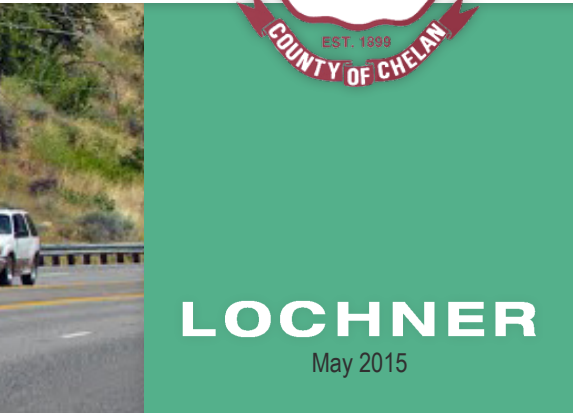




Chelan County

# Cashmere Area Transportation Study



**LOCHNER**

May 2015



# Cashmere Area Transportation Study

## CHELAN COUNTY

Prepared for:

Chelan County  
City of Cashmere  
Port of Chelan County  
Chelan-Douglas Transportation Council

Prepared by:

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## Chapter 1: Introduction

In 2002, the Washington State Department of Transportation (WSDOT) completed a US 2/97 Corridor Safety Study in which a need was identified to replace two Cashmere area US 2 intersections with freeway interchanges. The WSDOT study recommended replacement of the US 2/Hay Canyon Road traffic signal with an interchange, including realignment of the US 2/Goodwin Road Bridge connection and replacement of the bridge. The study also identified the need to replace the US 2/Cottlets Way intersection with a new freeway interchange to be located approximately one-half mile east of the existing intersection.

The US 2 Cashmere area intersection improvements recommended in the 2002 WSDOT study are high-cost improvements that are not feasible within current or expected future funding limitations. In addition, Cashmere's west side industrial area is expanding and lacks defined freight truck access. The impending closure of the 1929 vintage Goodwin Road Bridge complicates the freight truck access challenge and the general traffic circulation in the county, city and rural residential areas west of Cashmere.

### PURPOSE

The purpose of the US 2/97 Cashmere Area Transportation Study is to generate a report:

- Analyzing the effects and impacts of a permanent Goodwin Road Bridge closure
- Analyzing and recommending replacement options for the 1929<sup>1</sup> Goodwin Road Bridge alternative
- Recommending whether the Goodwin Road Bridge should be replaced or eliminated
- Identifying current and recommended truck routes between US 2 and the industrial areas in the Cashmere UGA
- Identifying and recommending road, intersection and bridge improvements along current and recommended routes for freight trucks in the Cashmere UGA
- Identifying, evaluating, and recommending alternatives to the high-cost safety and traffic improvements recommended in the 2002 WSDOT US 2/97 Corridor Safety Study
- Providing planning level design (type, size, location, and environmental analysis) and cost estimates for all recommended improvements, including Goodwin Road Bridge replacement

### STUDY AREA

The study area is the segment of US 2/97 between the Hay Canyon intersection vicinity east to the US 2/97 location proposed in the

<sup>1</sup> As-built plans are dated 1929.

2002 WSDOT study for the "East Cashmere Diamond Interchange," near the intersection of US 2/97 with Red Apple Road and Old Monitor Road. Additionally, the study will include areas within the Cashmere urban growth boundary and unincorporated rural areas to the east or west of the Cashmere UGA with present or future freight truck access to industrial areas in the Cashmere UGA (see Figure 1.1).

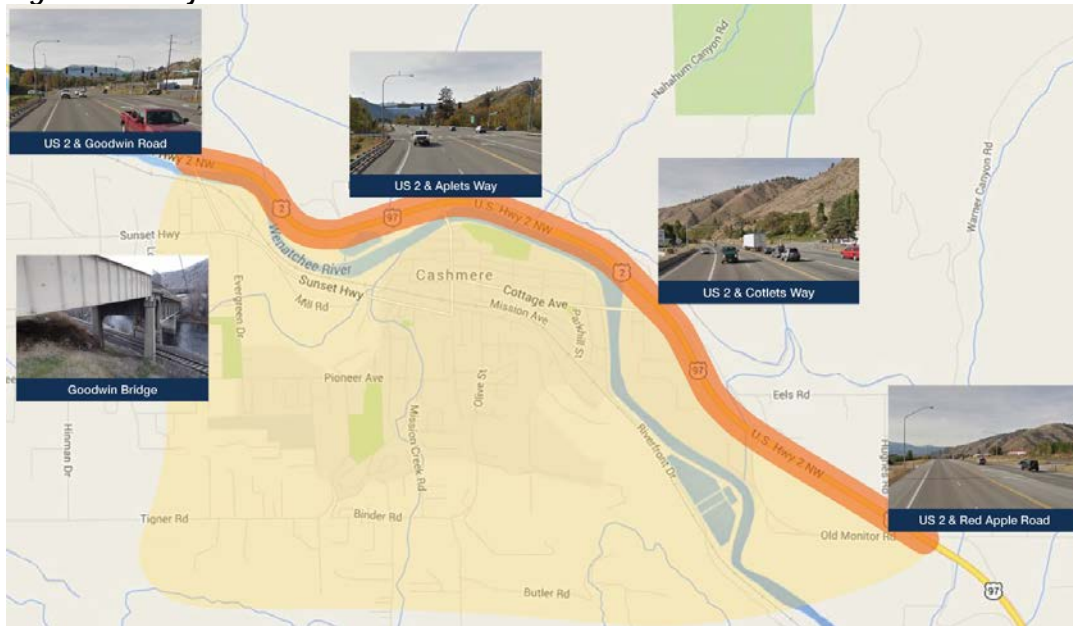
### PROJECT PARTNERS

This study is an inter-local cooperative effort among:

- Chelan County
- City of Cashmere
- Port of Chelan County
- WSDOT North Central Region
- Chelan-Douglas Transportation Council

### ALTERNATIVES TO GOODWIN ROAD

A Technical Advisory Committee made up of professional staff members of each of the Project Partners, including their consultant team, identified four alternatives to be reviewed to meet certain constraints. These constraints include clearing the Burlington Northern Santa Fe (BNSF) Railroad track, crossing the Wenatchee River, and meeting a project purpose of reducing overall costs associated with an interchange at US 2/SR 97. The

**Figure 1.1: Project Area**

alternatives were also presented at three public meetings – two in a community-wide open house format and at the annual meeting of the Cashmere Chamber of Commerce. The alternatives included:

- A no build alternative
- Replacing the bridge near its current location
- Replacing the bridge near the old alignment that was washed out in 1925
- Replacing the bridge near Orchard Drive almost one-half mile to the west of the current bridge

### TRUCK ROUTES

Once a preferred alternative is selected for the Goodwin Road Bridge replacement, truck routes are to be analyzed based on likely routes to and from the major freight users. These include Blue Star Growers, Bethlehem Construction, and Martin's Market Place (IGA), each of which uses the Cottlets Way/US 2 intersection. Additionally, Crunch Pak, which due to load restriction and turning movement issues at Goodwin Road, uses the Aplets Way intersection with US 2.

With limited industrial land in the broader region, the Port of Chelan is preparing to add the old 32-acre Cashmere Mill site, located at the intersection of Mill Road and Sunset Highway, to its inventory of industrial properties. Unless the Goodwin Road Bridge is replaced, access to this industrial area will also have to be through the US 2/Aplets Way intersection.

### US 2/97 ALTERNATIVES

For each of the three intersections entering Cashmere from US 2, alternatives that address safety, congestion and operational issues will be reviewed. In each case, the reality of funding restrictions for both short-term and long-term improvements has limited this evaluation to at-grade solutions. No grade-separated alternatives are considered.

Additionally, WSDOT is now requiring that projects on routes managed by the State of Washington also take into consideration elements of "practical design."<sup>2</sup>

<sup>2</sup> Practical Design is an approach to making project decisions that focus on the need for the project and looks for cost-effective solutions. A fully implemented practical design approach applies to all aspects of transportation system development, from system planning through all phases of project development. [www.wsdot.wa.gov/Projects/PracticalDesign](http://www.wsdot.wa.gov/Projects/PracticalDesign).

## Chapter 2: Data Collection

In order to complete the basic analysis required for the Cashmere Area Transportation Study, basic levels of data collection were required, as follows:

- Limited spot elevations along US 2, the BNSF Railroad tracks, and ground immediately south of the railroad tracks
- Land use and population data
- Household and employment data
- Traffic counts
- Truck routing
- Pavement and intersection condition

### SPOT ELEVATIONS

One directive of this analysis is to provide conceptual designs that do not include expensive, grade-separated intersections with US 2/97. In order to address a critical issue associated with connecting the local street system in Cashmere to US 2/97, sufficient clearance over the BNSF Railroad tracks must be provided while still getting back to grade in time to intersect with US 2/97.

Additionally, because the intent of a new bridge is in large part freight and emergency vehicle access, the slope of the bridge must be such that heavily loaded vehicles can operate on the structure.

To address the need, in August of 2014, the Chelan County land surveying firm, Northwest Geodimensions, collected spot elevations at the locations needed to complete the analysis.

### LAND USE, POPULATION, HOUSEHOLD & EMPLOYMENT DATA

In order to forecast traffic (see Appendix 1), land use, population, household and employment data were all considered.

Population, household and employment data were collected from the US Department of the Census and supplemented with growth trends from the Washington Office of Financial Management.

Land use data was collected from the City of Cashmere Comprehensive Plan.

### TRAFFIC COUNTS

PM peak period turning movement counts were collected for 15 study intersections in 2012, 2013 and most of 2014. Older counts were adjusted to a 2014 base year.

Heavy vehicles were counted by individual movement and identified separately from passenger vehicles.

US 2/Hay Canyon Rd and US 2/Aplets Way were counted Tuesday, June 10, 2014. US 2/Cottlets Way was counted Thursday, June 5, 2014. The volumes on US 2 were notably

higher on the June 5th count, so the higher through-traffic volumes were balanced on US 2 through the other two intersections.

### TRUCK ROUTING

On September 16, 2014, representatives of the Technical Team met with the major freight users in Cashmere (Bethlehem Construction, Martin's IGA Market, Crunch Pak, and Blue Star Growers) to discuss both the truck routes used and the relative frequency and timing of freight traffic.

While users could not provide accurate numbers of vehicles, they did identify the predominant routes and discussed potential design concerns. Major truck routes include:

- Division Street
- Cottage Avenue
- Sunset Highway
- Evergreen Drive
- Pioneer Avenue

If not for the restrictions on the Goodwin Road Bridge, it too would be a preferred freight route. While not discussed, because it is the main entryway to Blue Star Growers, Vine Street also carries a significant amount of freight traffic, even though it is categorized as a local street.

The truck route map is included in Chapter 4.

## PAVEMENT CONDITION

For small cities in the State of Washington, the Transportation Improvement Board (TIB) maintains the most comprehensive pavement condition inventory (see Figure 2.1). That inventory was used for this assessment, along with a drive-by visual assessment by the Technical Team.

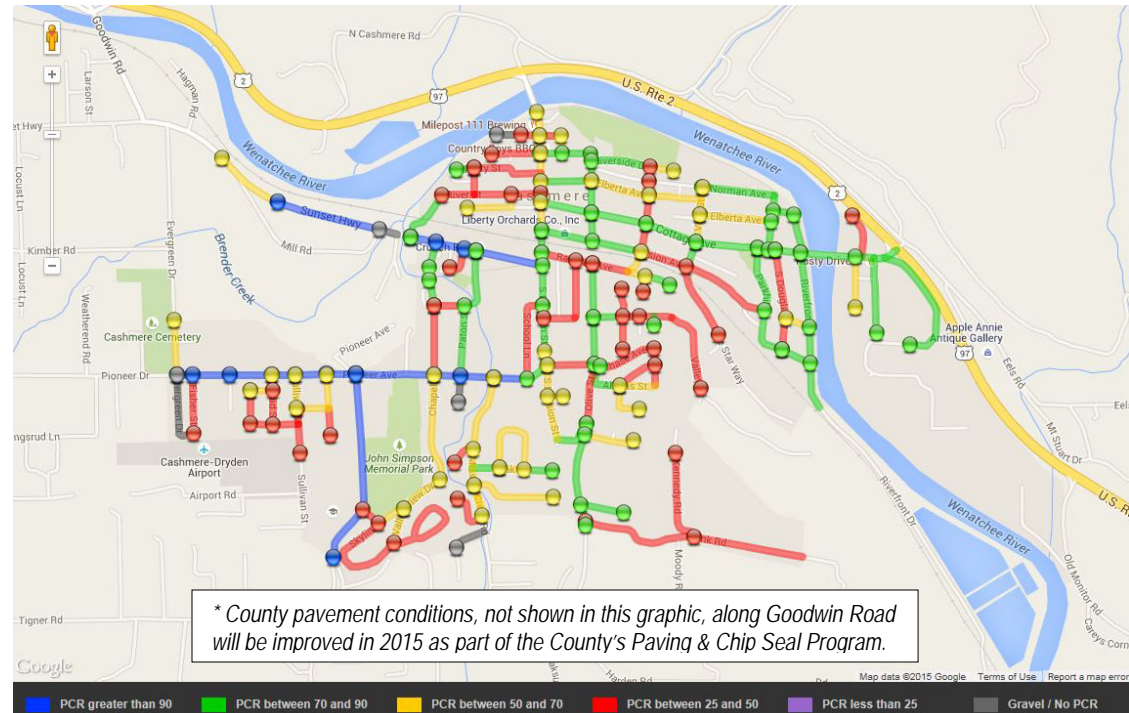
**Sunset Highway** In 2012, through a TIB grant, Cashmere improved a significant part of the Sunset Highway within the City limits, from South Division Street, west to just past the old mill site. The overall pavement condition from the end of this project to Goodwin Road has not been rated.

**Division Street** A series of pavement improvement projects has been completed on Division Street/Aplets Way, including a 2009 project from Pioneer Avenue to the BNSF Railroad tracks, and a project to be constructed in 2015 from the BNSF Railroad tracks to the Aplets Way Bridge.

**Cottage Avenue** Cottage Avenue from US 2 to Riverfront Drive was improved in 2001. The remainder of Cottage Avenue was given a Pavement Condition Rating of between 70 and 90, or well above the condition requiring work and the City-wide average of 59.8.

**Pioneer & Evergreen** The portions of Pioneer Avenue and Evergreen Drive that have been

Figure 2.1: Pavement Condition Survey, TIB



rated by TIB have a performance rating of between 50 and 70, and are not in imminent need of an overlay. A planning and overlay project was completed on Pioneer Avenue in 2012, extending its roadway life. TIB awarded another project to Cashmere in 2014 for additional planning, overlay, curb, gutter and sidewalk upgrades from Evergreen to Division Street.

Truck routing on both Pioneer and Evergreen are not on the preferred routes discussed with the major freight users in Cashmere and should be considered lower priority for the purposes of this study.

**Goodwin** The approaches to the Goodwin Road Bridge will have to be substantially upgraded if the Goodwin alignment is selected. The team recommends that Goodwin, from the Sunset Highway to US 2/97, be improved at

the same time, enhancing this street as a preferred freight route.

### INTERSECTION ANALYSIS

From an operational basis, the technical team also inventoried six intersections for their capacity to handle freight movements. Those intersections included:

- Division Street / Sunset Highway
- Division Street / Cottage Avenue
- Cottage Avenue / Vine Street
- Pioneer Drive / Evergreen Drive
- Evergreen Drive / Sunset Highway
- Sunset Highway / Goodwin Road

Both sight distance and truck turning movement geometric analyses were included. Rather than relying on the visual field inventory, turning movements were analyzed using AutoTURN for a WB-50 truck. The AutoTURN graphics are included in Appendix 5.

Three intersections are inadequate to handle truck turning movements if opposing vehicles are in the intersection, including the following:

- Pioneer Drive / Evergreen Drive
- Evergreen Drive / Sunset Highway
- Cottage Avenue / Vine Street

The geometrics of the remaining three intersections are adequate for the analysis vehicle:

- Division Street / Sunset Highway
- Division Street / Cottage Avenue
- Sunset Highway / Goodwin Road



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## Chapter 3: Traffic Analysis

### INTRODUCTION AND PROJECT DESCRIPTION

The US 2/97 Cashmere Area Transportation Study will identify, evaluate, and recommend alternatives to the high-cost safety and traffic improvements recommended in the 2002 WSDOT US 2/97 Corridor Safety Study. This chapter describes the current truck routes between US 2 and the industrial areas in the Cashmere Urban Growth Area (UGA), proposes four bridge build alternatives and summarizes the traffic operation analysis at critical intersections for the base conditions and the build alternatives.

### STUDY AREA

The study area includes the segment of US 2/97 between the Hay Canyon intersection vicinity east to the US 2/97 location proposed in WSDOT's study for the "East Cashmere Diamond Interchange," near the intersection of US 2/97 with Red Apple Road and Old Monitor Road. The study also includes areas within the Cashmere urban growth boundary and unincorporated rural areas to the east or west of the Cashmere UGA.

### MODEL ASSUMPTIONS

The Traffic analysis is based on spreadsheet-based traffic forecasting models specifically designed for the study area that focused on using land-use growth trends to predict traffic volumes on major roadways within the study area. Projected traffic volumes were 'balanced' between intersecting facilities based on existing turning movement splits.

The spreadsheet also provides the ability to be adaptive to changes in growth trends and in roadway and intersection alternatives. For each build alternative, traffic adjustments were manually entered to account for predicted traffic volume shifts based on the access differences between alternatives. For example, Alternative 2 assumes the Goodwin Road Bridge is completely closed, so existing passenger vehicle trips were re-routed to other roadways.

There are several development assumptions in the spreadsheet model. These assumptions include the following regarding development within the study area:

- A 1.2% annual traffic growth on SR 2
- A 0.7% growth in the City of Cashmere between 2014 and 2040

For detailed traffic forecasting methodology, see Appendix 1 – Forecast Methodology Summary.

### CURRENT FREIGHT ROUTES AND CRITICAL INTERSECTIONS

Major freight routes and critical intersections were identified by conducting interviews with the major freight users and area stakeholders. These are indicated on Figure 3.1.

Because the three intersections along US 2 (Goodwin Road, Cotlets Way and Aplets Way) operate as an integrated system, all three were included. The Traffic Level of Service analysis includes the following eight critical intersections:

- US 2 / Hay Canyon Road
- Sunset Highway / Webster Way
- Sunset Highway / Goodwin Road
- Sunset Highway / Evergreen Drive
- US 2 / Aplets Way
- South Cottage Avenue / Division Street
- US 2 / Cotlets Way
- Cottage Avenue / Tichenal Road

Figure 3.1: Main Freight Routes and Intersections (See Table 3.1 for List)



*Table 3.1: Main Freight Routes and Intersections List*

No.	Intersection	Control
1	US 2 / Hay Canyon Rd	Signal
2	US 2 EB off-ramp at Goodwin Rd	No Control
3	Sunset Hwy / Webster Way	Stop Control - 2 Way
4	Sunset Hwy / Goodwin Rd	Stop Control - 2 Way
5	Sunset Hwy / Evergreen Dr	Stop Control - 2 Way
6	Kimber Rd at Evergreen Dr	Stop Control - 2 Way
7	Pioneer Ave at Tigner Rd	Stop Control - 2 Way
8	US 2 / Aplets Way	Signal
9	Cottage Ave / Division St	Stop Control - All Way
10	Railroad Ave at Division St	Stop Control - 2 Way
11	Sunset Hwy / Division St	Stop Control - 2 Way
12	Pioneer Ave at Division St	Stop Control - 2 Way
13	Railroad Ave at Olive St	Stop Control - 2 Way
14	US 2 / Cotlets Way	Signal
15	Cottage Ave / Tichenal Rd	Stop Control - 2 Way
16	US 2/ West Bridge	Signal
17	Stines Hill Rd / West Bridge	Stop Control - All Way
18	US 2 / East Bridge	Signal
19	Sunset Hwy / East Bridge	Stop Control - 2 Way

## BRIDGE REPLACEMENT ALTERNATIVES

Four bridge alternatives and truck routing scenarios were considered in this study. Among the alternatives, Alternative 1 is specifically a “No Build Alternative” for the Goodwin Road Bridge. The four alternatives are summarized below (see Table 3.2):

## ANALYSIS RESULTS

Intersection Level of Service (LOS) analysis for PM Peak periods based on the Highway Capacity Manual using Synchro software was performed on each of the intersections described in the previous section. If the intersection did not meet a minimum LOS D, then roadway and intersection improvement concepts were developed to achieve the required LOS.

Table 3.3 summarizes the intersection LOS in 2040 for the subject intersections for each of the four improvement alternatives. The Synchro analysis reports unsignalized intersections LOS by approach. The results below for unsignalized intersections are based on the approach with the highest delay. The detailed results of the analysis are provided in Appendix 6.

The results of the LOS analysis for the intersections showed that there are some intersections that, without improvement, would not meet the minimum LOS standard in 2040. The Cottage Avenue / Tichenal Road intersection will operate at LOS F with westbound failing approach during the PM peak hour for all alternatives. The other intersections operate overall at LOS D or better.

*Table 3.2: Alternative Summary*

Description	
<b>Alternative 1 – No Build</b>	No Build Alternative. Bridge will be closed by 2040 and no replacement bridge constructed.
<b>Alternative 2 – Goodwin Road Alignment</b>	Goodwin Road Bridge is rebuilt and realigned with US 2. Truck access is allowed for rebuilt bridge.
<b>Alternative 3 – Orchard Drive Alignment</b>	A new roadway alignment begins in the vicinity of the junction of Turkey Shoot Road / Stines Hill Road and travels northeasterly for approximately 200 feet and then turns northerly toward the river. After approximately 400 feet, a new bridge crosses the railroad tracks and the river, intersecting US 2 at a new signalized intersection.
<b>Alternative 4 – 1929 / Evergreen Drive Alignment</b>	Evergreen Drive is extended from Sunset Highway northerly for approximately 400 feet. It then becomes grade separated on a new 200 foot structure crossing the railroad tracks and then turns slightly west. This alignment crosses the river on a separate 314-foot structure and intersects with US 2 at a new signalized intersection.

Table 3.3: Intersection Level-of-Service

Intersection	Control	2014 Base			2040 Alternative 1 – No Build Bridge Demolished			2040 Alternative 2 – Rebuild Goodwin Road Bridge			2040 Alternative 3 – New Bridge at Orchard Drive			2040 Alternative 4 – New Bridge at 1929 / Evergreen Drive		
		VOL	LOS	Delay	VOL	LOS	Delay	VOL	LOS	Delay	VOL	LOS	Delay	VOL	LOS	Delay
US 2 / Hay Canyon Rd	Signal	1,370	B	13.1	2,070	B	15.6	1,970	A	3.3	2,030	A	3.3	2,010	A	3.3
Sunset Hwy / Webster Way	Stop Control - 2 Way	301	B	10.9	514	B	11.4	346	B	11.4	484	B	12.4	346	B	11.4
Sunset Hwy / Goodwin Rd	Stop Control - 2 Way	445	B	10.9	530	B	11.7	345	B	10.2	455	A	7.8	355	B	10.2
Sunset Hwy / Evergreen Dr	Stop Control - 2 Way	450	B	11.1	535	B	13.7	442	B	12.2	540	B	13.8	485	B	12.6
US 2 / Aplets Way	Signal	1,490	B	16.0	2,275	C	22.9	2,370	C	20.7	2,260	B	17.4	2,260	B	14.7
Cottage Ave / Division St	Stop Control - All Way	960	B	15.4	1,160	C	20.5	1,395	D	34.3	1,145	C	20.2	1,145	C	20.2
Sunset Hwy / Division St	Stop Control - 2 Way	920	C	18.2	1,095	D	39.8	1,355	F	58.9	1,105	D	37.9	1,105	D	37.9
US 2 / Cotleys Way	Signal	2,380	C	21.1	3,105	C	29.7	3,105	C	29.7	3,105	C	29.7	3,105	C	29.7
Cottage Ave / Tichenal Rd	Stop Control - 2 Way	975	C	24.8	990	F	58.3	1,200	F	65.1	1,220	F	65.1	1,220	F	65.1
US 2 / West Bridge*	Signal	0	0	0	0	0	0	0	0	0	2,060	A	3.7	0	0	0
Stines Hill Rd / West Bridge*	Stop Control - All Way	0	0	0	0	0	0	0	0	0	455	A	8.5	0	0	0
US 2 / East Bridge	Signal	0	0	0	0	0	0	0	0	0	0	0	0	2,095	A	4.1
Sunset Hwy / East Bridge	Stop Control - 2 Way	0	0	0	0	0	0	0	0	0	0	0	0	555	B	11.9

\*New intersection from the built alternative

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## Chapter 4: Bridge Replacement Alternatives

The impending Goodwin Road Bridge closure complicates the freight truck access challenge to an expanding industrial area in the City of Cashmere. Part of the Cashmere Area Transportation Study is to evaluate whether the bridge should be replaced and if so, if it should be done near the current alignment or elsewhere.

### FREIGHT ROUTE ANALYSIS

Members of the Technical Team met with the four major freight users in Cashmere to discuss frequency of trips, common carrier vehicles, and preferred routes. The four major freight users are:

- Bethlehem Construction
- Blue Star Growers
- Martin's Market Place (IGA)
- Crunch Pak

The common delivery vehicle is an "18-wheeler" including double trailers. Blue Star Growers exceeds 3,000 one-way trips annually; Bethlehem Construction typically has 30-40 trips daily; Martin's Market Place is seasonally dependent on tourist traffic; and Crunch Pak has 75-80 freight trips daily.

Currently, Bethlehem Construction, Blue Star Growers, and Martin's Market Place rely on the

Cotlets Way intersection with US 2. Because of load restrictions on the Goodwin Road Bridge, Crunch Pak and the soon-to-be-opened Port of Chelan Industrial Park at the old Cashmere Mill Site have to rely on the Aplets Way/US 2 intersection and bridge over the Wenatchee River. This route requires routing through downtown Cashmere and a main pedestrian crossing for the Vale Elementary School (S. Division Street and Sunset Highway intersection).

Based on interviews with major freight users and the City of Cashmere staff, a "current" freight use map was developed (see Figure 4.2). Some freight goes in and out of the City on Sunset Highway to the west, bypassing Goodwin Road due to both the weight restriction on the bridge and the abrupt left turn required getting back to US 2. This is not a preferred route, in part due to grades.

For both Crunch Pak and the new industrial/business park at the old mill site, an accessible and useable Goodwin Road Bridge would be a significant improvement for freight movement.

### COMMUNITY DISCUSSION

The Technical Team participated in a public involvement process including an initial meeting with the Stakeholder Committee followed by two open houses, one with the

Figure 4.1: Bridge Alternatives



community at large and one with the Cashmere Chamber of Commerce. The Team presented four alternatives for the Goodwin Road Bridge (see Figure 4.1):

- No Build
- Goodwin Road Alignment
- Orchard Drive Alignment
- 1929 / Evergreen Drive Alignment

During the public meetings, no one supported the no build alternative. Further, no additional alternatives came out of the process (although there was much discussion about how to address each alternative) and the evaluation proceeded with the four alternatives presented.



Figure 4.2: Freight Route Map, Cashmere, WA



Photo courtesy of Google Maps

**LEGEND**

- Current Freight Routes
- Proposed Freight Routes

Miles



## NO BUILD ALTERNATIVE

The no build alternative poses a number of challenges for the City of Cashmere that are apparent to the Technical Committee and which were reinforced during public meetings:

- The current bridge is obsolete and will soon need to be closed to all traffic.
- The current bridge is the only grade-separated crossing between emergency services and much of the community, including schools.
- Without an alternative route, freight traffic from the expanding industrial area in west Cashmere, including Crunch Pak, will have to continue to use either the Aplets Way or Cotlets Way crossings, both of which have freight traffic going through the downtown.
- Without an alternative route, Crunch Pak freight traffic will have to continue going through the intersection of Sunset Highway and South Division Street, which is also a key pedestrian crossing for the Vale Elementary School.

## GOODWIN ROAD ALIGNMENT

A route was reviewed, adjusting the current alignment to match with Hay Canyon Road. The adjustment requires some new right-of-way to accommodate realigning the bridge. The bridge structure is kept relatively short, given that the railroad and river are close

together at this location and the river relatively narrow.

However, to maintain a slope on the bridge of no greater than 5 percent, the grade of US 2/97 will have to be raised approximately fourteen feet at the new intersection of Goodwin Road and US 2 (see Figure 4.3).<sup>1</sup>

## ORCHARD DRIVE ALIGNMENT

The existing roadway system, including a potential crossing of the railroad and Wenatchee River, creates an opportunity for an alternative bridge location in the west part of Cashmere, near Webster Way (see Figure 4.4). There is sufficient distance at this location for a new roadway to rise with sufficient clearance (minimum of 23.5 feet) over the railroad tracks, and still get back to grade at US 2/97; avoiding the need to either construct a grade separation with the highway or raise US 2.

This alignment will require a relatively long structure and substantial new road construction, as well as right-of-way acquisition.

<sup>1</sup> Previously estimated at 8 feet, actual survey data improved the reliability of the estimate.

*Figure 4.3: Goodwin Road Alignment*



**1929 / EVERGREEN DRIVE ALIGNMENT**

At the date of this writing, while not confirmed, it is assumed that the flood of 1925 wiped out the original bridge over the Wenatchee River that resulted in the current Goodwin Road Bridge being constructed in 1929. Old bridge abutments can still be seen and would align nearer an extension of Evergreen Drive than the current Goodwin Road alignment.

The wide expanse of land between the railroad and the river creates an opportunity to get over the railroad tracks with the appropriate clearances and intersect with US 2 at grade. This alignment does require additional right-of-way, including taking buildings, if aligned with Evergreen Drive south of the railroad tracks (see Figure 4.5).

A potential "fatal flaw" with this alignment is moving the intersection with US 2 an additional 700-800 feet east of the current location. The new intersection would be much closer to the reverse "S" curve in the west bound direction of US 2, potentially increasing the likelihood of rear-end collisions when the signal is indicating stop for westbound traffic.

The bridge at this location would also have to be relatively long.

Additional information can be found in the Structures Concept Report in Appendix 4.

*Figure 4.4: Orchard Drive Alignment**Figure 4.5: Evergreen Drive Alignment*

**CONCEPTUAL LEVEL COST ESTIMATES (NO DESIGN)**

Using the WSDOT planning level cost estimating tool, for comparative purposes only, the Technical Team prepared the following estimates of each alternative.

*Table 4.1: Conceptual Level Cost Estimates – No Design*

Planning Level Cost Estimate	Alternative 2 – Goodwin Road		Alternative 3 – Orchard Drive		Alternative 4 – Evergreen Drive	
	Low	High	Low	High	Low	High
Preliminary Engineering	\$879,000	\$1,172,000	\$1,202,000	\$1,603,000	\$1,015,000	\$1,354,000
Right-of-Way	\$67,000	\$89,000	\$464,000	\$618,000	\$331,000	\$442,000
Environmental Mitigation	\$918,000	\$1,224,000	\$1,068,000	\$1,424,000	\$930,000	\$1,240,000
Construction	\$10,418,000	\$13,891,000	\$13,915,000	\$18,553,000	\$11,830,000	\$15,773,000
<b>TOTAL</b>	<b>\$12,282,000</b>	<b>\$16,376,000</b>	<b>\$16,649,000</b>	<b>\$22,198,000</b>	<b>\$14,106,000</b>	<b>\$18,809,000</b>

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## Chapter 5: Intersection Options

A primary purpose of the Cashmere Area Transportation Study is to identify, evaluate, and recommend “alternatives to the high-cost safety and traffic improvements recommended in the 2002 WSDOT US 2/97 Corridor Safety Study.”<sup>1</sup>

More specifically, the US 2/97 Corridor Safety Study identified a need to replace two Cashmere area US 2 intersections with grade separated freeway style interchanges. The study recommended the replacement of the US 2/Hay Canyon Road traffic signal with a new grade separated crossing approximately one quarter mile west of the existing Goodwin Road/Hay Canyon Road intersection.

A diamond interchange was proposed as the long-term recommendation in east Cashmere, east of the Red Apple Road/Old Monitor Road intersection, with a frontage road connecting to Cottage/Cotlets Avenue via Tichenal Way.

The specific assignment of this study is to evaluate potential “at grade” amendments to each of the three entrances to the City of Cashmere via US 2. This direction was further refined by the Technical Advisory Committee to include both traditional intersection design solutions and roundabouts.

<sup>1</sup> Request for Proposals: US 2/97 Cashmere Area Transportation Study.

Larger sized graphics of alternatives and their associated intersection options discussed in this Chapter are included in Appendix 7.

### US 2/COTLETS WAY

Of the three intersections evaluated, US 2 and Cotlets Way was the most challenging to address. Approaching Cashmere from the east:

- The Cotlets Way intersection is the main gateway to the City
- It is the main access way to three of the four major freight users in Cashmere (Blue Star Growers, Bethlehem Construction and Martin’s Market Place - IGA)
- The distance between the end of the Wenatchee River Bridge and US 2 (approximately 700 feet) is relatively short for all the activities that access from it (approximately 16 homes, a museum and park, the Antique Mall, Rusty’s Drive In, two gasoline stations, Martin’s Market, Bethlehem Construction, and the City treatment facility)
- Rusty’s Drive In is a “landmark” eatery in the area, with a drive-thru window, traffic to which can queue back onto Cotlets Way

Over the years, WSDOT has made substantial improvements to this intersection to improve both operations and safety. While US 2 and Cotlets Way will continue to operate at Level of Service (LOS) C into the future, because the

intersection of Tichenal Road and Cotlets Way is so close, it currently operates at an LOS F, which only worsens in terms of delay, into the future. To resolve this issue, three options have been reviewed, each of which improves intersection operations and level of service.

All three design options close the current intersection of US 2/Cotlets Way, shifting it to the west in order to create improved operational access to Tichenal Road. All three options also require relocation of the Eels Road/US 2 intersection (north side of the highway). It should also be noted that all three options are planning level concepts only and survey data was not available.

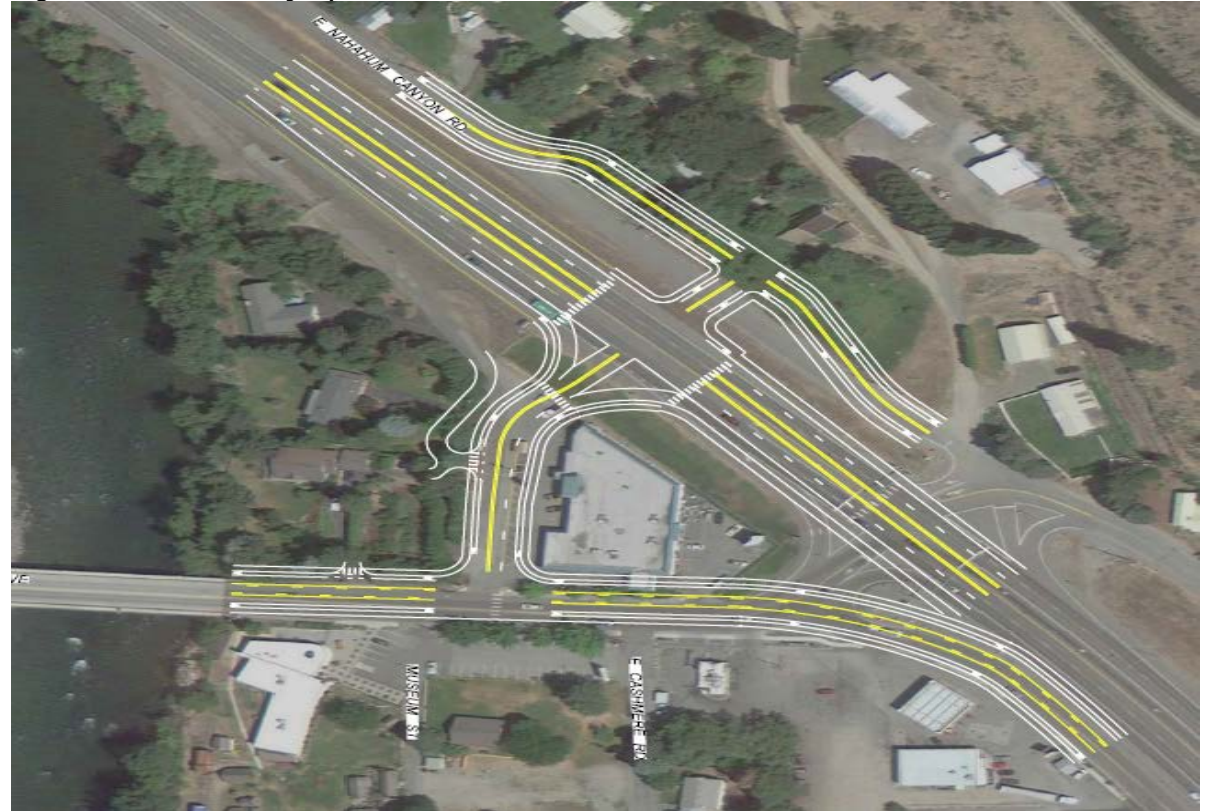
**Option One** (Figure 5.1) utilizes the old “off ramp” from US 2, now Big Rock Place, and creates a more traditional signalized intersection with US 2. The operational issues with Tichenal Road are resolved by extending the distance to the intersection with Big Rock Place and both parking and access to the Antique Mall are impacted. As part of this improvement, it is recommended that local access to private property be better channelized to improve operations and safety.

**Option Two** (Figure 5.2) is essentially the same as Option One, except that it replaces the conventional signalized intersection with

US 2, with a modern roundabout.<sup>2</sup> The impacts to the Antique Mall are somewhat greater given the splinter islands needed in the roundabout approaches.

**Option Three** (Figure 5.3) maintains a roundabout solution to the US 2 intersection, and adds a roundabout at the intersection of Cottage Avenue and Big Rock Place. Operations are improved, but this option requires the complete removal of the Antique Mall.

*Figure 5.1: Cotlets Way Option 1*



<sup>2</sup> It should be noted that during the meeting with the major freight users that they expressed a preference for conventional intersections over roundabouts.

Figure 5.2: Cotlets Way Option 2



Figure 5.3: Cotlets Way Option 3





### APLETS WAY

Operationally, the intersection of Aplets Way and US 2 seems to be functioning well, except when a north to west bound left turning vehicle is waiting for the intersection to clear. Given the end of the bridge in only 50 feet to 60 feet from the US 2 stop bar, there is insufficient room for a dedicated right turn lane and all right turning traffic is “trapped” behind the delayed, left turning vehicle (especially if it is a freight vehicle which can often be the case due to the weight restricted Goodwin Road Bridge).

Overall, this intersection operates at LOS C or better, and will well into the future (LOS B if the Goodwin Road Bridge is replaced).

Aplets Way is also the main gateway to historic downtown Cashmere and improving this intersection creates an opportunity for the community to enhance economic development, especially for tourist traffic. Two options were reviewed to both resolve the right turn issue and create more space for a gateway treatment.

**Option One** (Figure 5.4) maintains a traditional intersection controlled by a traffic signal, but shifts it north to create the spacing needed to install a dedicated right-turn lane. It also creates additional depth between the river and US 2 at this intersection potentially on which gateway signage to Cashmere could be installed.

**Option Two** (Figure 5.5) essentially accomplishes the same operational solution, except with a roundabout.

*Figure 5.4: Aplets Way Option 1*



*Figure 5.5: Aplets Way Option 2*

It should be noted that both options impact the storm water containment areas on the north side of US 2 and both impact the alignment of Nahahum Canyon Road; impacts that will have to be resolved in final design. Given vehicles currently using Nahahum Canyon Road and the US 2/Aplets Way intersection, from the east, can access US 2 via Cotlets Way, it may be more cost effective to close this short section of roadway rather than address the

steep bluff to the north. However, if this road is closed, East Nahahum Canyon Road will have to be upgraded at a potential cost of between \$1.89 million and \$2.51 million.

#### **GOODWIN ROAD**

The issues around Goodwin Road and US 2 have more to do with freight access than level of service. The intersection operates at LOS B or better currently and given the bridge is

approaching functional obsolescence. If closed, traffic operations improve at this intersection.

The purpose of replacing this bridge is more fully discussed in Chapter 4.

**Option One** (Figure 5.6), as with the previous two intersections, a conventional signalized concept. Operationally, the intersection would work far better than today, in large part due to raising US 2 and eliminating the “loop” in

Goodwin as it approaches the highway. Freight vehicles, emergency access vehicles, and school buses will now be able to cross the river via a grade separation from the railroad tracks.

Because US 2 will need to be raised as much as fourteen feet with this concept, both Vale Road and Sunburst Lane will be impacted and raised too as a result. In the traditional intersection option, the problem with the frontage road being too close to the US 2

intersection is left essentially unchanged in order to avoid a significant right-of-way take.

**Option Two** (Figure 5.7) utilizes a roundabout as the operational solution, once the bridge over the Wenatchee River is reconstructed on the Goodwin Road alignment. The splinter islands impact the approaches and needed right-of-way. Additionally, the roundabout pushes the intersection sufficiently far to the north that both Vale Road and Sunburst Lane

have to be realigned to intersect with Hay Canyon Road, necessitating the taking of the first building east of Hay Canyon Road and north of Vale Road. Additionally, the approaches to the roundabout from the bridge side of the intersection may result in some constructability questions related to the bridge structure; none that cannot be overcome, but which could increase cost.

*Figure 5.6: Goodwin Road Option 1*



Figure 5.7: Goodwin Road Option 2



**SUMMARY**

There are operational, cost and local preference issues that result in the decision about which type of intersection is best suited for any particular application.

According to information on the WSDOT web site, “studies have shown that roundabouts are safer than traditional stop sign or signal-controlled intersections.”<sup>3</sup> The discussion reports that roundabouts reduce injury crashes by 75 percent at intersections where stop signs or signals were previously used for traffic control.

A study by the Insurance Institute for Highway Safety and studies by the Federal Highway Administration have shown roundabouts typically achieve:

- A 37 percent reduction in overall collisions
- A 75 percent reduction in injury collisions
- A 90 percent reduction in fatality collisions
- A 40 percent reduction in pedestrian collisions

Utilizing the WSDOT Planning Level Cost Estimate tool, we have estimated the cost for constructing each of the intersections, which are summarized in Table 5.1. However, WSDOT also reports that the operational costs of maintaining a traffic signal is between

\$5,000 and \$10,000 annually; which should also be taken into consideration. The planning level cost estimates are provided in Appendix 8.

*Table 5.1: Planning Level Comparative Cost Estimates, Signalized, & Roundabout Intersections*

Intersection	Signalized Intersection		Roundabout		Double Roundabout	
	Low	High	Low	High	Low	High
US 2 / Aplets Way	\$5,577,000	\$7,436,000	\$6,020,000	\$8,027,000	N/A	N/A
US 2 / Cotleys Way	\$4,209,000	\$5,612,000	\$4,999,000	\$6,665,000	\$5,599,000	\$7,465,000
US 2 / Goodwin Road	\$3,731,000	\$4,975,000	\$6,347,000	\$8,462,000	N/A	N/A
Orchard Drive	\$1,705,000	\$2,273,000	\$4,389,000	\$5,852,000	N/A	N/A

*Note: Intersections listed were part of the original analysis. Not all of the intersections listed were selected to move forward throughout the study.*

<sup>3</sup>[www.wsdot.wa.gov/Safety/roundabouts/benefits.htm](http://www.wsdot.wa.gov/Safety/roundabouts/benefits.htm)

## Chapter 6: Recommendations

### INTRODUCTION

Ultimately, the purpose of the Cashmere Area Transportation Study is three-fold, to:

- Determine if the Goodwin Road Bridge over the Wenatchee River should be replaced and if yes, where;
- Evaluate each of the three intersections with US 2 leading into Cashmere and recommend solutions for the operational issues identified; and
- Evaluate the freight routes in Cashmere and recommend improvements for both the routes and the key intersections along those routes.

### BRIDGE REPLACEMENT

To resolve the question of bridge replacement, the no build option, which ultimately means the existing, substandard Goodwin Road Bridge will be demolished for safety reasons, three separate approaches were taken:

- The Technical Team evaluated each option based upon “measures of effectiveness;”
- A simplified benefit-cost assessment was completed; and

- A public process was completed, including three well attended public meetings, two at the Cashmere Riverside Center and a third at Chamber of Commerce Annual Meeting.

**Measures of Effectiveness** The Technical Team developed nine “measures of effectiveness” (see Figure 6.1) against which to evaluate the no build option and each of the alternative alignments discussed in Chapter 4.

Figure 6.1: Measures of Effectiveness

Bridge Alternatives	Alternative 1 – No Build	Alternative 2 – Goodwin Road	Alternative 3 – Orchard Drive	Alternative 4 – Evergreen Drive	
<b>Measures of Effectiveness</b>					
	<b>SCORING</b>				
Travel time from industrial area to US 2/97	○	◐	◑	◒	
Constructability	NA	◐	◑	◒	
Construction cost	NA	●	○	◐	
Fire & life safety access	○	◐	◑	◒	
Natural environment impacts	●	◐	◑	◒	
Compatibility with local plans	◐	◑	◒	◓	
Safety analysis results (collision potential/risk reduction)	NA	◐	◑	○	
Deviations needed to implement improvements	◐	◑	◒	◓	
Operations and maintenance	○	◐	◑	◒	
<b>TOTAL</b>	○	●	◑	◒	
<b>Scoring Key</b>	○	◐	◑	◒	●
	Poor	Fair	Neutral	Good	Best
	0	1	2	3	4
<i>Numerical Score</i>	13	26	16	18	

A Technical Team comprised of one transportation planner, one traffic engineer and one roadway design engineer scored each option against the other, based on their professional judgment as to which was best using a relative scoring system as follows:

- Provides the best overall solution, except that if two options are rated equal and best, they will both be given a score of "good"
- This option will provide a good solution to the problem, however, there is another solution that is better in the opinion of the Technical Team, except in the case described above
- This option is relatively neutral when compared against the others, some options are clearly better, while others may be worse
- This option only provides a fair solution and is not preferred
- In comparison to the other options presented, this one compares poorly against the measures of effectiveness

The Technical Team discussed each option and jointly scored them against one another. To simplify the evaluation, each of the symbols were given a numerical value from zero (being the poorest) to four (being the best). In some

cases a NA or not applicable was given if the metric did not apply. For example, constructability does not apply to the no build option. In those cases, in order not to penalize an option, a neutral score of 2 was given to all NA responses. Based on this qualitative evaluation, the No Build option was determined to be the least attractive outcome for the community.

**Simplified Benefit-Cost Assessment** During the Technical Committee meeting at which the Measures of Effectiveness were discussed and agreed upon, Committee members also suggested there is value in completing a benefit-cost assessment of the no-build versus the build option. The WSDOT Mobility Project Prioritization Process is an often accepted tool for doing benefit-cost evaluations for transportation projects on the state system. In general, it does a good job of evaluating user benefits in terms of travel time and safety, and if the RIMS<sup>1</sup> model is readily available, can also provide a measure of economic impact.

Given this is "out of scope" effort on the part of the Technical Team, nor did the travel time and RIMS approach particularly apply, a simplified alternative was provided based on:

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<sup>1</sup> Regional Input-Output Modelling System, Bureau of Economic Analysis.

**Cost** As measured by anticipated construction cost, an estimate of annualized maintenance, and loss of business.

Construction costs are still being finalized, at a zero design, planning level, so a mid-range value from the WSDOT Planning Level Cost Estimate was included.

Because bridges are designed for a 75-year life and require very little maintenance in their first 20-years of service (the time period over which this evaluation was done), the annualized maintenance cost was limited to the required every other year inspection. Roadway maintenance costs were not included given the roads remain and if not loaded with freight traffic on this route, the maintenance would shift to another route.

**Benefits** These were valued in a variety of ways, including the following:

- Savings from not having to build or maintain a second fire station on the south side of the river was considered. Based on a report entitled "The Cost Effectiveness of Fire Station Siting & the Impact on Emergency Response" we estimated the cost of buying the land, constructing a second station, and equipping that station at one million dollars. We also estimated the annual cost of maintaining a fire station to be \$250,000.

However, the Technical Committee concluded that it is unlikely a second fire station would be built and asked that an alternative “public safety” benefit be evaluated, based on travel time and loss of property due to delay if no bridge is available.

- Savings from not losing tax revenue from other businesses along Goodwin Road, that may well go out of business if the

bridge is closed (at the time of this writing, no value could be estimated).

- Savings through efficiency in school bus and freight vehicle routing. We worked with the School District to estimate savings by travel time, number of buses and operational costs.

We used data collected from the *Trucker Report* and its 130,000 members on the

real cost of trucking, per mile, to determine additional travel savings for those times when the tracks are blocked.

- The increased economic benefit to tourism in the Downtown by significantly reducing truck volumes through the business district (no measure has been determined at this time).
- A life cycle and residual value of right-of-way, grading and drainage investment,

Table 6.1: Benefit-Cost Assessment, Goodwin Road Bridge Construction

	Current Year (CY)	CY +1	CY +2	CY +3	CY +4	CY +5	CY 6 - 10	CY 11 - 20
<b>Costs</b>								
Construction Cost	\$15,200,000							
Annualized Maintenance			\$6,000		\$6,000		\$12,000	\$30,000
<b>Total Costs (Future Value)</b>	\$15,200,000	\$0	\$6,000	\$0	\$6,000	\$0	\$12,000	\$30,000
<b>Total Costs (Present Value)</b>	\$15,200,000	\$0	\$5,770	\$0	\$5,540	\$0	\$10,000	\$21,430
<b>Benefits</b>								
Emergency Access								
Loss of Property & Life due to delay		\$195,780	\$195,780	\$195,780	\$195,780	\$195,780	\$978,900	\$1,957,800
Loss of value due to collisions	\$27,200		\$27,200		\$27,200		\$68,000	\$136,000
Loss of Tax Revenue								
School Bus Routing	\$6,350	\$6,350	\$6,350	\$6,350	\$6,350	\$6,350	\$31,750	\$63,500
Diverted truck trips	\$12,464	\$12,464	\$12,464	\$12,464	\$12,464	\$12,464	\$62,319.94	\$124,639.88
Decreased Trucks in CBD								
School Cross Walk Safety			\$70,000				\$1,100,000	\$70,000
Life Cycle & Residual Value								
ROW (0.55)	\$103,380							
Grading & Drainage (0.60)	\$100,650							
Structures (0.57)	\$3,921,600							
All Other Costs (1.00)	\$8,536,000							
<b>Total Benefits (Future Value)</b>	\$12,903,424	\$214,594	\$311,794	\$214,594	\$241,794	\$214,594	\$2,240,970	\$2,351,940
<b>Total Benefits (Present Value)</b>	\$12,903,424	\$210,390	\$299,690	\$202,220	\$223,380	\$194,360	\$1,867,470	\$1,679,960
								<b>\$ 17,580,893.99</b>
<b>Present Value Discout Rate</b>	<b>2%</b>						<b>B/C Ratio</b>	<b>1.1534</b>



structures and other constructions costs using factors provided by WSDOT.

- An estimate of the likely value of increased safety to pedestrians by significantly reducing truck traffic in this relatively high use pedestrian area (anticipated two serious pedestrian injuries and one death in the 20-year estimate). There have been five pedestrian crashes in Cashmere since 2011, three of which were at or near intersections on Pioneer Avenue (near the elementary school). There was a serious injury at Pioneer and Mission Creek Road; a possible injury at Pioneer and Chapel Street; and a possible injury at School Lane and Pioneer.

We did not attempt to provide a value for the potential positive economic benefit derived from improving access to the new Mill Site Business Park, nor did we include the cost of bridge removal given it will eventually happen regardless of which action is taken.

The Benefit-Cost summary is provided in Table 6.1 and was derived from a simplified benefit-cost model provided by Bright Hub Project Management (see [brighthubpm.com](http://brighthubpm.com)). The ratio is 1.1534 or in excess of one, even without including some of the benefits we could not quantify within the scope of this project. For a bridge project, this is a positive outcome, given the relative high cost of bridge replacement.

**Public Comment** At all public meetings, the no-build and bridge replacement options were presented and discussed at length. As reported in Chapter 4, there is no support for the no-build option as represented by those present.

### BRIDGE ALTERNATIVES

Based on the qualitative assessment of each of the bridge alternatives presented above, public comment and project cost, the Goodwin Road alignment is recommended. It best meets the measures of effectiveness, by a wide margin, was most supported by the public present in the three public meetings, and is the most cost-effective as measured by the WSDOT Planning Level Cost Estimating Tool.

### INTERSECTION & ROUTE IMPROVEMENTS

As part of this project, the Technical Team evaluated the main truck routes in Cashmere and corresponding intersections (see Chapter 3). Over time, the Washington State Transportation Improvement Board and the City of Cashmere have worked to upgrade many of the freight routes in the community and will be upgrading Division Street in 2015.

If the recommendation to replace the Goodwin Road Bridge is accepted, it is anticipated that Sunset Highway and Goodwin Road will both become the main truck routes to and from

**Figure 6.2: US 2 Railroad Overpass**



Crunch Pak and the expanding business park at the old Mill Site – both of which directly access Sunset Highway.

As part of this project, the Technical Team recommends that Division Street be taken off the truck route system, with only local delivery and oversized vehicles incapable of getting under the railroad bridge over US 2 just east of Dryden permitted in the downtown (see Figure 6.2, photo courtesy of Google Earth).

If this recommendation is taken, the only segments of the freight route system within Cashmere in need of serious upgrade include Sunset Highway from the end of the current improvement at the Old Mill Site to Goodwin Road and Goodwin Road. It is recommended that the cross section of Sunset Highway be carried through the remainder of this system, which includes two travel lanes, bicycle lanes, landscape buffers back of curb, and sidewalks

on both sides of the street, including pedestrian level lighting.

The intersection of Sunset Highway and Goodwin Road is insufficient to handle truck

turning movements and should be reconstructed in this process. Although it is not recommended that Pioneer Drive nor Evergreen Drive remain on the freight route

system in Cashmere, if they do, the intersection of Evergreen Drive and Sunset Highway should also be improved to handle truck turning movements (see Figure 6.3).

*Figure 6.3: Freight Route Intersection Improvements, Goodwin & Evergreen*



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## Chapter 7: Funding Plan

### INTRODUCTION

At their March 30, 2015, meeting, the Technical Advisory Committee completed review of options for replacement of the Goodwin Road Bridge. At that time, it was decided that Options 1 and 2 for Alternative 2 – Goodwin Road were not viable as they necessitated raising US 2 between 11 and 14 feet. In addition, the Committee took three actions:

- Recommend to the County Commissioners and all participating agency boards, that the Goodwin Road Bridge be replaced close to its current alignment;
- The County Commission should determine which bridge replacement option at this location, Option 3 or Option 4, should be advanced into the final design and environmental process, given both work; and
- In order to provide the County Commission with better decision making advice, a funding plan for both Option 3 and Option 4 be provided.

### BRIDGE OPTIONS

To summarize, Alternative 2 Option 3 replaces the existing Goodwin Road Bridge on its current alignment. The new bridge allows for

the expansion of the BNSF Railroad to two-sets of tracks, spans the river with no piers in the water, spans US 2, then curves back to intersect with Hay Canyon Road at the same place as the private road to the manufactured home park.

Option 4 takes a similar approach, but aligns the bridge directly with Hay Canyon Road, spanning the railroad, river and US 2, as does Option 3, then relocates the intersection of existing Hay Canyon Road with US 2 to the west, necessitating creating a new entrance to the Jehovah's Witnesses church. With a relocation of the intersection and need to establish a new driveway for the Church, Option 4 requires about 60% more right-of-way than does Option 3. Alternatively, if in the future, traffic conditions warranted and funding is available, WSDOT could create a full grade separated interchange at this location, Option 4 would be more easily converted.

### PLANNING LEVEL COST COMPARISONS

Because the new bridge will serve as both improved grade separated emergency access to areas south of the railroad tracks, when a train is blocking access, and as a major freight route to and from both Crunch Pak and the Mill Site Industrial Park, there are three independent projects that will eventually need to be addressed:

*Figure 7.1: Alternative 2 Options*



- Replacement of the bridge (the primary purpose of this project);
- Reconstruction of Goodwin Road from the south bridge approach, south to its intersection with Sunset Highway; and
- Ultimately, improvement to Sunset Highway, from Goodwin to the east, where

the recent improvement project ended near the west end of the industrial site.

Table 7.1 summarizes key costs for each option and is based on the WSDOT Planning Level Cost Estimating Tool, with the exception of right-of-way. For this project, with the assistance of the Chelan County Assessor and given this project did not include appraisals, we inflated the cost of right-of-way in order to take a more conservative approach to cost estimating. Additionally, construction inflation was not included due to the concern that showing inflation on top of a conservative estimate would show unrealistically high values. If inflation were considered, it would be at a rate of 2% to 4% annually.

Within the initial two funding scenarios, only the improvement to Sunset Highway is left to a

future project. The remainder of the construction, design and right-of-way elements are included. Note, design for Goodwin Road is included in the Goodwin Road cost estimate.

### SOURCES OF REVENUE

*With the exception of the WSDOT bridge replacement grant, the funding plan is conceptual. Any and all amounts identified have to be approved by the respective elected body or board and are subject to change.*

For example, the Port of Chelan has been careful to note their support of this project and that any Port contribution is subject to inclusion within and approval of future Port budgets. Their funds would also be subject to:

- Payments over a three year period in reasonably equal amounts;

- The Port's contribution will essentially be the "last money in" (i.e., state, federal, Chelan County and City of Cashmere are also funding partners); and
- The project reconstructs Goodwin Avenue to its intersection with Sunset Highway.

The single largest source of design, permitting and construction funding for this project comes from an already awarded grant from the WSDOT Local Programs sponsored Bridge Replacement Advisory Committee (BRAC) through the Highway Bridge Program. In 2014, Chelan County was awarded up to \$12 million to replace the Goodwin Road Bridge, of which, only 15% can be spent for the approaches to the bridge and for which there is a 20% match required.

To make up the shortfall, a variety of revenue sources were explored and two initial funding scenarios developed, Draft Funding Program – Goodwin Road Bridge Replacement – Option 3, and Draft Funding Program – Goodwin Road Bridge Replacement – Option 4 (see Tables 7.2 and 7.3).

Based on the Planning Level Cost Estimates and available potential funding sources, the funding plan for Option 3 currently shows an approximately \$11,700 surplus (revenues over costs), while the funding plan for Option 4, because it both costs more and shares the

**Table 7.1: Planning Level Cost Estimates, Alternative 2 – Goodwin Road Options 3 & 4**

Design Element	Design Level	Planning Level Cost Estimate	
		Option 3	Option 4
Design (pro-rated by stage cost)	Conceptual	\$1,170,000	\$1,310,500
Bridge Stage	Conceptual	\$10,909,500	\$9,392,700
Approaches Stage	Conceptual	\$2,932,500	\$6,100,800
Right-of-Way	Conceptual	\$187,970	\$303,120
Goodwin Road	Conceptual	\$1,991,000	\$1,991,000
Sunset Highway	Conceptual	\$6,973,000	\$6,973,000
	<b>Total</b>	<b>\$24,163,970</b>	<b>\$26,071,120</b>

same funding sources, shows a deficit of just over \$826,000. However, we should be mindful that the cost estimates are based on very little design detail, that the cost estimating tool

appears to be very conservative, and that none of the funding sources have committed this revenue other than that associated with the WSDOT grant.

For this funding program to be successful, an additional grant through the regional STP program is still required.

**Table 7.2: Draft Funding Program for Goodwin Road Bridge Replacement – Option 3**

All Funding Options Are Subject to Approval by Respective Elected Officials, Boards or Funding Program Processes

Planning Cost Estimates, 2015 Dollars

Goodwin Road Bridge Replacement – Draft for Consideration	Design Level	Est. Construction Cost	Open to Traffic	State					Federal	County	City	Port	TOTAL	Surplus or Deficit
				WSDOT Local Bridge Program (Bridge)	WSDOT Local Bridge Program (Approach)	CRAB	FMSIB	TIB	STP	County (All Sources)	City (All Sources)			
Available Resources				\$ 12,000,000	≤ 15% of Bridge									
Available Resources	Total			\$ 11,831,630	\$ 168,370	\$ 500,000	\$ 500,000	\$ 1,100,000	\$ 1,000,000	\$ 1,600,000	\$ -	\$ 550,000	\$ 17,250,000	\$ 59,030
<b>Stage One - Construction Elements, Option 3, Existing Alignment, Span US 2</b>														
Design (pro-rated by stage cost)	Conceptual	\$ 1,170,000	2020	\$ 922,130	\$ 168,370		\$ 79,500						\$ 1,170,000	\$ -
Bridge Stage	Conceptual	\$ 10,909,500	2020	\$ 10,909,500									\$ 10,909,500	\$ -
Approaches Stage	Conceptual	\$ 2,932,500	2020			\$ 500,000	\$ 420,500		\$ 1,000,000	\$ 1,012,000			\$ 2,932,500	\$ -
Right-of-Way	Conceptual	\$ 187,970	2020							\$ 137,970		\$ 50,000	\$ 187,970	\$ -
<b>Future Stages - Independent of Bridge Replacement</b>														
Goodwin Road, South Approach to Sunset Hwy*	Conceptual	\$ 1,991,000	2020					\$ 1,100,000		\$ 391,000		\$ 500,000	\$ 1,991,000	\$ -
Sunset Highway, Goodwin to Existing Improvement*	Conceptual	\$ 6,973,000	Future Year										\$ -	\$ (6,973,000)
<b>Total 2020 Projects Only</b>		<b>\$ 17,190,970</b>		<b>\$ 11,831,630</b>	<b>\$ 168,370</b>	<b>\$ 500,000</b>	<b>\$ 500,000</b>	<b>\$ 1,100,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,540,970</b>	<b>\$ -</b>	<b>\$ 550,000</b>	<b>\$ 17,190,970</b>	<b>\$ -</b>
<b>Total Future Phases</b>		<b>\$ 6,973,000</b>		<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ (6,973,000)</b>
<b>Fund Balance</b>				<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 59,030</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 59,030</b>	

\* Engineering costs are included in these line item expenditures as provided for from the WSDOT Planning Level Cost Estimating Tool.

Note, this section of Sunset Highway is about 1/2 the length of the 2011 project and from TIB, that project was @ \$2,100,000; so far less costly. WSDOT model seems to estimate high.

ROW is estimated at \$0.60 per square foot in WSDOT model. The County Assessor recommends we use \$4/sq. foot. Lochner estimated additional ROW needs and applied the \$4, increasing cost from \$93,500 to \$187,970.

**Table 7.3: Draft Funding Program for Goodwin Road Bridge Replacement – Option 4**

All Funding Options Are Subject to Approval by Respective Elected Officials, Boards or Funding Program Processes

Planning Cost Estimates, 2015 Dollars

Goodwin Road Bridge Replacement – Draft for Consideration	Design Level	Estimated Construction Cost	Open to Traffic	State					Federal	County	City	Port	TOTAL	Surplus or Deficit
				WSDOT Local Bridge Program (Bridge)	WSDOT Local Bridge Program (Approach)	CRAB	FMSIB	TIB	STP	County (All Sources)	City (All Sources)	Port (All Sources)		
				\$ 12,000,000	≤ 15% of Bridge									
Available Resources	Total			\$ 10,170,000	\$ 1,830,000	\$ 500,000	\$ 1,000,000	\$ 1,400,000	\$ 1,000,000	\$ 1,600,000		\$ 550,000	\$ 18,050,000	\$ (1,048,120)
<b>Phase One - Construction Elements, Option 4, Goodwin Road Hay Canyon, Span US 2</b>														
Design (pro-rated by stage cost)	Conceptual	\$ 1,310,500	2020	\$ 777,300	\$ 533,200								\$ 1,310,500	\$ -
Bridge Stage	Conceptual	\$ 9,392,700	2020	\$ 9,392,700									\$ 9,392,700	\$ -
Approaches Stage	Conceptual	\$ 6,100,800	2020		\$ 1,296,800	\$ 500,000	\$ 1,000,000		\$ 1,000,000	\$ 1,600,000		\$ 550,000	\$ 5,946,800	\$ (154,000)
Right-of-Way	Conceptual	\$ 303,120	2020										\$ -	\$ (303,120)
<b>Future Phases - Independent of Bridge Replacement</b>														
Goodwin Road, South Approach to Sunset Hwy*	Conceptual	\$ 1,991,000	2020					\$ 1,400,000					\$ 1,400,000	\$ (591,000)
Sunset Highway, Goodwin to Existing Improvement*	Conceptual	\$ 6,973,000	Future Year										\$ -	\$ (6,973,000)
<b>Total 2020 Projects Only</b>		<b>\$ 19,098,120</b>		<b>\$ 10,170,000</b>	<b>\$ 1,830,000</b>	<b>\$ 500,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,400,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,600,000</b>	<b>\$ -</b>	<b>\$ 550,000</b>	<b>\$ 18,050,000</b>	<b>\$ (1,048,120)</b>
<b>Total Future Phases</b>		<b>\$ 6,973,000</b>		<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ (6,973,000)</b>
<b>Fund Balance</b>				<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>

\* Engineering costs are included in these line item expenditures as provided for from the WSDOT Planning Level Cost Estimating Tool.

Note, this section of Sunset Highway is about 1/2 the length of the 2011 project and from TIB, that project was @ \$2,100,000; so far less costly. WSDOT model seems to estimate high.

ROW is estimated at \$0.60 per square foot in WSDOT model. The County Assessor recommends we use \$4/sq. foot. Lochner estimated additional ROW needs and applied the \$4, increasing cost from \$93,500 to \$187,970.

**APPENDICES**

Appendix 1: Forecast Methodology

Appendix 2: Public Involvement

Appendix 3: Comment Resolution Matrix

Appendix 4: Structures Concept Report

Appendix 5: AutoTURN Graphics

Appendix 6: Traffic Analysis Reports

Appendix 7: Large Scale Graphics

Appendix 8: Cost Estimate



