trains per day. Table 2 shows the exposure factors for the open and closed conditions in 2015.

Table 2: 2015 Crossing Exposure Factor

Cross Street	BNSF Subdivision	Existing Condition Exposure Factor	Closed Condition Exposure Factor	Total Change
Birch Bay Lynden Road	Bellingham	135,324	135,888	+564
Main Street	Bellingham	11,568	14,592	+3,024
Valley View Road	Bellingham	4,368	600	-3,768
Valley View Road	Cherry Point	2,912	0	-2,912
Ham Road	Cherry Point	1,688	2,584	+896
Total Study Area		**155,860**	**153,464**	**-2,196**

The number of vehicles crossing railroad tracks and the exposure factors are reduced when the Valley View Road/Cherry Point crossing is closed. In general, this means that the study area is less likely to have vehicle-train conflicts when the Valley View Road and Cherry Point Subdivision crossing is closed.

The exposure factor at the Ham/Arnie Road crossing increases. This is the only crossing in the study area without gates.

In 2020, the pattern stays similar with overall exposure factor decreasing due to the closure of Valley View at the Cherry Point crossing. Table 3 and Table 4 show the open and closed condition ADT and the open and closed condition exposure factors for 2020. The exposure factor assumed 10 trains per day on the Cherry Point Subdivision and 14 trains per day on the Bellingham Subdivision.

Table 3: 2020 Crossing ADT

Cross Street	BNSF Subdivision	Existing Condition ADT	Closed Condition ADT	Change
Birch Bay Lynden Road	Bellingham	11137	11185	+48
Main Street	Bellingham	1064	1325	+261
Valley View Road	Bellingham	377	50	-327
Valley View Road	Cherry Point	377	0	-377
Ham Road	Cherry Point	229	345	+116

Table 4: 2020 Crossing Exposure Factor

Cross Street	BNSF Subdivision	Existing Condition Exposure Factor	Closed Condition Exposure Factor	Change
Birch Bay Lynden Road	Bellingham	155,918	156,590	+672
Main Street	Bellingham	14,896	18,550	+3,654
Valley View Road	Bellingham	5,278	700	-4,578
Valley View Road	Cherry Point	3,770	0	-3,770
Ham Road	Cherry Point	2,290	3,450	+1,160
Total Study Area		**182,152**	**179,290**	**-2,862**

Capacity at Intersections

The only intersection with substantial additional hourly volumes is the intersection of Main Street and Portal Way. In the peak hour, the eastbound left is estimated to increase from 27 vph to 36 vph, the southbound right increases from 3 vph to 17 vph, and the eastbound right increases from 3 vph to 4 vph. Existing and proposed peak hour turning movements are shown in Figure 6, Figure 7, and Figure 8.

There are four possible concerns for increasing the traffic at this intersection:

1. The stop controlled approach (Main Street) could experience added delay.
2. The added volume to the eastbound approach could also create a longer queue, possibly backing up across the Bellingham Subdivision.
3. Additional turning volumes on Portal Way could cause rear end crashes due to speed differential between vehicles slowing to turn from Portal Way to Main Street, and
4. The added volumes westbound across the tracks could cause backups into the Main Street and Portal Way intersection.

Highway Capacity Software (HCS) was used to determine the approach delay and 95th percentile queue for the eastbound approach. Results of the HCS analysis show that all approaches at the intersection will operate at a level of service (LOS) B or better in the 2015 and 2020 closed condition. This is an acceptable condition.

The 2020 closed condition 95th percentile queue length is calculated to be a fraction of a vehicle, meaning that 95% of the time there will be only one, or no car in the queue, which will not result in vehicles queueing on the BNSF Railway track. The intersection will not operate significantly different than the existing condition.

To determine how the intersection will operate if a train is present, HCS signal software was used to determine the 95th percentile queue if a train stopped Main Street traffic for two and half minutes. In the existing condition, if the train arrives during the peak 15 minute period, the 95th percentile queue would be 5 vehicles long. If the vehicle volume is increased in 2015 for

redistributed traffic, the queue becomes seven vehicles long. With the additional traffic in 2020, the 95th percentile queue is still seven vehicles long. This analysis assumes that a mile long train arrives during the busiest 15 minutes of the day, and is slowing to a speed to enter the Cherry Point Subdivision.

There is 115 feet between the westbound stop bar at the crossing and the Portal Way travel lane, which can hold approximately four or five vehicles. In the current condition, the crossing may occasionally cause queues backs up into the intersection.

To mitigate the effects of the added queue, a southbound right lane is recommended. Vehicles waiting to cross the tracks can store in the turn lane and not interfere with through movements on Portal Way.

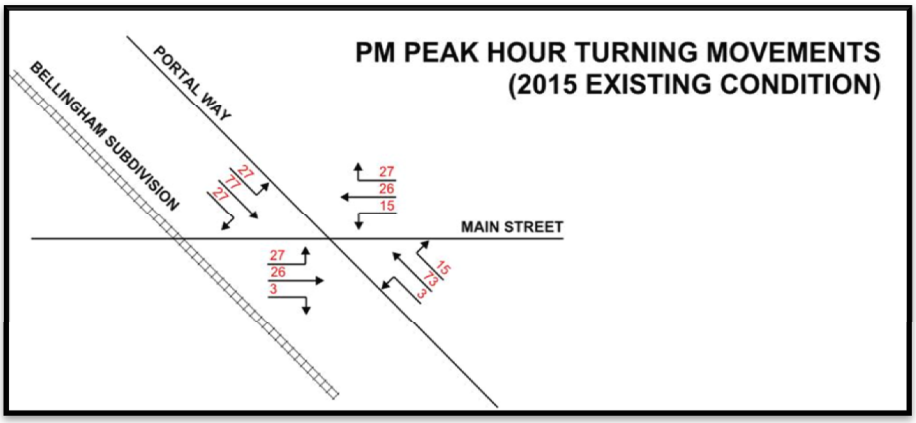

Figure 6: Main Street and Portal Way 2015 Turning Movement - Existing Condition

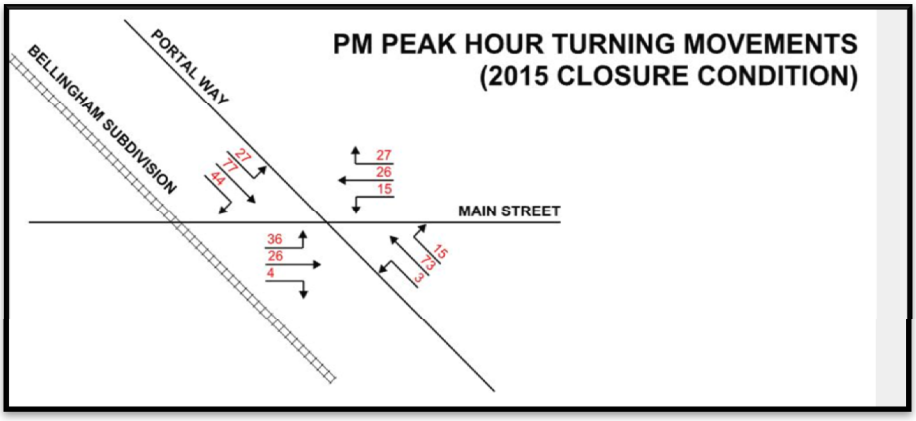

Figure 7: Main Street and Portal Way 2015 Turning Movement - Closed Condition

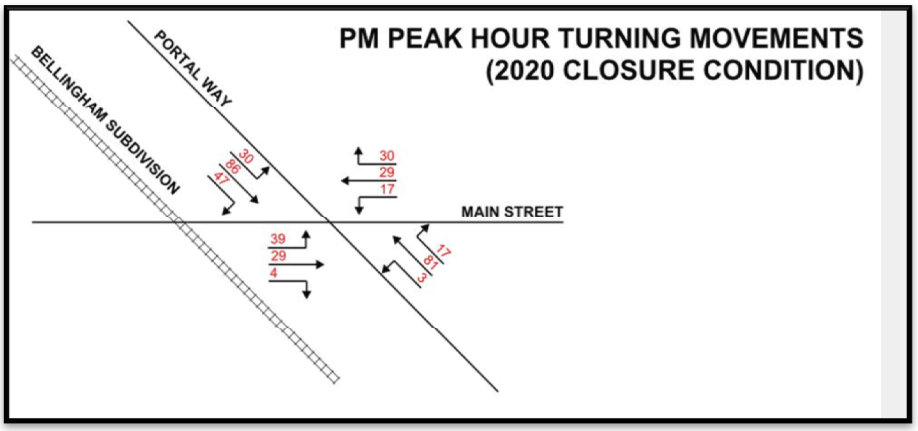

Figure 8: Main Street and Portal Way 2020 Turning Movement - Closed Condition

Roadways with Increased Traffic

According to Exhibit 1130-11 from the July 2014 WSDOT Design Manual (M 22-01.11), all the subject roadway widths are substandard. Moving traffic from Valley View Road to another, narrow roadway should not cause any additional safety concerns.

Changes in Access to Adjacent Property

Access to the properties on Valley View Road (Portal Way to Arnie Road) and Creasey Road (west of the Bellingham Subdivision) are affected by the closure of the Valley View/Cherry Point Crossing. The south leg of the intersection of Portal Way and Valley View Road will become a dead end.

4) Recommendations

If BNSF extends the existing meet/pass siding at the proposed location, the Valley View/Cherry Point crossing should be closed. Impacts to the surrounding traffic patterns are minor and can be mitigated. Recommendations include:

- Installing gates at the Ham/Arnie Road crossing,
- Constructing a southbound right turn lane at Portal Way and Main Street,
- Appropriately signing the change in access north of the closure, and
- Redesign of the intersection at Valley View Road and Creasey Road to allow design vehicles to turn around.