APPENDICES

Appendix 1: Forecast Methodology

Traffic Volume Forecast Methodology

EXISTING TRAFFIC VOLUMES

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

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

The actual peak hour of each intersection was used (ranging between 3:00 PM to 4:00 PM and 5:00 PM to 6:00 PM).

US 2/Hay Canyon Rd and US 2/Aplets Way were counted Tuesday, June 10, 2014. US 2/Cotlets Way was counted Thursday, June 5, 2014. The volumes on SR 2 were notably higher on the June 5 count, so the higher through-traffic volumes were balanced on SR 2 through the other two intersections.

Spot balancing was also performed at locations in Cashmere when counts conducted on different days didn't balance adequately.

2040 FORECAST

Historical Regional Growth Trends

Traffic volume growth on SR 2 was evaluated for the 20-year period between 1990 and 2010 based on data in the WSDOT Annual Traffic Report (ATR). (NOTE: MP 113.10 did not have data for 1990 through 1992, so 17-year growth from 1993 to 2010 was used.)

Chelan County population growth trends were evaluated for the same time period based on information available from the Office of Financial Management (OFM).

The traffic growth history and population growth history were compared to calculate a factor to apply to population forecasts to yield traffic growth forecasts.

The following is a summary of the traffic and population growth trends. A population growth-to-traffic growth factor was calculated comparing historic traffic and population growth trends for the same time periods.

The two calibration factors were very similar and the 0.886 factor was used because it represented the full 20-year sample period and yields a slightly more conservative (higher) growth projection.

2040 Regional Growth Projection

WVTC, working with WSDOT, has identified a region-wide traffic volume growth projection for State Routes in the Wenatchee area for use in the Wenatchee area travel demand model. The rate used was 1.2% annual (straight-line) growth. SR 2 east of Cashmere is an external station to the Wenatchee model.

Table One: Historical Traffic Volume Growth Trends

Location	Annual Average Daily Traffic						
	1990	1993	2010	Total Growth	Annual Growth	Population Growth Rate (see Table Two)	Calibration Factor
US 2 – MP 113.10 NW of Red Apple Road		17,036	20,942	22.93%	1.35%	1.67%	0.808
US 2 – MP 104.84 West of Cashmere, East of US 2/US 97 Junction	11,235		15,086	34.28%	1.71%	1.93%	0.886

Table Two: Historical Population Growth Trends

Location	Population			Annual Growth	
	1990	1993	2010	1990-2010	1993-2010
Chelan County	52,250	56,423	72,453	1.93%	1.67%

A traffic growth rate forecast was prepared using other data for comparison to the 1.2% used by WVTC.

The OFM population forecast for Chelan County was reviewed for low, medium and high growth projections. The 2010 to 2040 population forecast yields the following annual population growth rates (straight-line):

- Low – (72,453 to 76,706) = 0.20%
- Medium – (72,453 to 89,246) = 0.77%
- High – (72,453 to 120,084) = 2.19%

Applying the 0.886 population growth-to-traffic growth calibration factor yields the following calibrated annual traffic growth rates:

- Low – 0.18%
- Medium – 0.68%
- High – 1.94%

After discussion with WVTC and the City of Cashmere it was determined appropriate to use the 1.2% annual growth rate for through traffic on SR 2, which is consistent with the Wenatchee Travel Demand Model and within the predicted range between medium (0.68%) and high (1.94%) growth.

For the City of Cashmere it was determined appropriate to use the medium growth rate (0.68%) which was rounded to 0.70% for this calculation.

To estimate the “baseline” 2040 traffic volume scenario, the existing 2014 PM peak hour volumes were grown by 26 years of the appropriate growth rate. In addition to global growth rates, traffic estimated for the 5.25 acre upland parcels at the Port of Chelan site between Sunset Highway and Mill Road was included in the forecast. Industrial Park land-use was assumed with trucks comprising 13% of the total traffic generated by the site.

Bridge Alternatives

For each bridge alternative, traffic adjustments were manually entered to account for predicted traffic volume shifts based on the access differences between alternatives. For example, Alternative 1 assumes the Goodwin Road Bridge completely closed, so existing passenger vehicle trips were re-routed away from Goodwin Road to other roadways.

The attached spreadsheet provides the existing 2014 PM peak hour traffic volumes and 2040 PM peak hour forecast for a no-action alternative, Goodwin Road Bridge removal scenario and three additional build alternatives.

Appendix 2: Public Involvement

Public Involvement

Outreach Efforts

Public outreach and community involvement, especially with the Cashmere community, is a critical component of this study. Public outreach efforts started early in the process and have continued throughout the study. Active engagement began by meeting with a Technical Advisory Committee made up of the key jurisdictional interest: Chelan County, City of Cashmere, Chelan-Douglas Transportation Council, Port of Chelan, and WSDOT. Radio spots were conducted as part of weekly talk shows by the Chair of the Chelan County Commissioners and the Mayor of Cashmere. Early interviews were held with Stakeholder groups such as: freight haulers, fruit tree industry representatives, local truck dependent industries, and Emergency Services representatives. A public workshop held in Cashmere, including a "kick-off" open house and a Chamber of Commerce membership meeting, were held to help identify the public's perception and potential ideas for improvement.

Public Comment Summary

Prior to preparing the Draft Study, more than one hundred members of the public, business community, and local government service providers had the opportunity to share their opinions of the transportation issues surrounding the three primary access points to Cashmere and local traffic issues. With the release of the draft study, additional opportunities for input will be available through similar methods as presented in Table A2.1.

Table A2.1: Public Involvement Meeting Overview

Group	Date	Held At	Attendance
TAC Meeting	August 7, 2014	Chelan Douglas Transportation Council (CDTC)	12
	September 3, 2014	CDTC	11
	January 2015	To Be Determined	2 meetings after TAC meeting and final draft review
Open Houses	September 16, 2014	Cashmere	60
	October 22,2014	Cashmere	30
CDTC	January 2015	TBD	2 meetings after TAC meeting and final draft review
Board of County Commissioners	January 2015	Confluence Tech Center	Monthly Board Meetings
	January 2015	Commissioners' Chambers	Post CDTC Review

Raised comments during the open houses and stakeholder meetings suggested an emphasis on replacing the Goodwin Bridge and rail over-crossing. Support for the replacement ranged from critical economic development access to the City's west side industrial properties, to concerns for emergency vehicle access to the south portion of Cashmere when trains are blocking at grade crossings.

Generally, comments about the Aplets/Hwy 2/97 intersection accentuated adding an eastbound 2/97 on ramp to reduce congestion when someone is turning left or the light does not accommodate a free right turn. Several suggestions were made for necessary improvements to the Cotlets/Tichenal/ Hwy 2/ Hwy 97 intersection such as moving the intersection east or west, knowing that moving either direction would require some ROW purchase and potentially removing some commercial businesses. A complete listing of the comments is included in the next page.

Cashmere Open House Public Comments

The open house for the Highway 2/97 Cashmere Area Transportation Study held on September 16th, 2014 was well attended with over 60 members of the community.

Chelan County Commissioner Keith Goehner and Cashmere Mayor Jeff Gomes began the open house with some general comments about the importance of the study, emphasizing the need to replace the current Goodwin Bridge. If the plan is not acted upon, the structure is expected to be closed within the next 10 years.

It was generally observed by most attendees that replacing the bridge will be necessary for adequate circulation, emergency vehicle access, school bus access. and heavy truck traffic. Overall, all three access points are critical for general circulation of the whole area.

Community Comments

The following comments were collected at the September 16th Open House. They have been kept in their original language and structure.

- Exiting left from Wenatchee: make 2 lanes to turn, so those turning left do not block those going into Cashmere – at Colet Way.
- Eastbound on ramp at tree top.
- Looks like there is some potential for right turn storage – add acceleration lane/free right.
- Works OK now, no need to fix it
- Going eastbound on Hwy 2 you have an option to use free right at Cotlets.
- An adequate Goodwin would relieve some congestion on Aplets.
- Stage development: 1. Work on Goodwin; 2. Save wear and tear on Cotlets – maybe different controls at Hwy 2.
- More traffic on Cotlet and Aplet.
- Emergency access grade separation.
- If grade separation is best, use grade separated over pass.
- Trains will block everything without crossing.
- Sunset need sidewalks, lights, drainage, etc. – freight route with bridge.
- Need left turn for west-south capacity.
- The turning radius for trucks turning right off of Titchenal is widely recognized as too tight and to close to the highway.
- Consider adding an eastbound highway access directly from the east end of Titchenal Way.
- The Cotlets intersection could move to the east as long as it doesn't go as far as the old TreeTop [sic] building.
- Can a left turn lane be created in front of Rusty's? Left turn into Rusty's and onto Titchenal frequently block through traffic into town.
- Can a right in/right out with acceleration lane to access Titchenal be created?
- Drive in traffic to Rusty's backs onto Cotlet Way blocking traffic.
- What about a second traffic signal just west of Titchenal to control traffic in/out of Titchenal?

Additional Summarized Comments

- There was considerable discussion regarding Roundabouts. There were several people who totally opposed them, while 3 to 4 spoke up in favor of them.
- Auto oriented businesses, such as Rusty's Drive-in drive up and drive through. Several attendees were of the opinion that local walk-up customers are relatively few in number. This could have implications for any potential concepts to reconfigure the Cotlets/Titchenal intersection in a manner that would impact or relocate Rusty's.
- Asked if Rusty's could be relocated, several people all agreed as long as they stayed in the general area.
- Multiple individuals voiced frustration with the circulation problems and conflicting movements at Cotlets/Titchenal intersection.

Appendix 3: Comment Resolution Matrix

Cashmere Area Transportation Study

Review Comment and Resolution Form (RCR)

CODE
A. Accept comment - correct, add to, or clarify plans
D. Dismiss comment
C. Clarify or discuss and resolve prior to next design phase
R. Resolve comment in next design phase
PI. Preference comment to incorporate
PD. Preference comment, not incorporated

Submittal Stage: Preliminary | **Review Type:** Milestone Review | **Package Description:** Traffic Analysis | **Package** †

Due Date: 11/14/14 | **Position/Agency:** Chelan County | **Reviewer:** | **Email:**

Item No.	*Dwg. No. Page No.	Reviewer Last Name	Comments	Initial Code †	Resp. Person	Response/Transfer Discipline	Final Disposition ‡ Code	Final Disposition ‡ Date	QC
Build Alternatives									
1	Goodwin RD	WSDOT	Consider a US 2 roundabout for Alternative 3 "Goodwin Bridge".	A	RH	Will add roundabout option for Goodwin.			
2	Goodwin RD	WSDOT	Consider bicycle and pedestrian accommodations	A	RH	Crosswalks added. Bikes shall use widened sidewalks and crosswalks to cross US 2.			
3	Orchard Rd	WSDOT	Alternative 4 "Orchard Bridge" Options adds another signal on the US2. If Hay Canyon signal isn't removed, two signals will need to be coordinated. US 2 will have more delay.	A	RH	Would recommend removal of the signal at Hay Canyon, and change SB Hay Canyon to US 2 to Stop controlled movement.			
4	Orchard Rd	WSDOT	Consider bicycle and pedestrian accommodations.	A	RH	Crosswalks added. Bikes shall use widened sidewalks and crosswalks to cross US 2.			
5	Evergreen Dr	WSDOT	Alternative 5 "Evergreen Bridge" Options adds another signal on the US 2. If Hay Canyon signal isn't removed, two signals will need to be coordinated. US 2 will have more delay.	A	RH	Would recommend removal of the signal at Hay Canyon, and change SB Hay Canyon to US 2 to Stop controlled movement.			
6	Evergreen Dr	WSDOT	Consider bicycle and pedestrian accommodations.	A	RH	Crosswalks added. Bikes shall use widened sidewalks and crosswalks to cross US 2.			
7	Cottage Ave	WSDOT	Need to model the PM peak queue for the Cottage Ave/US 2 roundabout option. The small roundabout queue should not block the large roundabout.	A	YZ	The PM peak queue for the Cottage Ave/US 2 roundabout option has been analyzed. The southbound queue from the small roundabout is less than 100' during the peak hours. Given the more than 300' queuing space between these 2 roundabout, the queue impact would be minimum.			
8	Cottage Ave	WSDOT	Close proximity of Museum St., E. Cashmere Rd and business accesses to small roundabout will need to be addressed.	A	RH	Access would be coordinated and provided for local businesses.			
9	Cottage Ave	WSDOT	Add right turn bypass and extend to existing acceleration lane for AM peak traffic. EB US2	A	RH	Would be addressed in final design. Traffic analysis shows that roundabout would function adequately without the addition of right turn lanes.			
10	Cottage Ave	WSDOT	Define the access plan for the businesses at the roundabout.	A	RH	Access would be coordinated and provided for local businesses.			

Cashmere Area Transportation Study

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11	Cottage Ave / ALT	WSDOT	Need to clarify the intersection control for the Cottage Ave/US 2 roundabout/traffic signal option. Titchenal and Cottage should probably be stop controlled both westbound and eastbound. Cotlets southbound into the intersection will likely need to be free flow for rights and lefts to prevent queues from blocking the highway roundabout.	A	RH	Traffic analysis shows that stop control on Titchenal would result in LOS F, and supports roundabout or signalizing intersection.			
12	Cottage Ave / ALT	WSDOT	Westbound chicane on US 2 seems to be missing.	A	RH	Roundabout would be refined in final design. Turning templates and speed curves will be supplied.			
13	General	City of Cashmere	If a new bridge is constructed, consider accommodations for future utilities. Hangers for water, sewer, and dry utilities and block outs in the abutment wall could be installed now	A	RH	Accommodations for utilities as described would be addressed in final design.			
14	Aplets Way	City of Cashmere	Consider shifting intersection north to avoid impacts to Aplets Way bridge.	A	RH	Would be addressed in final design.			
15	Aplets Way	City of Cashmere	Consider two incoming lanes on both north and south side of roundabout. See MUTCD Figure 3C-8.	A	RH	Would be addressed in final design.			
16	Aplets Way	City of Cashmere	For single lanes on the side street, consider MUTCD Figure 3C-4	A	RH	Would be addressed in final design.			
17	Aplets Way	City of Cashmere	Roundabout inscribed circle seems small for a double lane roundabout that needs to accommodate a high volume of freight traffic. Lanes seem small for freight traffic. Should it be more of an oval-about to reduce deflection for US2 traffic? Turning templates need to be analyzed to ensure the impact footprint isn't sufficiently more than what is shown.	A	RH	Roundabout would be refined in final design. Turning templates and speed curves will be supplied.			
18	Aplets Way	City of Cashmere	How will this intersection accommodate pedestrian and bike traffic?	A	RH	Crosswalks added. Bikes shall use widened sidewalks and crosswalks to cross US 2.			

Cashmere Area Transportation Study

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19	Cottage Ave / ALT	City of Cashmere	Consider realigning roadway to allow free flowing traffic on Cottage Ave (east/north – south/west traffic) with a "T" intersection for Titchenal Way (stopping only Titchenal Way traffic).	A	RH	Traffic analysis shows that stop control on Titchenal would result in LOS F, and supports roundabout or signalizing intersection.			
20	Cottage Ave / ALT	City of Cashmere	Consider more pronounced deceleration offsets for westbound US2 traffic.	A	RH	Roundabout would be refined in final design. Turning templates and speed curves will be supplied.			
21	Cottage Ave / ALT	City of Cashmere	Consider two incoming lanes on both north and south side of roundabout. See MUTCD Figure 3C-8.	A	RH	Would be addressed in final design.			
22	Cottage Ave / ALT	City of Cashmere	For single lanes on the side street, consider MUTCD Figure 3C-4.	A	RH	Would be addressed in final design.			
23	Cottage Ave / ALT	City of Cashmere	Consider re-use of existing acceleration lane for Cottage Avenue approach as a shoe fly at roundabout.	A	RH	Analysis shows that roundabout would function adequately without the addition of right turn lanes.			
24	Cottage Ave / ALT	City of Cashmere	Not sure what the two-way left turn lanes are serving on US2, Cottage, and Titchenal Way. Titchenal could either have two westbound lanes or eliminate two-way left turn lane.	A	RH	Removed two-way left turn lanes on US2, Included on Cottage and Titchenal to provide access to local businesses and maintain through traffic.			
25	Cottage Ave / ALT	City of Cashmere	Roundabout inscribed circle seems small for a double lane roundabout that needs to accommodate a high volume of freight traffic. Lanes seem small for freight traffic. Should it be more of an oval-about to reduce deflection for US2 traffic? Turning templates need to be analyzed to ensure the impact footprint isn't sufficiently more than what is shown.	A	RH	Roundabout would be refined in final design. Turning templates and speed curves will be supplied.			
26	Cottage Ave / ALT	City of Cashmere	How will this intersection accommodate pedestrian and bike traffic?	A	RH	Crosswalks added. Bikes shall use widened sidewalks and crosswalks to cross US 2.			
27	Cottage Ave / ALT	City of Cashmere	Could Titchenal Way extend west to E. Cashmere Rd, intersecting at a "T" intersection on Cottage? This would allow the roundabout to set closer to the existing intersection.	A	RH	Would be addressed in final design.			
28	Cottage Ave	City of Cashmere	Cottage Ave intersection option has similar comments as the Cottage Ave Intersection – Alt with additional impacts to local businesses.	A	RH	Access would be coordinated and provided for local businesses.			

Cashmere Area Transportation Study

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Submittal Stage: Preliminary **Review Type:** Milestone Review **Package Description:** Traffic Analysis **Package** †

Due Date: 11/14/14 **Position/Agency:** Chelan County **Reviewer:** **Email:**

Item No.	*Dwg. No. Page No.	Reviewer Last Name	Comments	Initial Code †	Resp. Person	Response/Transfer Discipline	Final Disposition ‡ Code	Date	QC
29	Cottage Ave	City of Cashmere	For Cottage Ave intersection option, if the businesses are to be removed, consider moving the smaller roundabout north to avoid impacts to properties south of Cottage Ave.	A	RH	Would be addressed in final design.			
Cost Estimate									
30	General	City of Cashmere	Construction of selected bridge will be done within 200 ft. of Wenatchee River, which is a Shoreline of Statewide Significance. Shoreline Mitigation most likely within 200 ft. of Wenatchee River will be required by other Agencies. Please remove "wetland" and replace with "shoreline mitigation" and add a value within the Environmental Mitigation section of the estimate.	A	MB	Revised as suggested.			
31	General	WSDOT	Include bridge removal. Mobilization is typically 10%. Pavement estimate seems extremely low.	A	MB	Bridge removal included. Mobilization is 10% of construction cost. HMA increased for Goodwin option for reconstruction of US 2. Other pavement quantities verified.			
Traffic Analysis									
32	Appendix A	WSDOT	Peak hour and forecast volumes spreadsheet missing.	A	YZ	Added.			
33	Table 3	WSDOT	Alternative 1&2 appear the same, define the difference. Why US 2/Aplets Way delay is reduced in Alternative 2 from 1? Why volumes to US 2/Cotlets Way remain the same and Cottage Ave Titchenal Road increase in alternative 2 from 1?	A	YZ	Alternative 1 is a no build option, which assumes the current bridge would be in place for the design year. This is the base conditions to be used to make comparison to the build alternatives, although it is well known that the current bridge will not be functioning properly in the future. Alternative 2 is a build option, which assumes the current bridge would be removed for the design year. In Alternative 2, the existing bridge would be removed and there is less traffic to be able to entering/exiting the City center. So the US 2/Aplets Way delay is reduced. Traffic volumes to both US2/Cotlets Way and Cottage Ave Titchenal Road remain the same in alternative 1 and 2.			

Cashmere Area Transportation Study

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34	General	City of Cashmere	Goodwin Br is currently truck restrictive, what percentages of trucks are projected to use the new Goodwin Br for alternatives 3, 4, and 5?	A	YZ	Alternative 3 has 10% trucks for SB and 11% trucks for NB on Goodwin bridge. Alternative 4 and 5 both have 8% trucks for SB and 10% trucks for NB on the bridge.			
35	General	City of Cashmere	What are the current and projected truck percentages on each of the “main freight routes” identified in Figure 1? I am not sure all of the routes shown are necessarily set up for freight traffic in terms of their pavement structure.	A	YZ	See attached figure for existing truck percentages on main freight routes. The future truck percentages remain the same as existing truck percentages on freight routes except the new bridge, which has higher truck percentage as shown above.			
36	General	City of Cashmere	What is the current ADT and peak hour volume on Goodwin Br?	A	YZ	Current ADT on Goodwin Bridge is 2300. Existing peak hour volume is shown on the attached Figure 1.			
37	General	City of Cashmere	The final discussion paragraph talks about minimum LOS standards. It appears that a new bridge doesn’t change or improve the substandard level of service for several of the intersections. The table seems to indicate that the improvements do little to improve the LOS at any of the	A	YZ	That is correct. A new bridge won’t improve the traffic operation on the freight route, given the trucks are considered less than 10% of the overall traffic. However, the proposed improvements of the intersection will be followed on the recommendation part of the technical memo.			

** Indicate Drawing No. or Page No. or use "G" for General Comment.*

† To be filled out by design lead or segment lead prior to resolution meeting

‡ To be determined at Review Meeting or in subsequent meeting/discussion

Please note: These comments pertain to earlier versions of the study when five alternatives were considered. It was suggested to combine Alternatives 1 and 2 because of their similarities as No Build Alternatives. This suggestion is noted in Item No. 33 and was also later suggested by County staff. The client and consultant determined that combining these two alternatives into one was the best representation of the alternatives considered.

Appendix 4: Structures Concept Report

EXECUTIVE SUMMARY

This report is based on the findings and conclusions from Lochner's initial alternative alignment investigations for the replacement of the existing Goodwin Road Bridge.

Lochner's preceding US 2/97 Cashmere Area Transportation Study has produced a detailed report that identified, evaluated, and recommended alternatives to the high-cost safety and traffic improvements recommended in the 2002 WSDOT US 2/97 Corridor Safety Study. The memorandum described the current truck routes between US 2 and the industrial areas in the Cashmere Urban Growth Area (UGA), and proposed alignment alternatives and summarized the traffic operation analysis at critical intersections for the base conditions and the build alternatives.

Each of the proposed alignments will require crossing over the existing Burlington Northern Santa Fe (BNSF) Railway, over the Wenatchee River with bridge structures, and intersecting at-grade with US 2/97. The proposed alignments consist of an alignment replacing the existing bridge near the existing Goodwin Road Bridge, one alignment west of Goodwin Road which will be called Orchard Drive, and another alignment east of Goodwin Road which will be called the Evergreen Drive.

Bridge Aesthetics

Aesthetically, each of the proposed bridge structures along the proposed alignments will have similar visual attributes to standard WSDOT utilitarian type bridge structures. The primary visual presence for each proposed alignment will be from the railroad corridor and from the Wenatchee River. Each proposed alternative is assumed to have similar aesthetics. Costs associated beyond basic aesthetics have not been included in this report.

Recommended Goodwin Road Bridge Replacement

Alternative 2 Option 1 has been recommended for the replacement for the existing Goodwin Road Bridge.

This alternative would replace the Goodwin Road Bridge with a new structure, just east of the existing bridge. The new bridge would intersect with US 2/97 at the existing intersection location. The grade of US 2 would be raised in order to maintain a 5 percent maximum grade along the alignment. Retaining walls would be required along the south side of US 2 east and west of the intersection as well as fill embankment walls for the southern approach to the new bridge.

The new replacement bridge will consist of a 355.05-foot-long, three-span structure with a 2-foot, 2-inch voided slab for span 1 over the BNSF Railroad and 7 lines of WF83G girders spaced at 7 feet for span 2. Span 3 of the bridge is along a horizontal curve and would likely require flaring of the girders to meet the bridge curvature and intersection requirements for the improvements at US 2/97. The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders, and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch cast-in-place concrete bridge rail with a 1-foot, 10-inch BP rail on the east side, and two 2-foot,10-inch-high single slope cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10-inch BP rail. The abutments and piers would likely be constructed on spread footings or drilled shafts. The cost of this option including the cost of the bridge and approach slabs at each end is \$5.6 million plus the cost to remove the existing bridge of \$1.2 million resulting in a total cost of \$6.8 million in 2014 dollars.

INTRODUCTION

General

The following Structures Concept Report is primarily based on findings and conclusions from Lochner's US 2/97 Cashmere Area Transportation Study, which produced a detailed report that identified, evaluated, and recommended alternatives to the high-cost safety and traffic improvements recommended in the 2002 WSDOT US 2/97 Corridor Safety Study. The memorandum described the current truck routes between US 2 and the industrial areas in the Cashmere Urban Growth Area (UGA). This report carries forward three alignment alternatives to accommodate the proposed traffic operation analysis at critical intersections for the base conditions and the build alternatives.

The need for the project is based on growth of transportation demands for area commerce. The County, with many other stakeholders, has invested significant time and resources to realize Cashmere's vision for developing the local transportation infrastructure to help accommodate their long-term growth plan. The project is being progressed in cooperation with Chelan County, the City of Cashmere, Washington State Department of Transportation (WSDOT), and Wenatchee Valley Transportation Council (WVTC).

Figure 1 – Vicinity Map of Project (courtesy of Google Maps)

The vicinity map for the proposed project is depicted in Figure 1 with the proposed alignments that are near the location of the existing bridge, west of the existing bridge, and east of the existing bridge as depicted.

Project Study Area

The project limits are in the vicinity of the intersection 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.

Current Freight Routes and Critical Intersections

Lochner's US 2/97 Cashmere Area Transportation Study identified major freight routes and critical intersections by conducting interviews with the major freight users and stakeholders.

The three existing intersections along US 2/97, Goodwin Road, Cotlets Way and Aplets Way currently operate as an integrated system. The Traffic Level of Service analysis was evaluated at 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

Connection to Existing Highway Network

Each of the proposed alignments and associated bridges will provide a connection to US 2/97. Current evaluations consider intersections at grade.

Necessary Structures

Based on the findings and conclusions from Lochner's US 2/97 Cashmere Area Transportation Study, bridge structures will be required to cross over the existing BNSF Railway and the Wenatchee River. It is anticipated that adjacent to each of the structure's abutments will be wing walls and structural earth walls.

Design Reports and Supplements

The following are design reports and supplements:

- US 2/97 Cashmere Area Transportation Study

Environmental Studies and Documentation

The need for environmental studies and documentation will be required and are planned to follow the current studies.

Architectural Visual Assessment or Corridor Theme Reports

There have been no Architectural Visual Assessment or Corridor Theme Reports prepared for this project.

Hydraulic Reports

There are no hydraulic reports or analysis that will apply to this project.

Geotechnical Reports

There are no geotechnical reports or analysis that will apply to this project.

PROJECT DESCRIPTION

General Conditions and Topography

The existing topography in the vicinity of the project will primarily remain unchanged after construction with the exception for areas of removing the existing bridge and adding the new bridge. Depending on the approach grades and widening required for the proposed structures, approach walls will be required to accommodate the new channelization.

Goodwin Road Bridge

The current Goodwin Road Bridge has been recently funded for replacement by the Local Agency Bridge Program managed by WSDOT, also known as BRAC. This report is to evaluate options for replacement. Each option is to accommodate the proposed alignment and provide the least cost for the most benefit.

DESIGN CRITERIA

All materials and workmanship will be in accordance with the requirements of the Washington State Department of

Transportation "Standard Specifications for Roads, Bridges and Municipal Construction," English units, dated 2014 and amendments.

The structures are to be designed in accordance with the WSDOT Bridge Design Manual (LRFD) and the "AASHTO LRFD Bridge Design Specifications," Customary U.S. units, 2012. All prestressed concrete elements are to be designed for service load and checked for load and resistance factor design. All other elements are to be designed per load and resistance factor design method. Seismic design is to be in accordance with the AASHTO Guide Specifications for LRFD Seismic Bridge Design, Second Edition 2011, with 2014 interim revisions.

Concrete in the bridge deck is to be Class 4000D. Concrete in the drilled shafts is to be Class 4000P. Concrete in the approach slabs is to be Class 4000A. All other cast-in-place concrete is to be Class 4000 unless otherwise noted. Any other concrete in sidewalks, curbs, gutters, medians, and slope protection is to be Class 3000.

Reinforcing bars are to conform to ASTM A706 Grade 60, unless otherwise noted.

Steel for plate girders will be AASHTO M 270 grades 50 or 50W.

For the BNSF Railway clearances under the bridge structure, the BNSF and Union Pacific Railroad Guidelines for Railroad Grade Separation Projects dated January 2007 have been considered for the initial design clearance criteria. With the site constraints and steep slopes on the south side of the rail tracks combined with the proximity of the Wenatchee River on the north side, it is likely not possible to meet the 25-foot clearance desired by the railroad per section 5.2.2 and that requesting special review and approval as allowed by BNSF per section 5.2.2 will be granted. Therefore, the structure concept layouts have considered a 20-foot distance between the centerline of the existing track and the centerline of a possible future track. Setbacks to the proposed bridge structure are 18 feet, measured from the centerline of the track to the face of the proposed structures.

STRUCTURAL STUDIES

Bridge Aesthetics

Aesthetically, each of the proposed bridge structures for this study will have standard visual attributes used for WSDOT bridge structures. The visual presence of the bridge structures will be primarily seen from the BNSF Railroad and from the Wenatchee River. Some visual presence will be from the US 2/97 corridor. Costs associated beyond basic aesthetics have not been included in this report.

Cost Estimates

The unit costs are based on WSDOT Bridge Design Manual, July 2011 dollars. It has been assumed that the Inflation Index is the adjustment of costs from 2011 dollars to 2014 dollars. The ultimate construction costs may change depending on when the final design occurs, what foundation system is required, market conditions and design requirements related to the final Bridge Type selected. Any and all project changes may impact the final design and construction cost for the structures. The Design and Construction Management costs at this stage are to be based on a percentage of the construction cost. This project is not within WSDOT right-of- way, except for the intersection with US 2/97, and it will be subject to state and local sales tax as required by DOR Rules 171 and 172.

Geometric Constraints

Design Speed

The design speed for the structures within the corridor will be designed for a design speed of 35 mph and a posted speed limit of 25 mph.

Profile Grade

The profile grades for the evaluated bridges have a maximum of 5 percent.

Project Staging and Stage Construction Requirements

Total Duration of Construction

The necessary detour work to replace the existing bridge will only be required for the Goodwin Road alignment option. The extent of required utility work in the vicinity of the proposed alignments is not known at the time of this study. However, the total duration of construction should fit within the boundaries for the critical path construction activities.

Construction Delays

Two potential causes of significant delay during construction are (1) the total amount of detour work required; and, (2) the relocation of utilities in the vicinity of the bridge abutments. The proposed alignments require varying sizes of structures, and retaining walls will be required adjacent to some of the bridge wing walls due to the grade requirements needed. The amount of retaining walls and fill slopes for each of the alignment alternatives have not been fully developed at the time of this report.

Use of Standard Construction Technologies

All else being equal, a project that uses standard construction technologies is less risky than one that requires specialized construction technologies and specialty subcontractors. The proposed alignment will consider the use of standard construction technologies recommended by WSDOT.

Foundations

The required bridge foundations have not been determined, yet it is likely that the required foundation types will be either spread footings or drilled shafts.

Hydraulics

There are no hydraulic reports or analysis developed for this report. Future coordination will be required to determine if a hydraulics report will be required for the removal of the existing pier in the river and the replacement with a new pier within the river. Currently, there is one new pier proposed within the 100-year flood zone of the river for this project.

Feasibility of Construction

It appears that the construction of the bridge structures is completely feasible based on the current alignment alternative. Currently, the proposed structures are near the spanning capacities, and increasing the length between the abutments may result in new structure types to be considered.

Structural Constraints

There are currently no structural constraints foreseen for the proposed structure types.

Maintenance

The proposed bridges are to use standard WSDOT prestressed concrete or steel plate girders and standard constructed cast-in-place concrete abutments. These proposed structures are within the guidelines specified in the WSDOT Bridge Design Manual and likely supported by the WSDOT LAG manual requirements. Therefore, the perceived maintenance should likely be minimal. However, in order to achieve efficient spanning structures, the geometry has required some tall abutment walls; hence, it is desired to have abutment walls with minimal height. Therefore, the proposed abutment walls may be a subject of graffiti and require additional maintenance.

PROPOSED STRUCTURES

Three separate alignment alternatives were evaluated, with a total of four bridges studied for the replacement of the existing Goodwin Road Bridge. For each structure, the length of the wing wall has been limited to 15 feet with retaining walls required adjacent to the wing walls.

Each of the proposed alignments will require crossing over the existing BNSF railway, over the Wenatchee River with bridge structures, and intersecting at-grade with US 2/97. The proposed alignments consist of an alignment replacing the existing bridge near the existing Goodwin Road Bridge, one alignment west of Goodwin Road which will be called Orchard Drive, and one alignment east of Goodwin Road which will be called Evergreen Drive.

For each of the bridge structures evaluated, maximum span lengths, girder type and spacing were developing following the WSDOT Bridge Design Manual.

Removal of the Existing Goodwin Road Bridge

The existing Goodwin Road Bridge consists of five spans of reinforced concrete girder bridge, plus a two-span steel truss bridge structure over the Wenatchee River. The location of the existing bridge is depicted in Figure 1. A total of 10,185 square feet of bridge deck area is forecasted for removal at an estimated cost of $1.2 million. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A.

Full removal of the bridge with no replacement will be considered Alternative 1 – No Build, Bridge Demolished.

Alignment Alternative 2 – Bridge Replacement near Goodwin Road

The alignment for the proposed Alternative 2 includes utilizing rebuild of the existing Goodwin Road Bridge and realignment to intersect with US 2/97 at grade at the existing intersection location. The location of the proposed alignment is depicted in Figure 2, and would replace the Goodwin Road Bridge with a new structure, just east of the existing bridge. This alignment option will require regrading the approach to the new bridge on the south and raising the US 2/97 intersection by 14 feet to maintain a 5 percent maximum grade along the alignment. Truck access will be allowed on the rebuilt bridge. The approach to the layout of the proposed bridge has included reducing the total bridge length required. Retaining walls would be required along the south side of US 2 east and west of the intersection as well as fill embankment walls for the southern approach to the new bridge.

Alternative 2 Option 1 – *Goodwin Road*

This proposed option considers a new replacement bridge that will consist of a 355.05-foot long, 3-span bridge consisting of 66.83-foot – 175.00-foot – 113.512-foot spans. The alignment of the new bridge over the Wenatchee River, the Goodwin Line, is along a bearing of N 7°33'20" W, and Piers 1, 2, 3 and 4 are skewed to the alignment at 112°21'31”, 111°18'10”, 102°57'40” and 92°59'06” respectively. The three-span structure will have a 2-foot, 2-inch voided slab spaced at 4 feet for span 1 over the BNSF Railroad and seven lines of WF83G girders spaced at 7 feet for span 2. Span 3 of the bridge is along a horizontal curve and would likely require flaring of the girders to meet the bridge curvature and intersection requirements for the improvements at US 2/97.

The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch cast-in-place concrete bridge rail with a 1-foot, 10-inch BP rail on the east side, and two 2-foot, 10-inch-high single slope cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10-inch BP rail. The abutments and piers would likely be constructed on spread footings or drilled shafts.

This option would require the construction of the temporary work bridges. Considering construction of the substructure elements occurs during the low flow months and within the window allowed by permits, this will minimize the need for temporary work bridges. This option would likely require a temporary work bridge access to construction Pier 3 in the river channel.

The proposed cost for the replacement bridge along the Goodwin Road, including bridge approach slabs would be $5.6 million. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A. The cost for construction of the mechanically stabilized earth walls adjacent to the wing walls at each abutment is not included.

This is recommended as the preferred option based on the least construction cost for the bridge. A concept layout plan, elevation and typical sections are depicted on Sheets BG1-1 and BR1-2 in Appendix 4.B.

Alternative 2 Option 2 – *Goodwin Road*

This proposed option considers a new replacement bridge that will consist of a 335.05-foot long, three-span bridge consisting of 66.83-foot – 175.00-foot – 113.512-foot spans. The alignment of the new bridge over the Wenatchee River, the Goodwin Road alignment, is along a bearing of N 7°33'20" W, and Piers 1, 2, 3 and 4 are skewed to the alignment at 112°21'21", 111°18'10", 102°57'40" and 92°59'06" respectively. The three-span structure will have a 2-foot, 2-inch voided slab spaced at 4 feet for span 1 over the BNSF Railroad and six lines of 7-foot 6-inch-deep steel plate girders spaced at 8.25 feet for span 2. Span 3 of the bridge is along a horizontal curve and would likely require flaring of the girders to meet the bridge curvature and intersection requirements for the improvements at US 2/97.

The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of

Figure 2 – Proposed Alignment Alternative 2 (courtesy of Google Maps)

a 2-foot, 8-inch cast-in-place concrete bridge rail with a 1-foot, 10- inch BP rail on the east side, and two 2-foot, 10-inch-high, single-slope, cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10-inch BP rail. The abutments and piers would likely be constructed on spread footings or drilled shafts.

This option would require the construction of the temporary work bridges. Considering construction of the substructure elements occurs during the low flow months and within the window allowed by permits, this will minimize the need for temporary work bridges. This option would likely need a temporary work bridge access to construction Pier 3 in the river channel.

The proposed cost for Option 2, including shallow depth steel girders for span 1 and bridge approach slabs would be $7.1 million for the bridge. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A. The cost for construction of the mechanically stabilized earth walls adjacent to the wing walls at each abutment is included in the Roadway Cost Estimate in Appendix 8.

Our recommending the preferred option is based on the least construction cost. Therefore, the option discussed herein does not represent the recommended option.

Figure 3 – Proposed Alignment Alternative 3 (courtesy of Google Maps)

Alignment Alternative 3 – Bridge Replacement at Orchard Drive

The alignment for the proposed Alternative 3 includes a new roadway alignment that begins in the vicinity of the junction of Turkey Shoot Road / Stines Hill Road and travels northeasterly for approximately 200 feet, then turns northwesterly for 300 feet, then turns northerly for 600 feet and then bends toward the river. After approximately 300 feet, a new bridge crosses the railroad tracks and the river, intersecting US 2 at a new signalized intersection. The location of the proposed alignment is depicted in Figure 3. This alignment option will require regrading the approach to the new bridge on the south and meeting the US 2/97 intersection at grade. Truck access will be allowed on the rebuilt bridge. The proposed alignment would accommodate a three-span bridge. The alignment of the new bridge over the Wenatchee River, the Orchard Line is along a bearing of N 30°19'46" E. The alignment of Piers 1 and 2 would be parallel to the railroad alignment and Piers 3 and 4 would be normal to the alignment. The approach to the layout of the proposed bridge has included reducing the total bridge length required.

Alternative 3 Option 1 – *Orchard Drive*

This option considers a new replacement bridge that will consist of a 410-foot long, three-span structure consisting of 116.14-foot – 175-foot – 114-foot spans with seven lines of WF83G girders spaced at 7 feet.

The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch, cast-in-place concrete bridge rail with a 1-foot, 10-inch BP rail on the east side, and two 2-foot, 10- inch-high single slope cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10 inch BP rails. The abutments and piers would likely be constructed on spread footings or drilled shafts.

This option would require the construction of the temporary work bridges. Considering construction of the substructure elements occurs during the low flow months and within the window allowed by permits, this will minimize the need for temporary work bridges. This option would likely need a temporary work bridge access to construction Pier 2 in the river channel.

The proposed cost of the replacement bridge along the Orchard Drive alignment, including bridge approach slabs would be $6.6 million. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A. The cost for construction of the mechanically stabilized earth walls adjacent to the wing walls at each abutment is not included.

Our recommending the preferred option is based on the least construction cost. Therefore, the option discussed herein does not represent the recommended option.

However, a concept layout plan is depicted on Sheet BR2-1 in Appendix 4.B.

Alternative 3 Option 2 – *Orchard Drive*

This option considers a new replacement bridge that will consist of a 410-foot-long, three-span structure consisting of 116.14-foot – 175-foot – 114-foot spans with six lines of 7-foot, 6-inch-deep steel plate girders spaced at 8.25 feet.

The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch cast-in-place concrete bridge rail with a 1 foot, 10inch BP rail on the east side, and two 2-foot, 10- inch-high, single-slope cast-in-place concrete bridge rails between the traveled way with a 1-foot,10-inch BP rail. The abutments and piers would likely be constructed on spread footings or drilled shafts.

This option would require the construction of the temporary work bridges. Considering construction of the substructure elements occurs during the low flow months and within the window allowed by permits, this will minimize the need for temporary work bridges. This option would likely need a temporary work bridge access to construction Pier 2 in the river channel.

The proposed cost for the replacement bridge along the Orchard Line, including bridge approach slabs, would be $8.1 million. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A. The cost for construction of the mechanically stabilized earth walls adjacent to the wing walls at each abutment is not included.

Our recommending the preferred option is based on the least construction cost. Therefore, the option discussed herein does not represent the recommended option.

However, a concept layout plan is depicted on Sheet BR2-1 in Appendix 4.B.

Alignment Alternative 4 – Bridge Replacement at Evergreen Drive

The alignment for the proposed Alternative 4 includes a new roadway alignment that begins as an extension of Evergreen Drive from Sunset Highway and continues northerly for approximately 400 feet, and then becomes grade-separated on a new bridge structure crossing the railroad tracks, which turns slightly west. The alignment then crosses the Wenatchee River on another bridge structure and then intersects with US 2/97 at a new signalized intersection. The location of the proposed alignment is depicted in Figure 4. This alignment option will require regrading the approach to the new bridge on the south and meeting the US 2/97 intersection at-grade. Truck access will be allowed on the rebuilt bridge. The proposed alignment would accommodate a two-span bridge over the BNSF Railroad and then a three-span bridge over the Wenatchee River. The alignment of the new bridge over BNSF Railroad, the Evergreen Line, is along a bearing of N 3°18'05" E, and abutments and Pier 2 are along a bearing of N 40°22'37" W. The alignment of the new bridge over the Wenatchee River, the Evergreen Line, is along a bearing of N 21°33'24" E, and abutments and Pier 2 are along a bearing of N 68°26'36" W. There is a slight flare to the bridge deck to meet the intersection requirements for US 2/97; and the span 2 girders may need to flare or the deck may need an extended overhang. The approach to the layout of the proposed bridge has considered reducing the total bridge length required.

Figure 4 – Proposed Alignment Option 3 (courtesy of Google Maps)

Alternative 4 Option 1 – *Evergreen Drive*

This 2 bridge option includes a two-span bridge over the BNSF Railroad to meet the alignment and clearance needs, and a two-span bridge over the Wenatchee River.

The BNSF Railroad crossing bridge option considers a new replacement bridge that will consist of a 202.87-foot-long, two- span structure consisting of 108.50-foot – 87.60-foot spans with of seven lines of WF42G girders spaced at 7 feet on center for span 1 and a 36-inch voided slab spaced at 4 feet on center for span 2.

The Wenatchee River crossing bridge option considers a new replacement bridge that will consist of a 314.07-foot-long, two-span structure consisting of 154.70-foot – 154.70-foot spans with seven lines of WF66G girders spaced at 7 feet.

The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch cast-in-place concrete bridge rail with a 1-foot, 10-inch BP rail on the east side, and two 2-foot, 10-inch-high, single-slope cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10-inch BP rail. The abutments and piers would likely be constructed on spread footings or drilled shafts.

This option would require the construction of the temporary work bridges. Considering construction of the substructure elements occurs during the low flow months and within the window allowed by permits, this will minimize the need for temporary work bridges. This option would likely need a temporary work bridge access to construction Pier 2B in the river channel.

The proposed cost for the replacement bridge along the Evergreen Drive alignment, including bridge approach slabs would be $3.0 million for the BNSF overcrossing and $5.1 million for the Wenatchee River overcrossing, resulting in a total cost for bridges to be $8.1 million. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A. The cost for construction of the mechanically stabilized earth walls adjacent to the wing walls at each abutment is not included.

Our recommending the preferred option is based on the least construction cost. Therefore, the option discussed herein does not represent the recommended option.

However, a concept layout plan is depicted on Sheet BR3-1 in Appendix 4.B.

Alternative 4 Option 2 – *Evergreen Drive*

This two- bridge option includes a two-span bridge over the BNSF Railroad to meet the alignment and clearance needs, and a two-span bridge over the Wenatchee River.

The BNSF Railroad crossing bridge option considers a new replacement bridge that will consist of a 202.87-foot-long, two-span structure consisting 108.50-foot – 87.60-foot spans with of seven lines of 3-foot, 0-inch-deep steel plate girders spaced at 7 feet on center for spans 1 and 2.

The Wenatchee River crossing bridge option considers a new replacement bridge that will consist of a 314.07-foot-long, two-span structure consisting of 154.70-foot – 154.70 foot spans with six lines of 6-foot, 3 inch-deep steel plate girders spaced at 8.25 feet.

The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch, cast-in-place concrete bridge rail with a 1-foot, 10-inch BP rail on the east side, and two 2-foot, 10- inch-high, single-slope, cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10-inch BP rail. The abutments and piers would likely be constructed on spread footings or drilled shafts.

This option would require the construction of the temporary work bridges. Considering construction of the substructure elements occurs during the low flow months and within the window allowed by permits, this will minimize the need for temporary work bridges. This option would likely need a temporary work bridge access to construction Pier 2B in the river channel.

The proposed cost for the replacement bridge along the Evergreen Drive alignment, including bridge approach slabs would be $3.7 million for the BNSF overcrossing with steel girders and $6.3

million for the Wenatchee River overcrossing, resulting in a total cost for bridges to be $10.0 million. The bases for costs and assumptions are summarized in Table 1 in Appendix 4.A. The cost for construction of the mechanically stabilized earth walls adjacent to the wing walls at each abutment is not included.

Our recommending the preferred option is based on the least construction cost. Therefore, the option discussed herein does not represent the recommended option.

However, a concept layout plan is depicted on Sheet BR3-1 in Appendix 4.B.

SUMMARY AND CONCLUSIONS

In summary, the findings in this Structures Concept Report are as follows:

- The alignment alternatives will require either two separate bridges or one continuous bridge, and the total length of bridges required for Alignment Alternative 2 will be 355.05-feet; Alignment Alternative 3 will be 410.00-feet; and Alignment Alternative 4 will be 516.94-feet.
- Based on the final profile defined for the alignment, the need for additional retaining walls and fill slopes will be required, and these have not been considered for this report.
- The recommended *Alignment Alternative 1 Option 1 – Bridge Replacement near Goodwin Road* will consist of a 355.05-foot-long, three-span structure with a 2-foot, 2-inch voided slab for span 1 over the BNSF Railroad and 7 lines of WF83G girders spaced at 7.0-feet for span 2. Span 3 of the bridge is along a horizontal curve and would likely require flaring of the girders to meet the bridge curvature and intersection requirements for the improvements at US 2/97. The bridge deck is proposed to be cast-in-place concrete with two 12-foot lanes, two 5-foot shoulders and a 10-foot shared path on the east side. Bridge rails will consist of a 2-foot, 8-inch, cast-in-place, concrete bridge rail with a 1-foot, 10-inch BP rail on the east side, and two 2-foot, 10-inch-high, singleslope, cast-in-place concrete bridge rails between the traveled way with a 1-foot, 10-inch BP rails. The abutments and piers would likely be constructed on spread footings or drilled shafts. The cost of this option is $5.6 million, plus the cost to remove the existing bridge of $1.2 million resulting in a total cost of $6.8 million.
- Aesthetically, the bridge structures will have minimal consideration due to utilitarian needs. Costs associated beyond basic aesthetics have not been included in this report
- The alignment of the structures is on grades of four to eight percent.
- Construction duration is not likely to control the critical path for overall construction of the project. The impact associated with the type of retaining walls and earthwork required has not been studied.

APPENDIX 4.A: Cost Estimate

TABLE A-1
SUMMARY OF BRIDGE COSTS

BRIDGE ALTERNATIVE	BRIDGE LENGTH (ft.)	DECK AREA (s.f.)	COST PER DECK AREA ($/s.f.)	APPROACH SLAB AREA (s.y.)	COST PER APPROACH SLAB AREA ($/s.y.)	TEMP. WORK BRIDGE AREA (s.f.)	COST PER WORK BRIDGE DECK AREA ($/s.f.)	COST CONTINGENCIES: INFLATION INDEX (see note)	COST CONTINGENCIES: BRIDGE TYPE (see note)	COST CONTINGENCIES: PROJECT CHANGES (see note)	COST CONTINGENCIES: DESIGN & CONSTR. MNGMNT (see note)	TOTAL BRIDGE COST (all spans)
<u>Demolition of the Existing Goodwin Bridge</u> -												
Existing Bridge Demo		10,185	$75.00					4.13%	10.00%	20.00%	20.00%	$1,200,000
<u>Goodwin Road Replacement Bridge</u> -												
Precast Concrete Slab Bridge, Option 1 : *Span 1*	66.8	3,342	$155.00	192.92	$250.00			4.13%	10.00%	20.00%	20.00%	
Precast Concrete Girder Bridge, Option 1 : *Spans 2 & 3*	288.2	14,122	$200.00	162.96	$250.00	2,611	$50.00	4.13%	10.00%	20.00%	20.00%	$5,600,000
Steel Girder Bridge, Option 2 : *Span 1*	66.8	3,342	$230.00	192.92	$250.00		$50.00	4.13%	10.00%	20.00%	20.00%	
Steel Girder Bridge, Option 2 : *Spans 2 & 3*	288.2	14,122	$250.00	162.96	$250.00	2,611	$50.00	4.13%	10.00%	20.00%	20.00%	$7,100,000
<u>New Orchard Drive Bridge</u> - *Westerly Option*												
Precast Concrete Girder Bridge, Option 1	410.0	19,553	$200.00	310.38	$250.00	4,203	$50.00	4.13%	10.00%	20.00%	20.00%	$6,600,000
Steel Girder Bridge, Option 2	410.0	19,553	$250.00	310.38	$250.00	4,203	$50.00	4.13%	10.00%	20.00%	20.00%	$8,100,000
<u>Evergreen Drive Replacement Bridge</u> - *Easterly Option*												
Precast Concrete Slab Bridge, Option 1A : *Railroad O'xing*	202.9	9,725	$180.00	519.07	$250.00		$50.00	4.13%	10.00%	20.00%	20.00%	$3,000,000
Precast Concrete Girder Bridge, Option 1B : *River O'xing*	314.1	15,075	$200.00	254.50	$250.00	3,128	$50.00	4.13%	10.00%	20.00%	20.00%	$5,100,000
Steel Girder Bridge, Option 1A : *Railroad O'xing*	202.9	9,725	$230.00	519.07	$250.00		$50.00	4.13%	10.00%	20.00%	20.00%	$3,700,000
Steel Girder Bridge, Option 1B : *River O'xing*	314.1	15,075	$250.00	254.50	$250.00	3,128	$50.00	4.13%	10.00%	20.00%	20.00%	$6,300,000

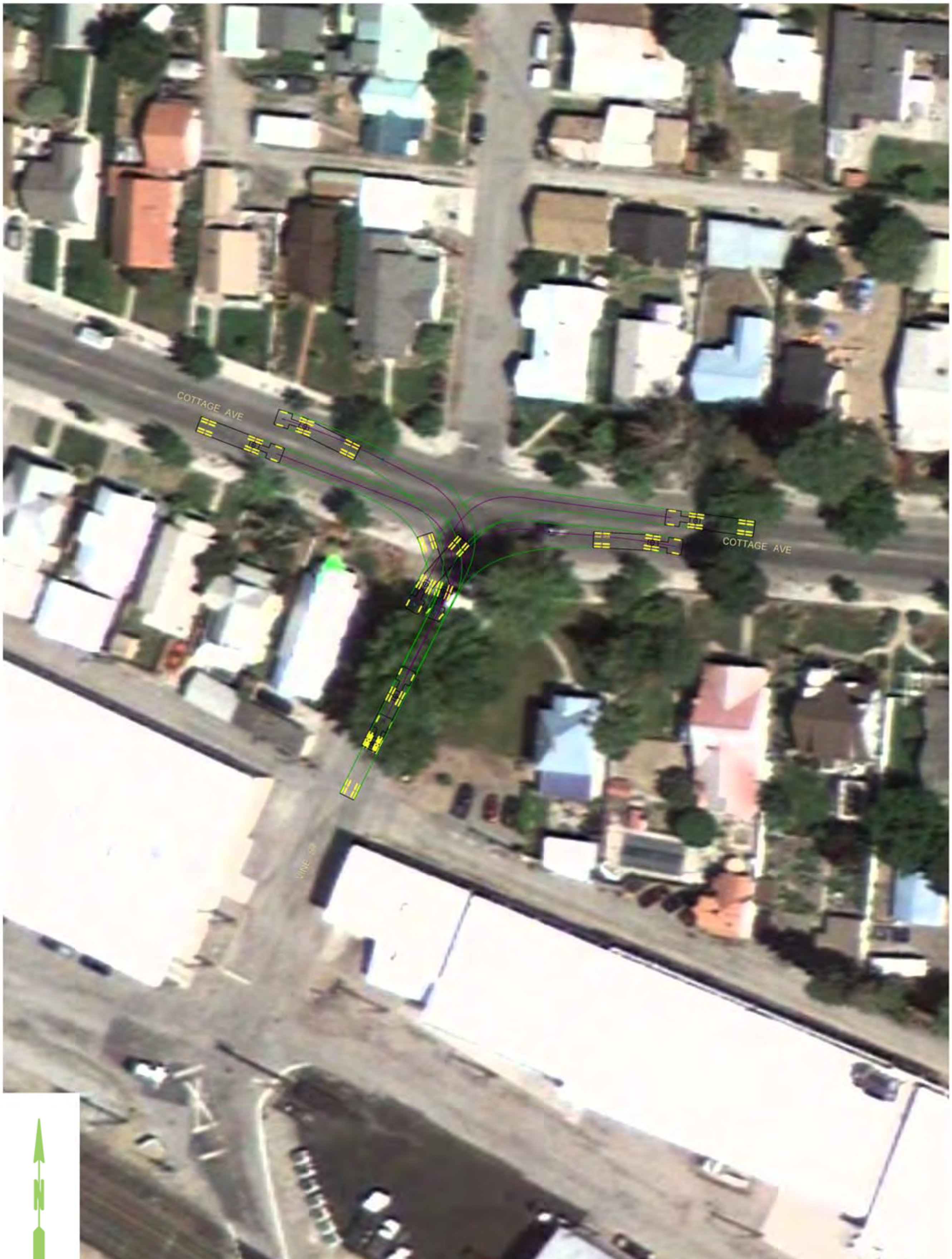
<u>Note</u>: i) Unit costs are based on WSDOT Bridge Design Manual, July 2011 dollars
ii) Inflation Index is the adjustment of costs from July 2011 dollars to 2014 dollars.
iii) Construction costs may change depending on final design, the foundation system required, and market conditions and design requirements related to the final Bridge Type selected.
iv) Project Changes may impact the final design and construction cost.
v) Design and Construction Management costs at this stage are based on a a percentage of the construction cost.
vi) State and local sales tax is not included and will be applied to the construction costs as required by DOR Rules 171 and 172.

APPENDIX 4.B: List of Drawings

LIST OF DRAWINGS

Sheet	Location	Description
BG1-1	Goodwin Road	Bridge Layout Plan - Option 1
BG1-2	Goodwin Road	Bridge Typical Sections - Option 1
BG2-1	Orchard Drive	Bridge Layout Plan - Option 1
BG3-1	Evergreen Drive	Bridge Layout Plan – Option 1

Appendix 5: AutoTURN Graphics



CASHMERE AREA TRANSPORTATION STUDY

TRUCK ROUTE GEOMETRIC REVIEW

LOCHNER

CITY OF CASHMERE

NOVEMBER 11, 2014

CASHMERE AREA TRANSPORTATION STUDY

INTERSECTION #4 GOODWIN RD/ SUNSET HWY

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NOVEMBER 11, 2014

CASHMERE AREA TRANSPORTATION STUDY

INTERSECTION #5 SUNSET HWY/ EVERGREEN DR

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NOVEMBER 11, 2014

CASHMERE AREA TRANSPORTATION STUDY

INTERSECTION #9 N DIVISION ST/ COTTAGE AVE

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CASHMERE AREA TRANSPORTATION STUDY

INTERSECTION #11 SUNSET HWY/ N DIVISION ST.

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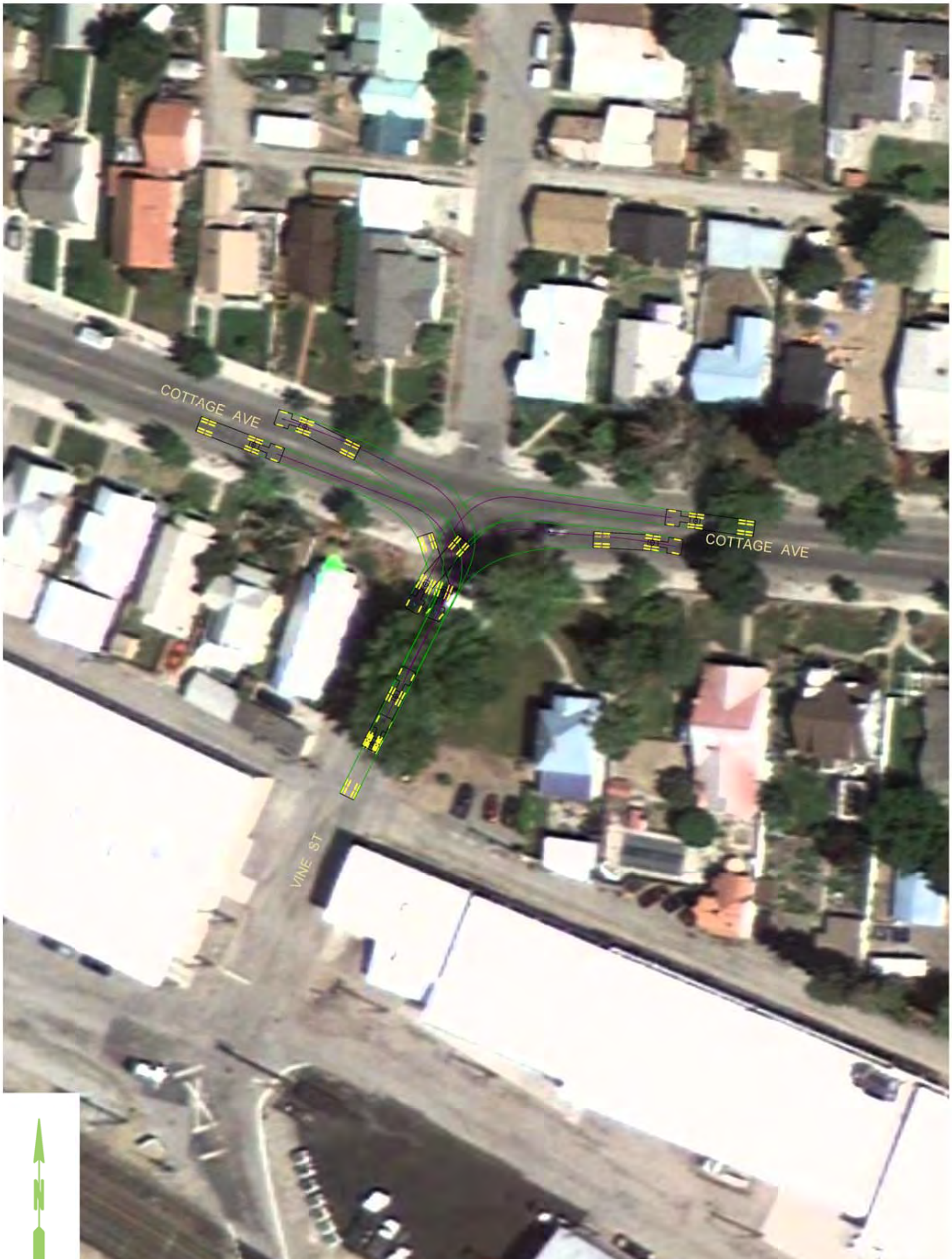
NOVEMBER 11, 2014



CASHMERE AREA TRANSPORTATION STUDY

BLUE STAR ENTRANCE

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CASHMERE AREA TRANSPORTATION STUDY

INTERSECTION EVERGREEN DR/ PIONEER DR

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NOVEMBER 11, 2014

Appendix 6: Traffic Analysis Reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	10	557	57	594	31	110	26	42
v/c Ratio	0.06	0.53	0.22	0.49	0.05	0.17	0.05	0.06
Control Delay	21.2	14.4	20.7	11.7	0.2	7.6	11.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	14.4	20.7	11.7	0.2	7.6	11.2	7.9
Queue Length 50th (ft)	2	43	10	47	0	6	3	2
Queue Length 95th (ft)	14	106	42	105	0	39	18	20
Internal Link Dist (ft)		2069		2822		280		312
Turn Bay Length (ft)	260		260		290		30	
Base Capacity (vph)	176	1411	264	1687	810	659	509	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.39	0.22	0.35	0.04	0.17	0.05	0.06

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	535	0	55	570	30	40	15	50	25	20	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	0	1810	1810	1810	1900	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	10	557	0	57	594	31	42	16	52	26	21	21
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	0	5	5	5	5	5	5	5	5	5
Cap, veh/h	18	980	0	80	1103	493	292	133	274	609	318	318
Arrive On Green	0.01	0.28	0.00	0.05	0.32	0.32	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1723	3529	0	1723	3438	1538	452	347	716	1290	831	831
Grp Volume(v), veh/h	10	557	0	57	594	31	110	0	0	26	0	42
Grp Sat Flow(s),veh/h/ln	1723	1719	0	1723	1719	1538	1516	0	0	1290	0	1663
Q Serve(g_s), s	0.2	5.8	0.0	1.4	5.9	0.6	0.0	0.0	0.0	0.6	0.0	0.7
Cycle Q Clear(g_c), s	0.2	5.8	0.0	1.4	5.9	0.6	1.8	0.0	0.0	2.4	0.0	0.7
Prop In Lane	1.00		0.00	1.00		1.00	0.38		0.47	1.00		0.50
Lane Grp Cap(c), veh/h	18	980	0	80	1103	493	698	0	0	609	0	635
V/C Ratio(X)	0.55	0.57	0.00	0.71	0.54	0.06	0.16	0.00	0.00	0.04	0.00	0.07
Avail Cap(c_a), veh/h	165	1314	0	247	1478	661	698	0	0	609	0	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.6	12.8	0.0	19.7	11.7	9.9	8.6	0.0	0.0	9.3	0.0	8.2
Incr Delay (d2), s/veh	23.8	0.5	0.0	11.2	0.4	0.1	0.5	0.0	0.0	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.8	0.0	0.9	2.9	0.3	0.9	0.0	0.0	0.2	0.0	0.3
LnGrp Delay(d),s/veh	44.4	13.3	0.0	30.9	12.1	9.9	9.0	0.0	0.0	9.5	0.0	8.4
LnGrp LOS	D	B		C	B	A	A			A		A
Approach Vol, veh/h		567			682			110			68	
Approach Delay, s/veh		13.8			13.6			9.0			8.8	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	5.9	15.9		20.0	4.4	17.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	6.0	16.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		3.8	3.4	7.8		4.4	2.2	7.9
Green Ext Time (p_c), s		0.7	0.0	4.1		0.6	0.0	4.8

Intersection Summary	
HCM 2010 Ctrl Delay	13.1
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	70	25	65	75	10	25	2	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	73	26	68	78	10	26	2	21

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	89	0	0	99	0	0	310	314	86
Stage 1	-	-	-	-	-	-	90	90	-
Stage 2	-	-	-	-	-	-	220	224	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1494	-	-	1481	-	-	639	598	967
Stage 1	-	-	-	-	-	-	912	816	-
Stage 2	-	-	-	-	-	-	778	715	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1494	-	-	1481	-	-	614	569	967
Mov Cap-2 Maneuver	-	-	-	-	-	-	614	569	-
Stage 1	-	-	-	-	-	-	911	815	-
Stage 2	-	-	-	-	-	-	739	681	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	3.3	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	724	1494	-	-	1481	-	-	621
HCM Lane V/C Ratio	0.068	0.001	-	-	0.046	-	-	0.012
HCM Control Delay (s)	10.3	7.4	0	-	7.5	0	-	10.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	321	322	83
Stage 1	219	219	-
Stage 2	102	103	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	628	592	971
Stage 1	779	718	-
Stage 2	899	806	-
Platoon blocked, %			
Mov Cap-1 Maneuver	590	563	971
Mov Cap-2 Maneuver	590	563	-
Stage 1	778	684	-
Stage 2	877	805	-

Approach	SB
HCM Control Delay, s	10.9
HCM LOS	B

Minor Lane/Major Mvmt

Intersection								
Int Delay, s/veh	3.5							

Movement	EBL	EBT		WBT	WBR		SBL	SBR
Vol, veh/h	30	90		120	85		50	70
Conflicting Peds, #/hr	0	0		0	0		0	0
Sign Control	Free	Free		Free	Free		Stop	Stop
RT Channelized	-	None		-	None		-	None
Storage Length	-	-		-	-		0	-
Veh in Median Storage, #	-	0		0	-		0	-
Grade, %	-	0		0	-		0	-
Peak Hour Factor	90	90		90	90		90	90
Heavy Vehicles, %	3	3		3	3		3	3
Mvmt Flow	33	100		133	94		56	78

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	228	0		-	0		348	181
Stage 1	-	-		-	-		181	-
Stage 2	-	-		-	-		167	-
Critical Hdwy	4.13	-		-	-		6.43	6.23
Critical Hdwy Stg 1	-	-		-	-		5.43	-
Critical Hdwy Stg 2	-	-		-	-		5.43	-
Follow-up Hdwy	2.227	-		-	-		3.527	3.327
Pot Cap-1 Maneuver	1334	-		-	-		647	859
Stage 1	-	-		-	-		848	-
Stage 2	-	-		-	-		860	-
Platoon blocked, %		-		-	-			
Mov Cap-1 Maneuver	1334	-		-	-		630	859
Mov Cap-2 Maneuver	-	-		-	-		630	-
Stage 1	-	-		-	-		848	-
Stage 2	-	-		-	-		838	-

Approach	EB			WB			SB	
HCM Control Delay, s	1.9			0			10.9	
HCM LOS							B	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1334	-	-	-	746
HCM Lane V/C Ratio	0.025	-	-	-	0.179
HCM Control Delay (s)	7.8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	110	45	30	135	70	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	138	56	38	169	88	75

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	194	0	410	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	244	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1367	-	594	873
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	792	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1367	-	576	873
Mov Cap-2 Maneuver	-	-	-	-	576	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	767	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	576	873	-	-	1367	-
HCM Lane V/C Ratio	0.152	0.086	-	-	0.027	-
HCM Control Delay (s)	12.4	9.5	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.5	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	5	723	96	170	670	186	32
v/c Ratio	0.04	0.74	0.17	0.57	0.43	0.33	0.06
Control Delay	24.4	22.6	1.2	28.8	10.2	9.9	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	22.6	1.2	28.8	10.2	9.9	12.4
Queue Length 50th (ft)	2	111	0	51	57	21	6
Queue Length 95th (ft)	10	165	6	#104	123	63	22
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	137	1102	613	344	1791	556	527
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.66	0.16	0.49	0.37	0.33	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	680	90	160	625	5	80	5	90	15	10	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	5	723	0	170	665	5	85	5	96	16	11	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	9	980	438	214	1413	11	297	49	256	328	209	79
Arrive On Green	0.01	0.29	0.00	0.13	0.41	0.41	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1691	3374	1509	1691	3432	26	561	142	750	642	613	232
Grp Volume(v), veh/h	5	723	0	170	327	343	186	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1771	1453	0	0	1487	0	0
Q Serve(g_s), s	0.1	9.6	0.0	4.9	7.0	7.0	2.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	9.6	0.0	4.9	7.0	7.0	4.5	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.46		0.52	0.50		0.16
Lane Grp Cap(c), veh/h	9	980	438	214	695	729	602	0	0	617	0	0
V/C Ratio(X)	0.55	0.74	0.00	0.79	0.47	0.47	0.31	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	136	1085	485	340	746	783	602	0	0	617	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.7	15.9	0.0	21.1	10.7	10.7	12.2	0.0	0.0	11.0	0.0	0.0
Incr Delay (d2), s/veh	43.3	2.4	0.0	6.5	0.5	0.5	1.3	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.7	0.0	2.7	3.4	3.5	2.1	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	68.0	18.4	0.0	27.6	11.2	11.1	13.6	0.0	0.0	11.1	0.0	0.0
LnGrp LOS	E	B		C	B	B	B			B		
Approach Vol, veh/h		728			840			186			32	
Approach Delay, s/veh		18.7			14.5			13.6			11.1	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	10.3	18.5		21.0	4.3	24.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	10.0	16.0		17.0	4.0	22.0
Max Q Clear Time (g_c+I1), s		6.5	6.9	11.6		2.6	2.1	9.0
Green Ext Time (p_c), s		0.9	0.1	2.8		1.0	0.0	6.3

Intersection Summary			
HCM 2010 Ctrl Delay			16.0
HCM 2010 LOS			B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	230	40	0	205	255	0	55	175
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	271	47	0	241	300	0	65	206
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	15.4	12.5	12.1
HCM LOS	C	B	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	85%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	15%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	255	270	55	175
LT Vol	205	0	0	0	175
Through Vol	0	255	40	0	0
RT Vol	0	0	230	55	0
Lane Flow Rate	241	300	318	65	206
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.403	0.442	0.524	0.122	0.36
Departure Headway (Hd)	6.01	5.298	5.943	6.811	6.302
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	598	678	607	526	570
Service Time	3.748	3.037	3.982	4.559	4.049
HCM Lane V/C Ratio	0.403	0.442	0.524	0.124	0.361
HCM Control Delay	12.8	12.2	15.4	10.5	12.6
HCM Lane LOS	B	B	C	B	B
HCM 95th-tile Q	1.9	2.3	3	0.4	1.6

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	15.5
Intersection LOS	C

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	150	15	0	5	265	0	300	185
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	167	17	0	6	294	0	333	206
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.7	12.4	18.2
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	270	150	15	485
LT Vol	265	0	0	300
Through Vol	0	0	15	185
RT Vol	5	150	0	0
Lane Flow Rate	300	167	17	539
Geometry Grp	2	7	7	2
Degree of Util (X)	0.439	0.326	0.027	0.7
Departure Headway (Hd)	5.264	7.036	5.815	4.79
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	687	513	618	760
Service Time	3.283	4.751	3.53	2.79
HCM Lane V/C Ratio	0.437	0.326	0.028	0.709
HCM Control Delay	12.4	13.1	8.7	18.2
HCM Lane LOS	B	B	A	C
HCM 95th-tile Q	2.2	1.4	0.1	5.8

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBT	EBR	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Group Flow (vph)	63	354	37	10	16	771	42	344	818	26
v/c Ratio	0.14	0.23	0.08	0.02	0.14	0.85	0.08	0.82	0.43	0.03
Control Delay	17.2	0.3	16.4	0.1	29.1	31.4	0.3	39.7	9.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	0.3	16.4	0.1	29.1	31.4	0.3	39.7	9.3	0.1
Queue Length 50th (ft)	17	0	10	0	6	137	0	116	74	0
Queue Length 95th (ft)	42	0	29	0	22	#225	0	#238	151	0
Internal Link Dist (ft)	92		295			3161			432	
Turn Bay Length (ft)		50		20	370		60	510		50
Base Capacity (vph)	443	1553	463	567	118	948	543	445	1895	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.08	0.02	0.14	0.81	0.08	0.77	0.43	0.03

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	40	20	340	20	15	10	15	740	40	330	785	25
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	42	21	0	21	16	10	16	771	0	344	818	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	381	170	461	333	227	461	27	921	412	397	1658	742
Arrive On Green	0.30	0.30	0.00	0.30	0.30	0.30	0.02	0.27	0.00	0.23	0.48	0.00
Sat Flow, veh/h	929	572	1553	790	765	1553	1740	3471	1553	1740	3471	1553
Grp Volume(v), veh/h	63	0	0	37	0	10	16	771	0	344	818	0
Grp Sat Flow(s),veh/h/ln	1501	0	1553	1555	0	1553	1740	1736	1553	1740	1736	1553
Q Serve(g_s), s	0.5	0.0	0.0	0.0	0.0	0.3	0.5	12.0	0.0	10.9	9.2	0.0
Cycle Q Clear(g_c), s	1.5	0.0	0.0	0.8	0.0	0.3	0.5	12.0	0.0	10.9	9.2	0.0
Prop In Lane	0.67		1.00	0.57		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	551	0	461	560	0	461	27	921	412	397	1658	742
V/C Ratio(X)	0.11	0.00	0.00	0.07	0.00	0.02	0.59	0.84	0.00	0.87	0.49	0.00
Avail Cap(c_a), veh/h	551	0	461	560	0	461	122	970	434	456	1658	742
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.7	0.0	0.0	14.4	0.0	14.2	28.0	19.9	0.0	21.3	10.2	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.2	0.0	0.1	18.3	6.3	0.0	14.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.5	0.0	0.1	0.4	6.5	0.0	6.8	4.4	0.0
LnGrp Delay(d),s/veh	14.8	0.0	0.0	14.7	0.0	14.3	46.3	26.2	0.0	35.8	10.4	0.0
LnGrp LOS	B			B		B	D	C		D	B	
Approach Vol, veh/h		63			47			787			1162	
Approach Delay, s/veh		14.8			14.6			26.6			17.9	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	17.1	19.2		21.0	4.9	31.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	15.0	16.0		17.0	4.0	27.0
Max Q Clear Time (g_c+I1), s		3.5	12.9	14.0		2.8	2.5	11.2
Green Ext Time (p_c), s		0.4	0.2	1.2		0.4	0.0	8.5

Intersection Summary	
HCM 2010 Ctrl Delay	21.1
HCM 2010 LOS	C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection							
Int Delay, s/veh	6.7						

Movement		EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h		270	95	110	275	100	125
Conflicting Peds, #/hr		0	0	0	0	0	0
Sign Control		Free	Free	Free	Free	Stop	Stop
RT Channelized		-	None	-	None	-	None
Storage Length		-	-	-	-	0	-
Veh in Median Storage, #		0	-	-	0	0	-
Grade, %		0	-	-	0	0	-
Peak Hour Factor		93	93	93	93	93	93
Heavy Vehicles, %		4	4	4	4	4	4
Mvmt Flow		290	102	118	296	108	134

Major/Minor		Major1		Major2		Minor1	
Conflicting Flow All		0	0	392	0	873	341
Stage 1		-	-	-	-	341	-
Stage 2		-	-	-	-	532	-
Critical Hdwy		-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1		-	-	-	-	5.44	-
Critical Hdwy Stg 2		-	-	-	-	5.44	-
Follow-up Hdwy		-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver		-	-	1156	-	318	697
Stage 1		-	-	-	-	716	-
Stage 2		-	-	-	-	585	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver		-	-	1156	-	279	697
Mov Cap-2 Maneuver		-	-	-	-	279	-
Stage 1		-	-	-	-	716	-
Stage 2		-	-	-	-	514	-

Approach		EB		WB		NB	
HCM Control Delay, s		0		2.4		24.8	
HCM LOS						C	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	418	-	-	1156	-
HCM Lane V/C Ratio	0.579	-	-	0.102	-
HCM Control Delay (s)	24.8	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.6	-	-	0.3	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	10	906	68	927	36	130	31	47
v/c Ratio	0.06	0.79	0.30	0.64	0.05	0.22	0.06	0.08
Control Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Length 50th (ft)	3	125	19	83	0	14	6	5
Queue Length 95th (ft)	14	#216	48	178	0	44	21	22
Internal Link Dist (ft)		2069		2822		280		312
Turn Bay Length (ft)	260		260		290		30	
Base Capacity (vph)	156	1249	234	1625	784	586	490	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.73	0.29	0.57	0.05	0.22	0.06	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	870	0	65	890	35	50	15	60	30	25	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	0	1810	1810	1810	1900	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	10	906	0	68	927	36	52	16	62	31	26	21
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	0	5	5	5	5	5	5	5	5	5
Cap, veh/h	18	1159	0	87	1297	580	277	108	251	534	325	262
Arrive On Green	0.01	0.34	0.00	0.05	0.38	0.38	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1723	3529	0	1723	3438	1538	478	308	717	1278	928	749
Grp Volume(v), veh/h	10	906	0	68	927	36	130	0	0	31	0	47
Grp Sat Flow(s),veh/h/ln	1723	1719	0	1723	1719	1538	1503	0	0	1278	0	1677
Q Serve(g_s), s	0.3	10.8	0.0	1.8	10.5	0.7	0.0	0.0	0.0	0.8	0.0	0.9
Cycle Q Clear(g_c), s	0.3	10.8	0.0	1.8	10.5	0.7	2.5	0.0	0.0	3.3	0.0	0.9
Prop In Lane	1.00		0.00	1.00		1.00	0.40		0.48	1.00		0.45
Lane Grp Cap(c), veh/h	18	1159	0	87	1297	580	636	0	0	534	0	587
V/C Ratio(X)	0.56	0.78	0.00	0.78	0.71	0.06	0.20	0.00	0.00	0.06	0.00	0.08
Avail Cap(c_a), veh/h	151	1203	0	226	1353	605	636	0	0	534	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	13.6	0.0	21.5	12.1	9.1	10.5	0.0	0.0	11.7	0.0	9.9
Incr Delay (d2), s/veh	24.2	3.3	0.0	13.9	1.7	0.0	0.7	0.0	0.0	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.6	0.0	1.2	5.2	0.3	1.3	0.0	0.0	0.3	0.0	0.4
LnGrp Delay(d),s/veh	46.7	16.9	0.0	35.3	13.9	9.1	11.2	0.0	0.0	11.9	0.0	10.2
LnGrp LOS	D	B		D	B	A	B			B		B
Approach Vol, veh/h		916			1031			130			78	
Approach Delay, s/veh		17.3			15.1			11.2			10.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	6.3	19.4		20.0	4.5	21.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	6.0	16.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		4.5	3.8	12.8		5.3	2.3	12.5
Green Ext Time (p_c), s		0.8	0.0	2.6		0.8	0.0	4.3

Intersection Summary		
HCM 2010 Ctrl Delay		15.6
HCM 2010 LOS		B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	35	105	145	105	60	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	117	161	117	67	89

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	278	0	-	0	413	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1279	-	-	-	594	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	836	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1279	-	-	-	574	818
Mov Cap-2 Maneuver	-	-	-	-	574	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1279	-	-	-	692
HCM Lane V/C Ratio	0.03	-	-	-	0.225
HCM Control Delay (s)	7.9	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	130	55	35	165	80	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	162	69	44	206	100	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	491	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	294	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1325	-	533	839
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	513	839
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	513	839	-	-	1325	-
HCM Lane V/C Ratio	0.195	0.104	-	-	0.033	-
HCM Control Delay (s)	13.7	9.8	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	952	112	202	877	234	32
v/c Ratio	0.09	0.96	0.20	0.69	0.51	0.46	0.07
Control Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Length 50th (ft)	4	160	0	62	82	32	6
Queue Length 95th (ft)	16	#274	12	#141	171	84	22
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	123	991	569	309	1725	512	465
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.96	0.20	0.65	0.51	0.46	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	895	105	190	820	5	95	10	115	15	10	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	952	0	202	872	5	101	11	122	16	11	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1023	458	249	1511	9	266	57	246	298	189	71
Arrive On Green	0.01	0.30	0.00	0.15	0.44	0.44	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	524	177	763	607	588	221
Grp Volume(v), veh/h	11	952	0	202	428	449	234	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1464	0	0	1416	0	0
Q Serve(g_s), s	0.3	14.5	0.0	6.1	10.1	10.1	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	14.5	0.0	6.1	10.1	10.1	6.6	0.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.43		0.52	0.50		0.16
Lane Grp Cap(c), veh/h	19	1023	458	249	741	778	569	0	0	559	0	0
V/C Ratio(X)	0.58	0.93	0.00	0.81	0.58	0.58	0.41	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	128	1023	458	320	741	778	569	0	0	559	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.0	17.9	0.0	21.8	11.1	11.1	14.3	0.0	0.0	12.4	0.0	0.0
Incr Delay (d2), s/veh	24.5	14.4	0.0	11.5	1.1	1.1	2.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.7	0.0	3.6	4.9	5.1	3.1	0.0	0.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	50.5	32.3	0.0	33.2	12.2	12.2	16.5	0.0	0.0	12.6	0.0	0.0
LnGrp LOS	D	C		C	B	B	B			B		
Approach Vol, veh/h		963			1079			234			32	
Approach Delay, s/veh		32.5			16.1			16.5			12.6	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	11.8	20.0		21.0	4.6	27.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	10.0	16.0		17.0	4.0	22.0
Max Q Clear Time (g_c+I1), s		8.6	8.1	16.5		2.7	2.3	12.1
Green Ext Time (p_c), s		1.0	0.1	0.0		1.3	0.0	6.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.9
HCM 2010 LOS	C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	255	310	0	70	210
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	300	365	0	82	247
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.5	16.2	14.4
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	255	310	315	70	210
LT Vol	255	0	0	0	210
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	300	365	371	82	247
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.534	0.577	0.651	0.167	0.465
Departure Headway (Hd)	6.407	5.693	6.32	7.288	6.776
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	561	631	571	490	529
Service Time	4.176	3.461	4.377	5.066	4.554
HCM Lane V/C Ratio	0.535	0.578	0.65	0.167	0.467
HCM Control Delay	16.4	16	20.5	11.5	15.4
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.1	3.7	4.7	0.6	2.4

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	28.3
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	200	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	222	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.9	16	39.8
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	200	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	200	0	0
Lane Flow Rate	350	222	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.561	0.464	0.048	0.918
Departure Headway (Hd)	5.774	7.509	6.282	5.171
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	623	478	567	696
Service Time	3.843	5.279	4.052	3.23
HCM Lane V/C Ratio	0.562	0.464	0.049	0.918
HCM Control Delay	16	16.7	9.4	39.8
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.5	2.4	0.2	12.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBT	EBR	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Group Flow (vph)	78	464	47	16	21	1010	47	453	1068	31
v/c Ratio	0.18	0.30	0.11	0.03	0.18	1.09	0.09	1.04	0.55	0.03
Control Delay	17.7	0.5	16.7	0.1	30.4	82.5	0.3	81.8	10.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	0.5	16.7	0.1	30.4	82.5	0.3	81.8	10.6	0.1
Queue Length 50th (ft)	21	0	13	0	7	~224	0	~184	107	0
Queue Length 95th (ft)	50	0	34	0	26	#332	0	#339	214	0
Internal Link Dist (ft)	92		295			3161			432	
Turn Bay Length (ft)		50		20	370		60	510		50
Base Capacity (vph)	423	1553	446	557	115	925	534	434	1931	904
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.30	0.11	0.03	0.18	1.09	0.09	1.04	0.55	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	50	25	445	25	20	15	20	970	45	435	1025	30
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	52	26	0	26	21	16	21	1010	0	453	1068	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	359	160	440	312	226	440	34	926	414	435	1725	772
Arrive On Green	0.28	0.28	0.00	0.28	0.28	0.28	0.02	0.27	0.00	0.25	0.50	0.00
Sat Flow, veh/h	914	565	1553	773	797	1553	1740	3471	1553	1740	3471	1553
Grp Volume(v), veh/h	78	0	0	47	0	16	21	1010	0	453	1068	0
Grp Sat Flow(s),veh/h/ln	1479	0	1553	1570	0	1553	1740	1736	1553	1740	1736	1553
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.4	0.7	16.0	0.0	15.0	13.4	0.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	1.1	0.0	0.4	0.7	16.0	0.0	15.0	13.4	0.0
Prop In Lane	0.67		1.00	0.55		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	519	0	440	538	0	440	34	926	414	435	1725	772
V/C Ratio(X)	0.15	0.00	0.00	0.09	0.00	0.04	0.61	1.09	0.00	1.04	0.62	0.00
Avail Cap(c_a), veh/h	519	0	440	538	0	440	116	926	414	435	1725	772
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.2	0.0	0.0	15.8	0.0	15.6	29.2	22.0	0.0	22.5	11.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.2	16.4	57.6	0.0	54.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.6	0.0	0.2	0.5	15.0	0.0	13.7	6.5	0.0
LnGrp Delay(d),s/veh	16.3	0.0	0.0	16.1	0.0	15.7	45.6	79.6	0.0	76.8	11.6	0.0
LnGrp LOS	B			B		B	D	F		F	B	
Approach Vol, veh/h		78			63			1031			1521	
Approach Delay, s/veh		16.3			16.0			78.9			31.1	
Approach LOS		B			B			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	19.0	20.0		21.0	5.2	33.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	15.0	16.0		17.0	4.0	27.0
Max Q Clear Time (g_c+I1), s		4.3	17.0	18.0		3.1	2.7	15.4
Green Ext Time (p_c), s		0.5	0.0	0.0		0.5	0.0	8.6

Intersection Summary			
HCM 2010 Ctrl Delay			48.6
HCM 2010 LOS			D

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	13.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	335	115	125	360	115	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	360	124	134	387	124	161

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	484	0	1078	422
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1068	-	240	627
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1068	-	202	627
Mov Cap-2 Maneuver	-	-	-	-	202	-
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	431	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	58.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	328	-	-	1068	-
HCM Lane V/C Ratio	0.869	-	-	0.126	-
HCM Control Delay (s)	58.3	-	-	8.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8	-	-	0.4	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	10	948	979	36	57	21
v/c Ratio	0.05	0.71	0.74	0.06	0.13	0.03
Control Delay	8.3	13.7	14.3	3.7	10.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	13.7	14.3	3.7	10.0	4.2
Queue Length 50th (ft)	1	86	90	0	11	0
Queue Length 95th (ft)	7	135	141	11	22	8
Internal Link Dist (ft)		2069	2822		312	
Turn Bay Length (ft)	260			290	30	30
Base Capacity (vph)	196	1407	1407	650	703	641
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.67	0.70	0.06	0.08	0.03

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	910	940	35	55	20
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	10	948	979	36	57	21
Adj No. of Lanes	1	2	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	538	2004	2004	897	118	105
Arrive On Green	0.58	0.58	0.58	0.58	0.07	0.07
Sat Flow, veh/h	537	3529	3529	1538	1723	1538
Grp Volume(v), veh/h	10	948	979	36	57	21
Grp Sat Flow(s),veh/h/ln	537	1719	1719	1538	1723	1538
Q Serve(g_s), s	0.3	3.6	3.8	0.2	0.7	0.3
Cycle Q Clear(g_c), s	4.1	3.6	3.8	0.2	0.7	0.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	538	2004	2004	897	118	105
V/C Ratio(X)	0.02	0.47	0.49	0.04	0.48	0.20
Avail Cap(c_a), veh/h	600	2398	2398	1073	1202	1073
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.0	2.8	2.8	2.0	10.3	10.1
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.0	3.1	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.6	1.8	0.3	0.4	0.1
LnGrp Delay(d),s/veh	4.0	2.9	3.0	2.1	13.4	11.0
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		958	1015		78	
Approach Delay, s/veh		2.9	2.9		12.7	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				17.4		5.6		17.4
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s				6.1		2.7		5.8
Green Ext Time (p_c), s				7.3		0.1		7.5

Intersection Summary		
HCM 2010 Ctrl Delay		3.3
HCM 2010 LOS		A

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	130	195	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	6	144	217	6	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	222	0	-	0	375	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	156	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1341	-	-	-	624	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1341	-	-	-	621	818
Mov Cap-2 Maneuver	-	-	-	-	621	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1341	-	-	-	706
HCM Lane V/C Ratio	0.004	-	-	-	0.016
HCM Control Delay (s)	7.7	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	135	2	35	190	10	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	169	2	44	238	12	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	171	0	495	170
Stage 1	-	-	-	-	170	-
Stage 2	-	-	-	-	325	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1394	-	530	869
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1394	-	511	869
Mov Cap-2 Maneuver	-	-	-	-	511	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	702	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	511	869	-	-	1394	-
HCM Lane V/C Ratio	0.024	0.101	-	-	0.031	-
HCM Control Delay (s)	12.2	9.6	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	883	176	271	798	357	26
v/c Ratio	0.10	0.84	0.30	0.77	0.42	0.82	0.06
Control Delay	28.3	28.0	4.5	39.3	8.7	34.3	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	28.0	4.5	39.3	8.7	34.3	14.8
Queue Length 50th (ft)	4	153	0	92	68	94	6
Queue Length 95th (ft)	17	#246	36	#195	143	#231	21
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	115	1097	609	375	1895	436	453
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.80	0.29	0.72	0.42	0.82	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	830	165	255	745	5	160	10	165	5	15	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	883	0	271	793	5	170	11	176	5	16	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1070	479	322	1705	11	269	29	199	123	319	87
Arrive On Green	0.01	0.32	0.00	0.19	0.50	0.50	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1691	3374	1509	1691	3437	22	624	104	708	168	1134	310
Grp Volume(v), veh/h	11	883	0	271	389	409	357	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1436	0	0	1613	0	0
Q Serve(g_s), s	0.4	13.8	0.0	8.8	8.6	8.6	12.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	13.8	0.0	8.8	8.6	8.6	13.5	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.48		0.49	0.19		0.19
Lane Grp Cap(c), veh/h	19	1070	479	322	837	879	498	0	0	530	0	0
V/C Ratio(X)	0.58	0.82	0.00	0.84	0.46	0.47	0.72	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	119	1128	505	387	837	879	498	0	0	530	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.0	17.9	0.0	22.2	9.4	9.4	19.4	0.0	0.0	14.9	0.0	0.0
Incr Delay (d2), s/veh	25.0	4.9	0.0	13.4	0.4	0.4	8.6	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	7.1	0.0	5.3	4.1	4.3	6.5	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	52.9	22.9	0.0	35.6	9.8	9.8	28.0	0.0	0.0	15.1	0.0	0.0
LnGrp LOS	D	C		D	A	A	C			B		
Approach Vol, veh/h		894			1069			357			26	
Approach Delay, s/veh		23.2			16.3			28.0			15.1	
Approach LOS		C			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	14.8	22.0		20.0	4.6	32.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	13.0	19.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		15.5	10.8	15.8		2.6	2.4	10.6
Green Ext Time (p_c), s		0.1	0.2	2.3		2.0	0.0	9.2

Intersection Summary		
HCM 2010 Ctrl Delay		20.7
HCM 2010 LOS		C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	27
Intersection LOS	D

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	365	310	0	70	335
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	429	365	0	82	394
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	24.9	27.1	28.5
HCM LOS	C	D	D

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	365	310	315	70	335
LT Vol	365	0	0	0	335
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	429	365	371	82	394
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.824	0.627	0.705	0.177	0.789
Departure Headway (Hd)	6.907	6.189	6.953	7.72	7.206
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	528	587	523	467	504
Service Time	4.62	3.901	4.953	5.434	4.92
HCM Lane V/C Ratio	0.813	0.622	0.709	0.176	0.782
HCM Control Delay	34.3	18.7	24.9	12.1	31.9
HCM Lane LOS	D	C	C	B	D
HCM 95th-tile Q	8.2	4.3	5.6	0.6	7.2

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	41
Intersection LOS	E

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	240	25	0	5	385	0	405	295
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	267	28	0	6	428	0	450	328
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	19.4	23.4	58.9
HCM LOS	C	C	F

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	1%	100%	0%	0%
Vol Thru, %	99%	0%	0%	58%
Vol Right, %	0%	0%	100%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	390	240	25	700
LT Vol	385	0	0	405
Through Vol	0	0	25	295
RT Vol	5	240	0	0
Lane Flow Rate	433	267	28	778
Geometry Grp	2	7	7	2
Degree of Util (X)	0.724	0.573	0.05	1
Departure Headway (Hd)	6.017	7.74	6.51	5.615
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	598	467	547	653
Service Time	4.087	5.483	4.283	3.615
HCM Lane V/C Ratio	0.724	0.572	0.051	1.191
HCM Control Delay	23.4	20.4	9.6	58.9
HCM Lane LOS	C	C	A	F
HCM 95th-tile Q	6.1	3.5	0.2	15.5

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBT	EBR	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Group Flow (vph)	78	464	47	16	21	1010	47	453	1068	31
v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.93	0.52	0.03
Control Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Length 50th (ft)	27	0	16	0	9	224	0	187	107	0
Queue Length 95th (ft)	60	0	41	0	30	#350	0	#354	207	2
Internal Link Dist (ft)	92		295			3161			432	
Turn Bay Length (ft)		50		20	370		60	510		50
Base Capacity (vph)	362	1553	381	485	99	1047	565	499	2065	955
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.91	0.52	0.03

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	50	25	445	25	20	15	20	970	45	435	1025	30
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	52	26	0	26	21	16	21	1010	0	453	1068	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	306	136	379	271	196	379	33	1046	468	491	1960	877
Arrive On Green	0.24	0.24	0.00	0.24	0.24	0.24	0.02	0.30	0.00	0.28	0.56	0.00
Sat Flow, veh/h	900	557	1553	780	804	1553	1740	3471	1553	1740	3471	1553
Grp Volume(v), veh/h	78	0	0	47	0	16	21	1010	0	453	1068	0
Grp Sat Flow(s),veh/h/ln	1457	0	1553	1584	0	1553	1740	1736	1553	1740	1736	1553
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	1.4	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Prop In Lane	0.67		1.00	0.55		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	442	0	379	467	0	379	33	1046	468	491	1960	877
V/C Ratio(X)	0.18	0.00	0.00	0.10	0.00	0.04	0.63	0.97	0.00	0.92	0.54	0.00
Avail Cap(c_a), veh/h	442	0	379	467	0	379	100	1046	468	499	1960	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	20.4	0.0	20.1	33.9	24.0	0.0	24.3	9.5	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.2	17.9	19.9	0.0	22.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.8	0.0	0.3	0.6	12.4	0.0	11.5	6.5	0.0
LnGrp Delay(d),s/veh	21.2	0.0	0.0	20.9	0.0	20.3	51.8	43.9	0.0	46.8	9.9	0.0
LnGrp LOS	C			C		C	D	D		D	A	
Approach Vol, veh/h		78			63			1031			1521	
Approach Delay, s/veh		21.2			20.7			44.0			20.9	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	23.7	25.0		21.0	5.3	43.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	20.0	21.0		17.0	4.0	37.0
Max Q Clear Time (g_c+I1), s		5.1	19.6	22.0		3.4	2.8	15.5
Green Ext Time (p_c), s		0.5	0.1	0.0		0.5	0.0	13.6

Intersection Summary		
HCM 2010 Ctrl Delay		29.7
HCM 2010 LOS		C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	15.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	355	115	125	360	115	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	382	124	134	387	124	161

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	505	0	1100	444
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1049	-	233	610
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	195	610
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	65.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	317	-	-	1049	-
HCM Lane V/C Ratio	0.899	-	-	0.128	-
HCM Control Delay (s)	65.1	-	-	8.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8.5	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	10	901	49	76	927	36	146	58	21
v/c Ratio	0.07	0.76	0.08	0.48	0.66	0.05	0.24	0.10	0.03
Control Delay	22.4	19.1	0.9	35.2	14.5	0.1	8.5	11.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	19.1	0.9	35.2	14.5	0.1	8.5	11.7	0.1
Queue Length 50th (ft)	3	120	0	22	88	0	16	11	0
Queue Length 95th (ft)	14	#183	4	#69	#197	0	48	31	0
Internal Link Dist (ft)		2069			2822		414	312	
Turn Bay Length (ft)	260		260	260		290			30
Base Capacity (vph)	153	1303	668	157	1523	742	616	589	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.69	0.07	0.48	0.61	0.05	0.24	0.10	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	865	45	70	890	35	60	15	60	30	25	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1863	1863	1810	1810	1900	1863	1900	1900	1834	1810
Adj Flow Rate, veh/h	10	901	49	76	927	36	65	16	65	31	27	21
Adj No. of Lanes	1	2	1	1	2	1	0	1	0	0	1	1
Peak Hour Factor	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Percent Heavy Veh, %	5	5	2	2	5	5	2	2	2	2	2	5
Cap, veh/h	18	1139	525	95	1287	576	315	101	245	381	297	555
Arrive On Green	0.01	0.33	0.33	0.05	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	1723	3438	1583	1774	3438	1538	568	279	680	730	824	1538
Grp Volume(v), veh/h	10	901	49	76	927	36	146	0	0	58	0	21
Grp Sat Flow(s),veh/h/ln	1723	1719	1583	1774	1719	1538	1528	0	0	1554	0	1538
Q Serve(g_s), s	0.3	11.2	1.0	2.0	10.9	0.7	0.4	0.0	0.0	0.0	0.0	0.4
Cycle Q Clear(g_c), s	0.3	11.2	1.0	2.0	10.9	0.7	2.8	0.0	0.0	1.0	0.0	0.4
Prop In Lane	1.00		1.00	1.00		1.00	0.45		0.45	0.53		1.00
Lane Grp Cap(c), veh/h	18	1139	525	95	1287	576	661	0	0	678	0	555
V/C Ratio(X)	0.56	0.79	0.09	0.80	0.72	0.06	0.22	0.00	0.00	0.09	0.00	0.04
Avail Cap(c_a), veh/h	146	1240	571	151	1287	576	661	0	0	678	0	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.2	14.3	10.9	22.1	12.6	9.4	10.5	0.0	0.0	10.0	0.0	9.8
Incr Delay (d2), s/veh	24.3	3.3	0.1	14.7	2.0	0.0	0.2	0.0	0.0	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.8	0.4	1.4	5.5	0.3	1.3	0.0	0.0	0.5	0.0	0.2
LnGrp Delay(d),s/veh	47.5	17.6	11.0	36.7	14.6	9.5	10.7	0.0	0.0	10.2	0.0	9.9
LnGrp LOS	D	B	B	D	B	A	B			B		A
Approach Vol, veh/h		960			1039			146			79	
Approach Delay, s/veh		17.6			16.1			10.7			10.1	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	6.5	19.6		21.0	4.5	21.6
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	4.0	17.0		17.0	4.0	17.0
Max Q Clear Time (g_c+I1), s		4.8	4.0	13.2		3.0	2.3	12.9
Green Ext Time (p_c), s		0.9	0.0	2.4		1.0	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	16.1
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	35	100	140	115	85	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	111	156	128	94	72

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	283	0	-	0	408	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	189	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1274	-	-	-	597	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1274	-	-	-	577	818
Mov Cap-2 Maneuver	-	-	-	-	577	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	813	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1274	-	-	-	661
HCM Lane V/C Ratio	0.031	-	-	-	0.252
HCM Control Delay (s)	7.9	0	-	-	12.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	130	55	35	170	80	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	162	69	44	212	100	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	497	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	300	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1325	-	529	839
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	747	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	509	839
Mov Cap-2 Maneuver	-	-	-	-	509	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	509	839	-	-	1325	-
HCM Lane V/C Ratio	0.196	0.104	-	-	0.033	-
HCM Control Delay (s)	13.8	9.8	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	952	112	197	877	229	26
v/c Ratio	0.10	0.83	0.18	0.72	0.48	0.48	0.05
Control Delay	28.3	25.5	1.9	41.0	9.8	14.4	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	25.5	1.9	41.0	9.8	14.4	14.1
Queue Length 50th (ft)	4	160	0	68	82	38	6
Queue Length 95th (ft)	17	#236	14	#154	167	95	21
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	115	1212	647	288	1838	480	480
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.79	0.17	0.68	0.48	0.48	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	895	105	185	820	5	90	10	115	5	15	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	952	0	197	872	5	96	11	122	5	16	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1172	524	242	1648	9	240	54	233	129	341	94
Arrive On Green	0.01	0.35	0.00	0.14	0.48	0.48	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	504	180	780	178	1143	314
Grp Volume(v), veh/h	11	952	0	197	428	449	229	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1464	0	0	1635	0	0
Q Serve(g_s), s	0.4	14.6	0.0	6.4	10.1	10.1	4.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	14.6	0.0	6.4	10.1	10.1	7.2	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.42		0.53	0.19		0.19
Lane Grp Cap(c), veh/h	19	1172	524	242	808	849	527	0	0	564	0	0
V/C Ratio(X)	0.58	0.81	0.00	0.82	0.53	0.53	0.43	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	119	1245	557	297	808	849	527	0	0	564	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.0	16.9	0.0	23.7	10.3	10.3	16.4	0.0	0.0	14.2	0.0	0.0
Incr Delay (d2), s/veh	25.0	4.0	0.0	13.3	0.7	0.6	2.6	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	7.4	0.0	3.9	4.8	5.0	3.3	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.0	20.9	0.0	37.0	11.0	11.0	19.0	0.0	0.0	14.4	0.0	0.0
LnGrp LOS	D	C		D	B	B	B			B		
Approach Vol, veh/h		963			1074			229			26	
Approach Delay, s/veh		21.2			15.8			19.0			14.4	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	12.1	23.8		21.0	4.6	31.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	10.0	21.0		17.0	4.0	27.0
Max Q Clear Time (g_c+I1), s		9.2	8.4	16.6		2.6	2.4	12.1
Green Ext Time (p_c), s		0.9	0.1	3.2		1.3	0.0	9.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	245	310	0	70	205
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	288	365	0	82	241
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.2	15.8	14.1
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	310	315	70	205
LT Vol	245	0	0	0	205
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	288	365	371	82	241
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.511	0.575	0.647	0.166	0.452
Departure Headway (Hd)	6.388	5.674	6.289	7.264	6.752
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	562	635	574	492	531
Service Time	4.153	3.438	4.344	5.038	4.526
HCM Lane V/C Ratio	0.512	0.575	0.646	0.167	0.454
HCM Control Delay	15.7	15.9	20.2	11.5	15
HCM Lane LOS	C	C	C	B	B
HCM 95th-tile Q	2.9	3.7	4.6	0.6	2.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	27.2
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	190	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	211	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.2	15.8	37.9
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	190	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	190	0	0
Lane Flow Rate	350	211	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.556	0.439	0.048	0.908
Departure Headway (Hd)	5.714	7.491	6.264	5.119
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	630	479	569	703
Service Time	3.776	5.257	4.029	3.172
HCM Lane V/C Ratio	0.556	0.441	0.049	0.909
HCM Control Delay	15.8	16	9.3	37.9
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.4	2.2	0.2	11.9

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBT	EBR	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Group Flow (vph)	78	464	47	16	21	1010	47	453	1068	31
v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.93	0.52	0.03
Control Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Length 50th (ft)	27	0	16	0	9	224	0	187	107	0
Queue Length 95th (ft)	60	0	41	0	30	#350	0	#354	207	2
Internal Link Dist (ft)	92		295			3161			432	
Turn Bay Length (ft)		50		20	370		60	510		50
Base Capacity (vph)	362	1553	381	485	99	1047	565	499	2065	955
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.91	0.52	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	50	25	445	25	20	15	20	970	45	435	1025	30
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	52	26	0	26	21	16	21	1010	0	453	1068	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	306	136	379	271	196	379	33	1046	468	491	1960	877
Arrive On Green	0.24	0.24	0.00	0.24	0.24	0.24	0.02	0.30	0.00	0.28	0.56	0.00
Sat Flow, veh/h	900	557	1553	780	804	1553	1740	3471	1553	1740	3471	1553
Grp Volume(v), veh/h	78	0	0	47	0	16	21	1010	0	453	1068	0
Grp Sat Flow(s),veh/h/ln	1457	0	1553	1584	0	1553	1740	1736	1553	1740	1736	1553
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	1.4	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Prop In Lane	0.67		1.00	0.55		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	442	0	379	467	0	379	33	1046	468	491	1960	877
V/C Ratio(X)	0.18	0.00	0.00	0.10	0.00	0.04	0.63	0.97	0.00	0.92	0.54	0.00
Avail Cap(c_a), veh/h	442	0	379	467	0	379	100	1046	468	499	1960	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	20.4	0.0	20.1	33.9	24.0	0.0	24.3	9.5	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.2	17.9	19.9	0.0	22.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.8	0.0	0.3	0.6	12.4	0.0	11.5	6.5	0.0
LnGrp Delay(d),s/veh	21.2	0.0	0.0	20.9	0.0	20.3	51.8	43.9	0.0	46.8	9.9	0.0
LnGrp LOS	C			C		C	D	D		D	A	
Approach Vol, veh/h		78			63			1031			1521	
Approach Delay, s/veh		21.2			20.7			44.0			20.9	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	23.7	25.0		21.0	5.3	43.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	20.0	21.0		17.0	4.0	37.0
Max Q Clear Time (g_c+I1), s		5.1	19.6	22.0		3.4	2.8	15.5
Green Ext Time (p_c), s		0.5	0.1	0.0		0.5	0.0	13.6

Intersection Summary			
HCM 2010 Ctrl Delay			29.7
HCM 2010 LOS			C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	15.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	355	115	125	360	115	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	382	124	134	387	124	161

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	505	0	1100	444
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1049	-	233	610
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	195	610
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	65.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	317	-	-	1049	-
HCM Lane V/C Ratio	0.899	-	-	0.128	-
HCM Control Delay (s)	65.1	-	-	8.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8.5	-	-	0.4	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	10	984	1005	36	31	47
v/c Ratio	0.05	0.74	0.75	0.06	0.09	0.07
Control Delay	8.3	14.3	14.8	3.7	11.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	14.3	14.8	3.7	11.4	4.3
Queue Length 50th (ft)	1	91	93	0	6	1
Queue Length 95th (ft)	8	142	146	11	14	14
Internal Link Dist (ft)		1995	2822		312	
Turn Bay Length (ft)	260			290	30	30
Base Capacity (vph)	194	1403	1403	648	701	649
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.70	0.72	0.06	0.04	0.07

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	945	965	35	30	45
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	10	984	1005	36	31	47
Adj No. of Lanes	1	2	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	529	2017	2017	902	117	105
Arrive On Green	0.59	0.59	0.59	0.59	0.07	0.07
Sat Flow, veh/h	524	3529	3529	1538	1723	1538
Grp Volume(v), veh/h	10	984	1005	36	31	47
Grp Sat Flow(s),veh/h/ln	524	1719	1719	1538	1723	1538
Q Serve(g_s), s	0.3	3.8	4.0	0.2	0.4	0.7
Cycle Q Clear(g_c), s	4.2	3.8	4.0	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	529	2017	2017	902	117	105
V/C Ratio(X)	0.02	0.49	0.50	0.04	0.26	0.45
Avail Cap(c_a), veh/h	583	2374	2374	1062	1190	1062
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.0	2.8	2.8	2.0	10.2	10.4
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.0	1.2	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	1.9	0.3	0.2	0.4
LnGrp Delay(d),s/veh	4.0	3.0	3.0	2.0	11.4	13.4
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		994	1041		78	
Approach Delay, s/veh		3.0	3.0		12.6	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				17.6		5.6		17.6
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s				6.2		2.7		6.0
Green Ext Time (p_c), s				7.4		0.1		7.5

Intersection Summary		
HCM 2010 Ctrl Delay		3.3
HCM 2010 LOS		A

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	130	55	55	165	10	35	2	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	5	135	57	57	172	10	36	2	21

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	182	0	0	193	0	0	467	471	164
Stage 1	-	-	-	-	-	-	174	174	-
Stage 2	-	-	-	-	-	-	293	297	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1381	-	-	1368	-	-	503	488	875
Stage 1	-	-	-	-	-	-	823	751	-
Stage 2	-	-	-	-	-	-	711	664	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1381	-	-	1368	-	-	482	464	875
Mov Cap-2 Maneuver	-	-	-	-	-	-	482	464	-
Stage 1	-	-	-	-	-	-	820	748	-
Stage 2	-	-	-	-	-	-	676	633	-

Approach	EB			WB			NB		
HCM Control Delay, s	0.2			1.9			12		
HCM LOS							B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	571	1381	-	-	1368	-	-	493
HCM Lane V/C Ratio	0.104	0.004	-	-	0.042	-	-	0.015
HCM Control Delay (s)	12	7.6	0	-	7.7	0	-	12.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	478	495	177
Stage 1	292	292	-
Stage 2	186	203	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	494	473	861
Stage 1	712	667	-
Stage 2	811	730	-
Platoon blocked, %			
Mov Cap-1 Maneuver	462	449	861
Mov Cap-2 Maneuver	462	449	-
Stage 1	709	636	-
Stage 2	786	727	-

Approach	SB
HCM Control Delay, s	12.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	185	250	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	6	206	278	6	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	283	0	-	0	498	281
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	217	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1274	-	-	-	530	755
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	817	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1274	-	-	-	527	755
Mov Cap-2 Maneuver	-	-	-	-	527	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	813	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1274	-	-	-	621
HCM Lane V/C Ratio	0.004	-	-	-	0.018
HCM Control Delay (s)	7.8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	130	55	35	170	80	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	162	69	44	212	100	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	497	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	300	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1325	-	529	839
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	747	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	509	839
Mov Cap-2 Maneuver	-	-	-	-	509	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	509	839	-	-	1325	-
HCM Lane V/C Ratio	0.196	0.104	-	-	0.033	-
HCM Control Delay (s)	13.8	9.8	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	947	112	202	877	229	26
v/c Ratio	0.09	0.82	0.18	0.68	0.47	0.50	0.06
Control Delay	28.3	25.0	1.9	36.8	9.1	15.6	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	25.0	1.9	36.8	9.1	15.6	14.8
Queue Length 50th (ft)	4	158	0	69	77	40	6
Queue Length 95th (ft)	17	#233	14	#148	161	98	21
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	116	1222	651	320	1894	458	456
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.77	0.17	0.63	0.46	0.50	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	890	105	190	820	5	90	10	115	5	15	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	947	0	202	872	5	96	11	122	5	16	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1194	534	249	1684	10	233	53	223	126	328	90
Arrive On Green	0.01	0.35	0.00	0.15	0.49	0.49	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	498	187	781	173	1151	315
Grp Volume(v), veh/h	11	947	0	202	428	449	229	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1466	0	0	1640	0	0
Q Serve(g_s), s	0.4	14.1	0.0	6.5	9.7	9.7	4.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	14.1	0.0	6.5	9.7	9.7	7.2	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.42		0.53	0.19		0.19
Lane Grp Cap(c), veh/h	19	1194	534	249	826	868	509	0	0	544	0	0
V/C Ratio(X)	0.58	0.79	0.00	0.81	0.52	0.52	0.45	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	121	1263	565	332	842	885	509	0	0	544	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.6	16.3	0.0	23.2	9.8	9.8	16.8	0.0	0.0	14.6	0.0	0.0
Incr Delay (d2), s/veh	24.9	3.4	0.0	10.8	0.5	0.5	2.9	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	7.1	0.0	3.8	4.6	4.9	3.4	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	52.5	19.7	0.0	34.0	10.3	10.3	19.7	0.0	0.0	14.7	0.0	0.0
LnGrp LOS	D	B		C	B	B	B			B		
Approach Vol, veh/h		958			1079			229			26	
Approach Delay, s/veh		20.0			14.7			19.7			14.7	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	12.2	23.9		20.0	4.6	31.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	21.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		9.2	8.5	16.1		2.6	2.4	11.7
Green Ext Time (p_c), s		0.8	0.1	3.7		1.2	0.0	9.6

Intersection Summary		
HCM 2010 Ctrl Delay		17.4
HCM 2010 LOS		B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	245	310	0	70	205
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	288	365	0	82	241
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.2	15.8	14.1
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	310	315	70	205
LT Vol	245	0	0	0	205
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	288	365	371	82	241
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.511	0.575	0.647	0.166	0.452
Departure Headway (Hd)	6.388	5.674	6.289	7.264	6.752
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	562	635	574	492	531
Service Time	4.153	3.438	4.344	5.038	4.526
HCM Lane V/C Ratio	0.512	0.575	0.646	0.167	0.454
HCM Control Delay	15.7	15.9	20.2	11.5	15
HCM Lane LOS	C	C	C	B	B
HCM 95th-tile Q	2.9	3.7	4.6	0.6	2.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	27.2
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	190	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	211	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.2	15.8	37.9
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	190	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	190	0	0
Lane Flow Rate	350	211	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.556	0.439	0.048	0.908
Departure Headway (Hd)	5.714	7.491	6.264	5.119
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	630	479	569	703
Service Time	3.776	5.257	4.029	3.172
HCM Lane V/C Ratio	0.556	0.441	0.049	0.909
HCM Control Delay	15.8	16	9.3	37.9
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.4	2.2	0.2	11.9

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBT	EBR	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Group Flow (vph)	78	464	47	16	21	1010	47	453	1068	31
v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.93	0.52	0.03
Control Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Length 50th (ft)	27	0	16	0	9	224	0	187	107	0
Queue Length 95th (ft)	60	0	41	0	30	#350	0	#354	207	2
Internal Link Dist (ft)	92		295			3161			432	
Turn Bay Length (ft)		50		20	370		60	510		50
Base Capacity (vph)	362	1553	381	485	99	1047	565	499	2065	955
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.91	0.52	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	50	25	445	25	20	15	20	970	45	435	1025	30
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	52	26	0	26	21	16	21	1010	0	453	1068	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	306	136	379	271	196	379	33	1046	468	491	1960	877
Arrive On Green	0.24	0.24	0.00	0.24	0.24	0.24	0.02	0.30	0.00	0.28	0.56	0.00
Sat Flow, veh/h	900	557	1553	780	804	1553	1740	3471	1553	1740	3471	1553
Grp Volume(v), veh/h	78	0	0	47	0	16	21	1010	0	453	1068	0
Grp Sat Flow(s),veh/h/ln	1457	0	1553	1584	0	1553	1740	1736	1553	1740	1736	1553
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	1.4	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Prop In Lane	0.67		1.00	0.55		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	442	0	379	467	0	379	33	1046	468	491	1960	877
V/C Ratio(X)	0.18	0.00	0.00	0.10	0.00	0.04	0.63	0.97	0.00	0.92	0.54	0.00
Avail Cap(c_a), veh/h	442	0	379	467	0	379	100	1046	468	499	1960	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	20.4	0.0	20.1	33.9	24.0	0.0	24.3	9.5	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.2	17.9	19.9	0.0	22.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.8	0.0	0.3	0.6	12.4	0.0	11.5	6.5	0.0
LnGrp Delay(d),s/veh	21.2	0.0	0.0	20.9	0.0	20.3	51.8	43.9	0.0	46.8	9.9	0.0
LnGrp LOS	C			C		C	D	D		D	A	
Approach Vol, veh/h		78			63			1031			1521	
Approach Delay, s/veh		21.2			20.7			44.0			20.9	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	23.7	25.0		21.0	5.3	43.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	20.0	21.0		17.0	4.0	37.0
Max Q Clear Time (g_c+I1), s		5.1	19.6	22.0		3.4	2.8	15.5
Green Ext Time (p_c), s		0.5	0.1	0.0		0.5	0.0	13.6

Intersection Summary			
HCM 2010 Ctrl Delay			29.7
HCM 2010 LOS			C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	15.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	355	115	125	360	115	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	382	124	134	387	124	161

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	505	0	1100	444
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1049	-	233	610
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	195	610
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	65.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	317	-	-	1049	-
HCM Lane V/C Ratio	0.899	-	-	0.128	-
HCM Control Delay (s)	65.1	-	-	8.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8.5	-	-	0.4	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	951	49	98	995	65	82
v/c Ratio	0.32	0.04	0.21	0.34	0.17	0.22
Control Delay	3.0	1.6	4.8	3.0	12.6	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	1.6	4.8	3.0	12.6	6.4
Queue Length 50th (ft)	0	0	0	0	7	1
Queue Length 95th (ft)	77	7	28	83	31	22
Internal Link Dist (ft)	962			235	1592	
Turn Bay Length (ft)		260	300			50
Base Capacity (vph)	2940	1323	462	2940	909	848
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.04	0.21	0.34	0.07	0.10

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	875	45	90	915	60	75
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	951	49	98	995	65	82
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2214	990	524	2214	171	152
Arrive On Green	0.63	0.63	0.63	0.63	0.10	0.10
Sat Flow, veh/h	3632	1583	561	3632	1774	1583
Grp Volume(v), veh/h	951	49	98	995	65	82
Grp Sat Flow(s),veh/h/ln	1770	1583	561	1770	1774	1583
Q Serve(g_s), s	4.0	0.3	3.1	4.2	1.0	1.4
Cycle Q Clear(g_c), s	4.0	0.3	7.1	4.2	1.0	1.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2214	990	524	2214	171	152
V/C Ratio(X)	0.43	0.05	0.19	0.45	0.38	0.54
Avail Cap(c_a), veh/h	2586	1157	583	2586	988	881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	2.8	2.1	4.6	2.8	12.2	12.4
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.1	1.4	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.2	0.5	2.0	0.5	0.7
LnGrp Delay(d),s/veh	2.9	2.1	4.7	2.9	13.6	15.3
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h	1000			1093	147	
Approach Delay, s/veh	2.8			3.1	14.6	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		22.0				22.0		6.8
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		21.0				21.0		16.0
Max Q Clear Time (g_c+I1), s		6.0				9.1		3.4
Green Ext Time (p_c), s		10.7				8.9		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		3.7
HCM 2010 LOS		A

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	SBU	SBL	SBR	SEU	SEL	SET	NWU	NWT	NWR
Vol, veh/h	0	110	30	0	25	90	0	85	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	120	33	0	27	98	0	92	125
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.9	8.5	8.5
HCM LOS	A	A	A

Lane	NWLn1	SELn1	SBLn1
Vol Left, %	0%	22%	79%
Vol Thru, %	43%	78%	0%
Vol Right, %	57%	0%	21%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	200	115	140
LT Vol	85	90	0
Through Vol	115	0	30
RT Vol	0	25	110
Lane Flow Rate	217	125	152
Geometry Grp	1	1	1
Degree of Util (X)	0.248	0.159	0.199
Departure Headway (Hd)	4.106	4.575	4.704
Convergence, Y/N	Yes	Yes	Yes
Cap	876	785	764
Service Time	2.126	2.598	2.731
HCM Lane V/C Ratio	0.248	0.159	0.199
HCM Control Delay	8.5	8.5	8.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.6	0.7

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	10	958	1010	36	31	47
v/c Ratio	0.05	0.72	0.76	0.06	0.09	0.07
Control Delay	8.3	13.8	14.9	3.7	11.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	13.8	14.9	3.7	11.4	4.4
Queue Length 50th (ft)	1	87	94	0	6	1
Queue Length 95th (ft)	8	137	147	11	14	14
Internal Link Dist (ft)		2069	957		312	
Turn Bay Length (ft)	260			290	30	30
Base Capacity (vph)	194	1402	1402	648	701	648
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.68	0.72	0.06	0.04	0.07

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	920	970	35	30	45
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	10	958	1010	36	31	47
Adj No. of Lanes	1	2	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	527	2014	2014	901	117	105
Arrive On Green	0.59	0.59	0.59	0.59	0.07	0.07
Sat Flow, veh/h	522	3529	3529	1538	1723	1538
Grp Volume(v), veh/h	10	958	1010	36	31	47
Grp Sat Flow(s),veh/h/ln	522	1719	1719	1538	1723	1538
Q Serve(g_s), s	0.3	3.7	4.0	0.2	0.4	0.7
Cycle Q Clear(g_c), s	4.2	3.7	4.0	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	527	2014	2014	901	117	105
V/C Ratio(X)	0.02	0.48	0.50	0.04	0.26	0.45
Avail Cap(c_a), veh/h	583	2379	2379	1064	1192	1064
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.1	2.7	2.8	2.0	10.2	10.4
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.0	1.2	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.6	1.9	0.3	0.2	0.4
LnGrp Delay(d),s/veh	4.1	2.9	3.0	2.0	11.4	13.3
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		968	1046		78	
Approach Delay, s/veh		2.9	3.0		12.6	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				17.5		5.6		17.5
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s				6.2		2.7		6.0
Green Ext Time (p_c), s				7.3		0.1		7.5

Intersection Summary		
HCM 2010 Ctrl Delay		3.3
HCM 2010 LOS		A

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection									
Int Delay, s/veh	3.5								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	135	200	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	6	150	222	6	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	228	0	-	0	386	225
Stage 1	-	-	-	-	225	-
Stage 2	-	-	-	-	161	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1334	-	-	-	615	812
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	865	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1334	-	-	-	612	812
Mov Cap-2 Maneuver	-	-	-	-	612	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1334	-	-	-	698
HCM Lane V/C Ratio	0.004	-	-	-	0.016
HCM Control Delay (s)	7.7	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	105	30	45	155	50	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	131	38	56	194	62	125

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	169	0	456	150
Stage 1	-	-	-	-	150	-
Stage 2	-	-	-	-	306	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1396	-	559	891
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	742	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1396	-	534	891
Mov Cap-2 Maneuver	-	-	-	-	534	-
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	709	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	891	-	-	1396	-
HCM Lane V/C Ratio	0.117	0.14	-	-	0.04	-
HCM Control Delay (s)	12.6	9.7	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.5	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	947	112	202	877	229	26
v/c Ratio	0.09	0.82	0.18	0.68	0.47	0.50	0.06
Control Delay	28.3	25.0	1.9	36.8	9.1	15.6	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	25.0	1.9	36.8	9.1	15.6	14.8
Queue Length 50th (ft)	4	158	0	69	77	40	6
Queue Length 95th (ft)	17	#233	14	#148	161	98	21
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	116	1222	651	320	1894	458	456
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.77	0.17	0.63	0.46	0.50	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	890	105	190	820	5	90	10	115	5	15	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	947	0	202	872	5	96	11	122	5	16	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1194	534	249	1684	10	233	53	223	126	328	90
Arrive On Green	0.01	0.35	0.00	0.15	0.49	0.49	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	498	187	781	173	1151	315
Grp Volume(v), veh/h	11	947	0	202	428	449	229	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1466	0	0	1640	0	0
Q Serve(g_s), s	0.4	14.1	0.0	6.5	9.7	9.7	4.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	14.1	0.0	6.5	9.7	9.7	7.2	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.42		0.53	0.19		0.19
Lane Grp Cap(c), veh/h	19	1194	534	249	826	868	509	0	0	544	0	0
V/C Ratio(X)	0.58	0.79	0.00	0.81	0.52	0.52	0.45	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	121	1263	565	332	842	885	509	0	0	544	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.6	16.3	0.0	23.2	9.8	9.8	16.8	0.0	0.0	14.6	0.0	0.0
Incr Delay (d2), s/veh	24.9	3.4	0.0	10.8	0.5	0.5	2.9	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	7.1	0.0	3.8	4.6	4.9	3.4	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	52.5	19.7	0.0	34.0	10.3	10.3	19.7	0.0	0.0	14.7	0.0	0.0
LnGrp LOS	D	B		C	B	B	B			B		
Approach Vol, veh/h		958			1079			229			26	
Approach Delay, s/veh		20.0			14.7			19.7			14.7	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	12.2	23.9		20.0	4.6	31.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	21.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		9.2	8.5	16.1		2.6	2.4	11.7
Green Ext Time (p_c), s		0.8	0.1	3.7		1.2	0.0	9.6

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	245	310	0	70	205
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	288	365	0	82	241
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.2	15.8	14.1
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	310	315	70	205
LT Vol	245	0	0	0	205
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	288	365	371	82	241
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.511	0.575	0.647	0.166	0.452
Departure Headway (Hd)	6.388	5.674	6.289	7.264	6.752
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	562	635	574	492	531
Service Time	4.153	3.438	4.344	5.038	4.526
HCM Lane V/C Ratio	0.512	0.575	0.646	0.167	0.454
HCM Control Delay	15.7	15.9	20.2	11.5	15
HCM Lane LOS	C	C	C	B	B
HCM 95th-tile Q	2.9	3.7	4.6	0.6	2.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	27.2
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	190	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	211	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.2	15.8	37.9
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	190	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	190	0	0
Lane Flow Rate	350	211	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.556	0.439	0.048	0.908
Departure Headway (Hd)	5.714	7.491	6.264	5.119
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	630	479	569	703
Service Time	3.776	5.257	4.029	3.172
HCM Lane V/C Ratio	0.556	0.441	0.049	0.909
HCM Control Delay	15.8	16	9.3	37.9
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.4	2.2	0.2	11.9

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	EBT	EBR	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Group Flow (vph)	78	464	47	16	21	1010	47	453	1068	31
v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.93	0.52	0.03
Control Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	0.5	21.8	0.1	36.7	46.6	0.3	53.0	10.1	0.2
Queue Length 50th (ft)	27	0	16	0	9	224	0	187	107	0
Queue Length 95th (ft)	60	0	41	0	30	#350	0	#354	207	2
Internal Link Dist (ft)	92		295			3161			432	
Turn Bay Length (ft)		50		20	370		60	510		50
Base Capacity (vph)	362	1553	381	485	99	1047	565	499	2065	955
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.30	0.12	0.03	0.21	0.96	0.08	0.91	0.52	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	50	25	445	25	20	15	20	970	45	435	1025	30
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	52	26	0	26	21	16	21	1010	0	453	1068	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	306	136	379	271	196	379	33	1046	468	491	1960	877
Arrive On Green	0.24	0.24	0.00	0.24	0.24	0.24	0.02	0.30	0.00	0.28	0.56	0.00
Sat Flow, veh/h	900	557	1553	780	804	1553	1740	3471	1553	1740	3471	1553
Grp Volume(v), veh/h	78	0	0	47	0	16	21	1010	0	453	1068	0
Grp Sat Flow(s),veh/h/ln	1457	0	1553	1584	0	1553	1740	1736	1553	1740	1736	1553
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	1.4	0.0	0.5	0.8	20.0	0.0	17.6	13.5	0.0
Prop In Lane	0.67		1.00	0.55		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	442	0	379	467	0	379	33	1046	468	491	1960	877
V/C Ratio(X)	0.18	0.00	0.00	0.10	0.00	0.04	0.63	0.97	0.00	0.92	0.54	0.00
Avail Cap(c_a), veh/h	442	0	379	467	0	379	100	1046	468	499	1960	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	20.4	0.0	20.1	33.9	24.0	0.0	24.3	9.5	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.2	17.9	19.9	0.0	22.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.8	0.0	0.3	0.6	12.4	0.0	11.5	6.5	0.0
LnGrp Delay(d),s/veh	21.2	0.0	0.0	20.9	0.0	20.3	51.8	43.9	0.0	46.8	9.9	0.0
LnGrp LOS	C			C		C	D	D		D	A	
Approach Vol, veh/h		78			63			1031			1521	
Approach Delay, s/veh		21.2			20.7			44.0			20.9	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	23.7	25.0		21.0	5.3	43.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	20.0	21.0		17.0	4.0	37.0
Max Q Clear Time (g_c+I1), s		5.1	19.6	22.0		3.4	2.8	15.5
Green Ext Time (p_c), s		0.5	0.1	0.0		0.5	0.0	13.6

Intersection Summary			
HCM 2010 Ctrl Delay			29.7
HCM 2010 LOS			C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	15.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	355	115	125	360	115	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	382	124	134	387	124	161

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	505	0	1100	444
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1049	-	233	610
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	195	610
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	65.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	317	-	-	1049	-
HCM Lane V/C Ratio	0.899	-	-	0.128	-
HCM Control Delay (s)	65.1	-	-	8.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8.5	-	-	0.4	-

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Group Flow (vph)	973	49	98	1011	82	65
v/c Ratio	0.36	0.04	0.25	0.38	0.26	0.19
Control Delay	4.0	1.7	6.2	4.0	15.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	1.7	6.2	4.0	15.3	5.8
Queue Length 50th (ft)	45	0	8	48	18	0
Queue Length 95th (ft)	84	8	31	89	36	18
Internal Link Dist (ft)	957			1757	1151	
Turn Bay Length (ft)		260	440			50
Base Capacity (vph)	2678	1210	399	2678	710	674
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.04	0.25	0.38	0.12	0.10

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NEL	NER		
Lane Configurations								
Volume (veh/h)	895	45	90	930	75	60		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	973	49	98	1011	82	65		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	2329	1042	516	2329	162	145		
Arrive On Green	0.66	0.66	0.66	0.66	0.09	0.09		
Sat Flow, veh/h	3632	1583	550	3632	1774	1583		
Grp Volume(v), veh/h	973	49	98	1011	82	65		
Grp Sat Flow(s),veh/h/ln	1770	1583	550	1770	1774	1583		
Q Serve(g_s), s	4.1	0.3	3.3	4.4	1.4	1.2		
Cycle Q Clear(g_c), s	4.1	0.3	7.4	4.4	1.4	1.2		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2329	1042	516	2329	162	145		
V/C Ratio(X)	0.42	0.05	0.19	0.43	0.51	0.45		
Avail Cap(c_a), veh/h	2329	1042	516	2329	889	794		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	2.6	1.9	4.3	2.6	13.8	13.7		
Incr Delay (d2), s/veh	0.6	0.1	0.8	0.6	2.4	2.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.1	0.2	0.6	2.2	0.8	0.6		
LnGrp Delay(d),s/veh	3.1	2.0	5.1	3.2	16.3	15.9		
LnGrp LOS	A	A	A	A	B	B		
Approach Vol, veh/h	1022			1109	147			
Approach Delay, s/veh	3.1			3.4	16.1			
Approach LOS	A			A	B			
Timer	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		25.0				25.0		6.9
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		21.0				21.0		16.0
Max Q Clear Time (g_c+I1), s		6.1				9.4		3.4
Green Ext Time (p_c), s		10.8				8.8		0.3
Intersection Summary								
HCM 2010 Ctrl Delay			4.1					
HCM 2010 LOS			A					

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection						
Int Delay, s/veh	3.8					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Vol, veh/h	65	145	135	75	55	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	158	147	82	60	87

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	228	0	-	0	487	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	299	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1340	-	-	-	540	854
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1340	-	-	-	509	854
Mov Cap-2 Maneuver	-	-	-	-	509	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	708	-

Approach	SE	NW	SW
HCM Control Delay, s	2.4	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1340	-	669
HCM Lane V/C Ratio	-	-	0.053	-	0.219
HCM Control Delay (s)	-	-	7.8	0	11.9
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0.2	-	0.8

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	10	906	68	927	36	130	31	47
v/c Ratio	0.06	0.79	0.30	0.64	0.05	0.22	0.06	0.08
Control Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Length 50th (ft)	3	125	19	83	0	14	6	5
Queue Length 95th (ft)	14	#216	48	178	0	44	21	22
Internal Link Dist (ft)		2069		2822		280		312
Turn Bay Length (ft)	260		260		290		30	
Base Capacity (vph)	156	1249	234	1625	784	586	490	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.73	0.29	0.57	0.05	0.22	0.06	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	870	0	65	890	35	50	15	60	30	25	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	0	1810	1810	1810	1900	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	10	906	0	68	927	36	52	16	62	31	26	21
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	0	5	5	5	5	5	5	5	5	5
Cap, veh/h	18	1159	0	87	1297	580	277	108	251	534	325	262
Arrive On Green	0.01	0.34	0.00	0.05	0.38	0.38	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1723	3529	0	1723	3438	1538	478	308	717	1278	928	749
Grp Volume(v), veh/h	10	906	0	68	927	36	130	0	0	31	0	47
Grp Sat Flow(s),veh/h/ln	1723	1719	0	1723	1719	1538	1503	0	0	1278	0	1677
Q Serve(g_s), s	0.3	10.8	0.0	1.8	10.5	0.7	0.0	0.0	0.0	0.8	0.0	0.9
Cycle Q Clear(g_c), s	0.3	10.8	0.0	1.8	10.5	0.7	2.5	0.0	0.0	3.3	0.0	0.9
Prop In Lane	1.00		0.00	1.00		1.00	0.40		0.48	1.00		0.45
Lane Grp Cap(c), veh/h	18	1159	0	87	1297	580	636	0	0	534	0	587
V/C Ratio(X)	0.56	0.78	0.00	0.78	0.71	0.06	0.20	0.00	0.00	0.06	0.00	0.08
Avail Cap(c_a), veh/h	151	1203	0	226	1353	605	636	0	0	534	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	13.6	0.0	21.5	12.1	9.1	10.5	0.0	0.0	11.7	0.0	9.9
Incr Delay (d2), s/veh	24.2	3.3	0.0	13.9	1.7	0.0	0.7	0.0	0.0	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.6	0.0	1.2	5.2	0.3	1.3	0.0	0.0	0.3	0.0	0.4
LnGrp Delay(d),s/veh	46.7	16.9	0.0	35.3	13.9	9.1	11.2	0.0	0.0	11.9	0.0	10.2
LnGrp LOS	D	B		D	B	A	B			B		B
Approach Vol, veh/h		916			1031			130			78	
Approach Delay, s/veh		17.3			15.1			11.2			10.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	6.3	19.4		20.0	4.5	21.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	6.0	16.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		4.5	3.8	12.8		5.3	2.3	12.5
Green Ext Time (p_c), s		0.8	0.0	2.6		0.8	0.0	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	35	105	145	105	60	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	117	161	117	67	89

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	278	0	-	0	413	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1279	-	-	-	594	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	836	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1279	-	-	-	574	818
Mov Cap-2 Maneuver	-	-	-	-	574	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1279	-	-	-	692
HCM Lane V/C Ratio	0.03	-	-	-	0.225
HCM Control Delay (s)	7.9	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	130	55	35	165	80	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	162	69	44	206	100	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	491	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	294	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1325	-	533	839
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	513	839
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	513	839	-	-	1325	-
HCM Lane V/C Ratio	0.195	0.104	-	-	0.033	-
HCM Control Delay (s)	13.7	9.8	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	952	112	202	877	234	32
v/c Ratio	0.09	0.96	0.20	0.69	0.51	0.46	0.07
Control Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Length 50th (ft)	4	160	0	62	82	32	6
Queue Length 95th (ft)	16	#274	12	#141	171	84	22
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	123	991	569	309	1725	512	465
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.96	0.20	0.65	0.51	0.46	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	895	105	190	820	5	95	10	115	15	10	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	952	0	202	872	5	101	11	122	16	11	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1023	458	249	1511	9	266	57	246	298	189	71
Arrive On Green	0.01	0.30	0.00	0.15	0.44	0.44	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	524	177	763	607	588	221
Grp Volume(v), veh/h	11	952	0	202	428	449	234	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1464	0	0	1416	0	0
Q Serve(g_s), s	0.3	14.5	0.0	6.1	10.1	10.1	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	14.5	0.0	6.1	10.1	10.1	6.6	0.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.43		0.52	0.50		0.16
Lane Grp Cap(c), veh/h	19	1023	458	249	741	778	569	0	0	559	0	0
V/C Ratio(X)	0.58	0.93	0.00	0.81	0.58	0.58	0.41	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	128	1023	458	320	741	778	569	0	0	559	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.0	17.9	0.0	21.8	11.1	11.1	14.3	0.0	0.0	12.4	0.0	0.0
Incr Delay (d2), s/veh	24.5	14.4	0.0	11.5	1.1	1.1	2.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.7	0.0	3.6	4.9	5.1	3.1	0.0	0.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	50.5	32.3	0.0	33.2	12.2	12.2	16.5	0.0	0.0	12.6	0.0	0.0
LnGrp LOS	D	C		C	B	B	B			B		
Approach Vol, veh/h		963			1079			234			32	
Approach Delay, s/veh		32.5			16.1			16.5			12.6	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	11.8	20.0		21.0	4.6	27.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	10.0	16.0		17.0	4.0	22.0
Max Q Clear Time (g_c+I1), s		8.6	8.1	16.5		2.7	2.3	12.1
Green Ext Time (p_c), s		1.0	0.1	0.0		1.3	0.0	6.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.9
HCM 2010 LOS	C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	255	310	0	70	210
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	300	365	0	82	247
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.5	16.2	14.4
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	255	310	315	70	210
LT Vol	255	0	0	0	210
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	300	365	371	82	247
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.534	0.577	0.651	0.167	0.465
Departure Headway (Hd)	6.407	5.693	6.32	7.288	6.776
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	561	631	571	490	529
Service Time	4.176	3.461	4.377	5.066	4.554
HCM Lane V/C Ratio	0.535	0.578	0.65	0.167	0.467
HCM Control Delay	16.4	16	20.5	11.5	15.4
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.1	3.7	4.7	0.6	2.4

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	28.3
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	200	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	222	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.9	16	39.8
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	200	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	200	0	0
Lane Flow Rate	350	222	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.561	0.464	0.048	0.918
Departure Headway (Hd)	5.774	7.509	6.282	5.171
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	623	478	567	696
Service Time	3.843	5.279	4.052	3.23
HCM Lane V/C Ratio	0.562	0.464	0.049	0.918
HCM Control Delay	16	16.7	9.4	39.8
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.5	2.4	0.2	12.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NET	NER	SWT	SWR
Lane Group Flow (vph)	21	1010	47	453	1068	31	78	464	47	16
v/c Ratio	0.13	0.87	0.08	0.78	0.45	0.03	0.34	0.30	0.20	0.04
Control Delay	30.6	33.4	0.2	31.9	6.5	0.2	31.3	0.5	28.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	33.4	0.2	31.9	6.5	0.2	31.3	0.5	28.2	0.2
Queue Length 50th (ft)	9	207	0	167	62	0	32	0	19	0
Queue Length 95th (ft)	28	#350	0	#305	204	2	66	0	44	0
Internal Link Dist (ft)		2721			861		307		291	
Turn Bay Length (ft)	370		60	510		50				20
Base Capacity (vph)	159	1159	611	586	2396	1096	342	1553	355	483
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.87	0.08	0.77	0.45	0.03	0.23	0.30	0.13	0.03

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	20	970	45	435	1025	30	50	25	445	25	20	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1827	1900	1827	1827	1900	1827	1827
Adj Flow Rate, veh/h	21	1010	0	453	1068	0	52	26	0	26	21	16
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	35	1302	582	516	2262	1012	191	63	162	175	106	162
Arrive On Green	0.02	0.38	0.00	0.30	0.65	0.00	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1740	3471	1553	1740	3471	1553	758	603	1553	677	1019	1553
Grp Volume(v), veh/h	21	1010	0	453	1068	0	78	0	0	47	0	16
Grp Sat Flow(s),veh/h/ln	1740	1736	1553	1740	1736	1553	1361	0	1553	1696	0	1553
Q Serve(g_s), s	0.6	13.7	0.0	13.3	8.3	0.0	1.9	0.0	0.0	0.0	0.0	0.5
Cycle Q Clear(g_c), s	0.6	13.7	0.0	13.3	8.3	0.0	3.1	0.0	0.0	1.3	0.0	0.5
Prop In Lane	1.00		1.00	1.00		1.00	0.67		1.00	0.55		1.00
Lane Grp Cap(c), veh/h	35	1302	582	516	2262	1012	254	0	162	281	0	162
V/C Ratio(X)	0.60	0.78	0.00	0.88	0.47	0.00	0.31	0.00	0.00	0.17	0.00	0.10
Avail Cap(c_a), veh/h	130	1360	608	649	2396	1072	567	0	493	607	0	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.56	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.1	14.8	0.0	17.9	4.7	0.0	22.9	0.0	0.0	22.1	0.0	21.7
Incr Delay (d2), s/veh	15.5	2.8	0.0	11.0	0.2	0.0	1.7	0.0	0.0	0.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	7.0	0.0	7.9	3.9	0.0	1.2	0.0	0.0	0.7	0.0	0.2
LnGrp Delay(d),s/veh	41.6	17.5	0.0	28.9	4.9	0.0	24.7	0.0	0.0	22.3	0.0	22.0
LnGrp LOS	D	B		C	A		C			C		C
Approach Vol, veh/h		1031			1521			78			63	
Approach Delay, s/veh		18.0			12.0			24.7			22.2	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		26.0	19.9	24.1		26.0	5.1	38.9
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	20.0	21.0		17.0	4.0	37.0
Max Q Clear Time (g_c+I1), s		5.1	15.3	15.7		3.3	2.6	10.3
Green Ext Time (p_c), s		0.5	0.6	4.4		0.5	0.0	15.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	360	124	285	134	387
v/c Ratio	0.76	0.10	0.43	0.45	0.66
Control Delay	32.7	4.1	13.1	26.1	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	4.1	13.1	26.1	8.6
Queue Length 50th (ft)	114	11	47	44	0
Queue Length 95th (ft)	#239	34	118	79	56
Internal Link Dist (ft)		1718	290	307	
Turn Bay Length (ft)	150			150	
Base Capacity (vph)	497	1269	669	462	697
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.72	0.10	0.43	0.29	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	335	115	115	150	125	360
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1900	1827	1827
Adj Flow Rate, veh/h	360	124	124	161	134	387
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	4	4	4
Cap, veh/h	429	1010	163	212	498	445
Arrive On Green	0.25	0.55	0.23	0.23	0.29	0.29
Sat Flow, veh/h	1740	1827	723	938	1740	1553
Grp Volume(v), veh/h	360	124	0	285	134	387
Grp Sat Flow(s),veh/h/ln	1740	1827	0	1661	1740	1553
Q Serve(g_s), s	9.8	1.6	0.0	8.0	3.0	11.8
Cycle Q Clear(g_c), s	9.8	1.6	0.0	8.0	3.0	11.8
Prop In Lane	1.00			0.56	1.00	1.00
Lane Grp Cap(c), veh/h	429	1010	0	375	498	445
V/C Ratio(X)	0.84	0.12	0.00	0.76	0.27	0.87
Avail Cap(c_a), veh/h	560	1323	0	535	560	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.69	0.69
Uniform Delay (d), s/veh	17.8	5.3	0.0	18.0	13.7	16.9
Incr Delay (d2), s/veh	8.7	0.1	0.0	13.5	0.2	10.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.8	0.0	5.0	1.4	10.3
LnGrp Delay(d),s/veh	26.5	5.4	0.0	31.5	13.9	27.1
LnGrp LOS	C	A		C	B	C
Approach Vol, veh/h		484	285		521	
Approach Delay, s/veh		21.1	31.5		23.7	
Approach LOS		C	C		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		31.5		18.2	16.3	15.2		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	16.0	16.0		
Max Q Clear Time (g_c+I1), s		3.6		13.8	11.8	10.0		
Green Ext Time (p_c), s		2.7		0.5	0.5	1.3		

Intersection Summary			
HCM 2010 Ctrl Delay			24.4
HCM 2010 LOS			C

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	10	906	68	927	36	130	31	47
v/c Ratio	0.06	0.79	0.30	0.64	0.05	0.22	0.06	0.08
Control Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Length 50th (ft)	3	125	19	83	0	14	6	5
Queue Length 95th (ft)	14	#216	48	178	0	44	21	22
Internal Link Dist (ft)		2069		2822		280		312
Turn Bay Length (ft)	260		260		290		30	
Base Capacity (vph)	156	1249	234	1625	784	586	490	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.73	0.29	0.57	0.05	0.22	0.06	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	870	0	65	890	35	50	15	60	30	25	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	0	1810	1810	1810	1900	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	10	906	0	68	927	36	52	16	62	31	26	21
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	0	5	5	5	5	5	5	5	5	5
Cap, veh/h	18	1159	0	87	1297	580	277	108	251	534	325	262
Arrive On Green	0.01	0.34	0.00	0.05	0.38	0.38	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1723	3529	0	1723	3438	1538	478	308	717	1278	928	749
Grp Volume(v), veh/h	10	906	0	68	927	36	130	0	0	31	0	47
Grp Sat Flow(s),veh/h/ln	1723	1719	0	1723	1719	1538	1503	0	0	1278	0	1677
Q Serve(g_s), s	0.3	10.8	0.0	1.8	10.5	0.7	0.0	0.0	0.0	0.8	0.0	0.9
Cycle Q Clear(g_c), s	0.3	10.8	0.0	1.8	10.5	0.7	2.5	0.0	0.0	3.3	0.0	0.9
Prop In Lane	1.00		0.00	1.00		1.00	0.40		0.48	1.00		0.45
Lane Grp Cap(c), veh/h	18	1159	0	87	1297	580	636	0	0	534	0	587
V/C Ratio(X)	0.56	0.78	0.00	0.78	0.71	0.06	0.20	0.00	0.00	0.06	0.00	0.08
Avail Cap(c_a), veh/h	151	1203	0	226	1353	605	636	0	0	534	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	13.6	0.0	21.5	12.1	9.1	10.5	0.0	0.0	11.7	0.0	9.9
Incr Delay (d2), s/veh	24.2	3.3	0.0	13.9	1.7	0.0	0.7	0.0	0.0	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.6	0.0	1.2	5.2	0.3	1.3	0.0	0.0	0.3	0.0	0.4
LnGrp Delay(d),s/veh	46.7	16.9	0.0	35.3	13.9	9.1	11.2	0.0	0.0	11.9	0.0	10.2
LnGrp LOS	D	B		D	B	A	B			B		B
Approach Vol, veh/h		916			1031			130			78	
Approach Delay, s/veh		17.3			15.1			11.2			10.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	6.3	19.4		20.0	4.5	21.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	6.0	16.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		4.5	3.8	12.8		5.3	2.3	12.5
Green Ext Time (p_c), s		0.8	0.0	2.6		0.8	0.0	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection									
Int Delay, s/veh	3.5								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	35	105	145	105	60	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	117	161	117	67	89

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	278	0	-	0	413	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1279	-	-	-	594	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	836	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1279	-	-	-	574	818
Mov Cap-2 Maneuver	-	-	-	-	574	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1279	-	-	-	692
HCM Lane V/C Ratio	0.03	-	-	-	0.225
HCM Control Delay (s)	7.9	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	130	55	35	165	80	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	162	69	44	206	100	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	491	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	294	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1325	-	533	839
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	513	839
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	513	839	-	-	1325	-
HCM Lane V/C Ratio	0.195	0.104	-	-	0.033	-
HCM Control Delay (s)	13.7	9.8	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	952	112	202	877	234	32
v/c Ratio	0.09	0.96	0.20	0.69	0.51	0.46	0.07
Control Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Length 50th (ft)	4	160	0	62	82	32	6
Queue Length 95th (ft)	16	#274	12	#141	171	84	22
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	123	991	569	309	1725	512	465
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.96	0.20	0.65	0.51	0.46	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	895	105	190	820	5	95	10	115	15	10	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	952	0	202	872	5	101	11	122	16	11	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1023	458	249	1511	9	266	57	246	298	189	71
Arrive On Green	0.01	0.30	0.00	0.15	0.44	0.44	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	524	177	763	607	588	221
Grp Volume(v), veh/h	11	952	0	202	428	449	234	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1464	0	0	1416	0	0
Q Serve(g_s), s	0.3	14.5	0.0	6.1	10.1	10.1	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	14.5	0.0	6.1	10.1	10.1	6.6	0.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.43		0.52	0.50		0.16
Lane Grp Cap(c), veh/h	19	1023	458	249	741	778	569	0	0	559	0	0
V/C Ratio(X)	0.58	0.93	0.00	0.81	0.58	0.58	0.41	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	128	1023	458	320	741	778	569	0	0	559	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.0	17.9	0.0	21.8	11.1	11.1	14.3	0.0	0.0	12.4	0.0	0.0
Incr Delay (d2), s/veh	24.5	14.4	0.0	11.5	1.1	1.1	2.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.7	0.0	3.6	4.9	5.1	3.1	0.0	0.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	50.5	32.3	0.0	33.2	12.2	12.2	16.5	0.0	0.0	12.6	0.0	0.0
LnGrp LOS	D	C		C	B	B	B			B		
Approach Vol, veh/h		963			1079			234			32	
Approach Delay, s/veh		32.5			16.1			16.5			12.6	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	11.8	20.0		21.0	4.6	27.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	10.0	16.0		17.0	4.0	22.0
Max Q Clear Time (g_c+I1), s		8.6	8.1	16.5		2.7	2.3	12.1
Green Ext Time (p_c), s		1.0	0.1	0.0		1.3	0.0	6.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.9
HCM 2010 LOS	C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	255	310	0	70	210
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	300	365	0	82	247
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.5	16.2	14.4
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	255	310	315	70	210
LT Vol	255	0	0	0	210
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	300	365	371	82	247
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.534	0.577	0.651	0.167	0.465
Departure Headway (Hd)	6.407	5.693	6.32	7.288	6.776
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	561	631	571	490	529
Service Time	4.176	3.461	4.377	5.066	4.554
HCM Lane V/C Ratio	0.535	0.578	0.65	0.167	0.467
HCM Control Delay	16.4	16	20.5	11.5	15.4
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.1	3.7	4.7	0.6	2.4

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	28.3
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	200	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	222	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.9	16	39.8
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	200	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	200	0	0
Lane Flow Rate	350	222	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.561	0.464	0.048	0.918
Departure Headway (Hd)	5.774	7.509	6.282	5.171
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	623	478	567	696
Service Time	3.843	5.279	4.052	3.23
HCM Lane V/C Ratio	0.562	0.464	0.049	0.918
HCM Control Delay	16	16.7	9.4	39.8
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.5	2.4	0.2	12.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Approach	SE	NW	NE	SW
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1078	1552	542	63
Demand Flow Rate, veh/h	1121	1614	564	66
Vehicles Circulating, veh/h	520	103	1099	1636
Vehicles Exiting, veh/h	1182	1077	542	81
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	20.2	18.7	1.3	13.7
Approach LOS	C	C	A	B

Lane	Left	Right	Left	Right	Left	Bypass	Left
Designated Moves	LT	TR	LT	TR	LT	R	LTR
Assumed Moves	LT	TR	LT	TR	LT	R	LTR
RT Channelized						Free	
Lane Util	0.470	0.530	0.470	0.530	1.000		1.000
Critical Headway, s	4.293	4.113	4.293	4.113	4.113		4.113
Entry Flow, veh/h	527	594	759	855	81	483	66
Cap Entry Lane, veh/h	765	785	1046	1051	524	1976	360
Entry HV Adj Factor	0.961	0.962	0.961	0.962	0.962	0.962	0.957
Flow Entry, veh/h	506	571	730	823	78	464	63
Cap Entry, veh/h	735	755	1005	1012	504	1900	344
V/C Ratio	0.689	0.757	0.726	0.813	0.155	0.244	0.184
Control Delay, s/veh	18.5	21.8	16.0	21.0	9.2	0.0	13.7
LOS	C	C	C	C	A	A	B
95th %tile Queue, veh	6	7	7	9	1	1	1

HCM research expects at least one 'Stop' controlled approach at the intersection.

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	484	285	134	387
v/c Ratio	0.75	0.27	0.35	0.60
Control Delay	18.3	3.1	16.5	6.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.3	3.1	16.5	6.4
Queue Length 50th (ft)	62	10	28	0
Queue Length 95th (ft)	#260	44	62	48
Internal Link Dist (ft)	1718	290	307	
Turn Bay Length (ft)			150	100
Base Capacity (vph)	739	1170	706	861
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.65	0.24	0.19	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	335	115	115	150	125	360
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1827	1827	1900	1827	1827
Adj Flow Rate, veh/h	360	124	124	161	134	0
Adj No. of Lanes	0	1	1	0	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	4	4	4
Cap, veh/h	696	206	435	564	175	156
Arrive On Green	0.60	0.60	0.60	0.60	0.10	0.00
Sat Flow, veh/h	767	342	723	938	1740	1553
Grp Volume(v), veh/h	484	0	0	285	134	0
Grp Sat Flow(s),veh/h/ln	1110	0	0	1661	1740	1553
Q Serve(g_s), s	7.0	0.0	0.0	2.2	2.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	0.0	2.2	2.0	0.0
Prop In Lane	0.74			0.56	1.00	1.00
Lane Grp Cap(c), veh/h	901	0	0	999	175	156
V/C Ratio(X)	0.54	0.00	0.00	0.29	0.77	0.00
Avail Cap(c_a), veh/h	1342	0	0	1115	1038	926
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.3	0.0	0.0	2.6	11.8	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	6.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0	1.0	1.3	0.0
LnGrp Delay(d),s/veh	4.8	0.0	0.0	2.7	18.7	0.0
LnGrp LOS	A			A	B	
Approach Vol, veh/h		484	285		134	
Approach Delay, s/veh		4.8	2.7		18.7	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		20.1		6.7		20.1		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		26.0		16.0		18.0		
Max Q Clear Time (g_c+I1), s		11.2		4.0		4.2		
Green Ext Time (p_c), s		4.9		0.2		4.7		

Intersection Summary		
HCM 2010 Ctrl Delay		6.2
HCM 2010 LOS		A

Two Way Analysis cannot be performed on Signalized Intersection.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	10	906	68	927	36	130	31	47
v/c Ratio	0.06	0.79	0.30	0.64	0.05	0.22	0.06	0.08
Control Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.2	23.6	13.0	0.1	8.6	12.3	8.8
Queue Length 50th (ft)	3	125	19	83	0	14	6	5
Queue Length 95th (ft)	14	#216	48	178	0	44	21	22
Internal Link Dist (ft)		2069		2822		280		312
Turn Bay Length (ft)	260		260		290		30	
Base Capacity (vph)	156	1249	234	1625	784	586	490	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.73	0.29	0.57	0.05	0.22	0.06	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	870	0	65	890	35	50	15	60	30	25	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	0	1810	1810	1810	1900	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	10	906	0	68	927	36	52	16	62	31	26	21
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	0	5	5	5	5	5	5	5	5	5
Cap, veh/h	18	1159	0	87	1297	580	277	108	251	534	325	262
Arrive On Green	0.01	0.34	0.00	0.05	0.38	0.38	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1723	3529	0	1723	3438	1538	478	308	717	1278	928	749
Grp Volume(v), veh/h	10	906	0	68	927	36	130	0	0	31	0	47
Grp Sat Flow(s),veh/h/ln	1723	1719	0	1723	1719	1538	1503	0	0	1278	0	1677
Q Serve(g_s), s	0.3	10.8	0.0	1.8	10.5	0.7	0.0	0.0	0.0	0.8	0.0	0.9
Cycle Q Clear(g_c), s	0.3	10.8	0.0	1.8	10.5	0.7	2.5	0.0	0.0	3.3	0.0	0.9
Prop In Lane	1.00		0.00	1.00		1.00	0.40		0.48	1.00		0.45
Lane Grp Cap(c), veh/h	18	1159	0	87	1297	580	636	0	0	534	0	587
V/C Ratio(X)	0.56	0.78	0.00	0.78	0.71	0.06	0.20	0.00	0.00	0.06	0.00	0.08
Avail Cap(c_a), veh/h	151	1203	0	226	1353	605	636	0	0	534	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	13.6	0.0	21.5	12.1	9.1	10.5	0.0	0.0	11.7	0.0	9.9
Incr Delay (d2), s/veh	24.2	3.3	0.0	13.9	1.7	0.0	0.7	0.0	0.0	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.6	0.0	1.2	5.2	0.3	1.3	0.0	0.0	0.3	0.0	0.4
LnGrp Delay(d),s/veh	46.7	16.9	0.0	35.3	13.9	9.1	11.2	0.0	0.0	11.9	0.0	10.2
LnGrp LOS	D	B		D	B	A	B			B		B
Approach Vol, veh/h		916			1031			130			78	
Approach Delay, s/veh		17.3			15.1			11.2			10.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	6.3	19.4		20.0	4.5	21.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	6.0	16.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		4.5	3.8	12.8		5.3	2.3	12.5
Green Ext Time (p_c), s		0.8	0.0	2.6		0.8	0.0	4.3

Intersection Summary			
HCM 2010 Ctrl Delay			15.6
HCM 2010 LOS			B

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	80	30	75	85	15	25	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4
Mvmt Flow	2	83	31	78	89	16	26	2	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	115	0	0	357	363	99
Stage 1	-	-	-	-	-	-	103	103	-
Stage 2	-	-	-	-	-	-	254	260	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1475	-	-	1462	-	-	595	561	951
Stage 1	-	-	-	-	-	-	898	806	-
Stage 2	-	-	-	-	-	-	746	689	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1475	-	-	1462	-	-	567	528	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	528	-
Stage 1	-	-	-	-	-	-	897	805	-
Stage 2	-	-	-	-	-	-	702	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	3.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1475	-	-	1462	-	-	573
HCM Lane V/C Ratio	0.077	0.001	-	-	0.053	-	-	0.013
HCM Control Delay (s)	10.6	7.4	0	-	7.6	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	96	96	96
Heavy Vehicles, %	4	4	4
Mvmt Flow	5	1	1

Major/Minor	Minor2		
Conflicting Flow All	370	372	96
Stage 1	253	253	-
Stage 2	117	119	-
Critical Hdwy	7.14	6.54	6.24
Critical Hdwy Stg 1	6.14	5.54	-
Critical Hdwy Stg 2	6.14	5.54	-
Follow-up Hdwy	3.536	4.036	3.336
Pot Cap-1 Maneuver	583	555	955
Stage 1	747	694	-
Stage 2	883	793	-
Platoon blocked, %			
Mov Cap-1 Maneuver	540	523	955
Mov Cap-2 Maneuver	540	523	-
Stage 1	746	654	-
Stage 2	856	792	-

Approach	SB
HCM Control Delay, s	11.4
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	35	105	145	105	60	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	117	161	117	67	89

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	278	0	-	0	413	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1279	-	-	-	594	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	836	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1279	-	-	-	574	818
Mov Cap-2 Maneuver	-	-	-	-	574	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1279	-	-	-	692
HCM Lane V/C Ratio	0.03	-	-	-	0.225
HCM Control Delay (s)	7.9	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	130	55	35	165	80	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	162	69	44	206	100	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	491	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	294	-
Critical Hdwy	-	-	4.14	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.236	-	3.536	3.336
Pot Cap-1 Maneuver	-	-	1325	-	533	839
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	513	839
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	513	839	-	-	1325	-
HCM Lane V/C Ratio	0.195	0.104	-	-	0.033	-
HCM Control Delay (s)	13.7	9.8	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	952	112	202	877	234	32
v/c Ratio	0.09	0.96	0.20	0.69	0.51	0.46	0.07
Control Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	42.6	1.9	35.7	10.7	12.1	12.5
Queue Length 50th (ft)	4	160	0	62	82	32	6
Queue Length 95th (ft)	16	#274	12	#141	171	84	22
Internal Link Dist (ft)		1947			1361	499	262
Turn Bay Length (ft)	560		260	440			
Base Capacity (vph)	123	991	569	309	1725	512	465
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.96	0.20	0.65	0.51	0.46	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	895	105	190	820	5	95	10	115	15	10	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1900	1900	1776	1900	1900	1776	1900
Adj Flow Rate, veh/h	11	952	0	202	872	5	101	11	122	16	11	5
Adj No. of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	19	1023	458	249	1511	9	266	57	246	298	189	71
Arrive On Green	0.01	0.30	0.00	0.15	0.44	0.44	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1691	3374	1509	1691	3439	20	524	177	763	607	588	221
Grp Volume(v), veh/h	11	952	0	202	428	449	234	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1772	1464	0	0	1416	0	0
Q Serve(g_s), s	0.3	14.5	0.0	6.1	10.1	10.1	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	14.5	0.0	6.1	10.1	10.1	6.6	0.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.43		0.52	0.50		0.16
Lane Grp Cap(c), veh/h	19	1023	458	249	741	778	569	0	0	559	0	0
V/C Ratio(X)	0.58	0.93	0.00	0.81	0.58	0.58	0.41	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	128	1023	458	320	741	778	569	0	0	559	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.0	17.9	0.0	21.8	11.1	11.1	14.3	0.0	0.0	12.4	0.0	0.0
Incr Delay (d2), s/veh	24.5	14.4	0.0	11.5	1.1	1.1	2.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.7	0.0	3.6	4.9	5.1	3.1	0.0	0.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	50.5	32.3	0.0	33.2	12.2	12.2	16.5	0.0	0.0	12.6	0.0	0.0
LnGrp LOS	D	C		C	B	B	B			B		
Approach Vol, veh/h		963			1079			234			32	
Approach Delay, s/veh		32.5			16.1			16.5			12.6	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	11.8	20.0		21.0	4.6	27.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	10.0	16.0		17.0	4.0	22.0
Max Q Clear Time (g_c+I1), s		8.6	8.1	16.5		2.7	2.3	12.1
Green Ext Time (p_c), s		1.0	0.1	0.0		1.3	0.0	6.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.9
HCM 2010 LOS	C

Two Way Analysis cannot be performed on Signalized Intersection.

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	270	45	0	255	310	0	70	210
Peak Hour Factor	0.92	0.85	0.85	0.92	0.85	0.85	0.92	0.85	0.85
Heavy Vehicles, %	2	4	4	2	4	4	2	4	4
Mvmt Flow	0	318	53	0	300	365	0	82	247
Number of Lanes	0	1	0	0	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	20.5	16.2	14.4
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	86%	100%	0%
Vol Thru, %	100%	0%	0%	0%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	255	310	315	70	210
LT Vol	255	0	0	0	210
Through Vol	0	310	45	0	0
RT Vol	0	0	270	70	0
Lane Flow Rate	300	365	371	82	247
Geometry Grp	7	7	2	7	7
Degree of Util (X)	0.534	0.577	0.651	0.167	0.465
Departure Headway (Hd)	6.407	5.693	6.32	7.288	6.776
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	561	631	571	490	529
Service Time	4.176	3.461	4.377	5.066	4.554
HCM Lane V/C Ratio	0.535	0.578	0.65	0.167	0.467
HCM Control Delay	16.4	16	20.5	11.5	15.4
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.1	3.7	4.7	0.6	2.4

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	28.3
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	200	25	0	5	310	0	355	220
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	1	1	2	1	1	2	1	1
Mvmt Flow	0	222	28	0	6	344	0	394	244
Number of Lanes	0	1	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.9	16	39.8
HCM LOS	C	C	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	2%	100%	0%	0%
Vol Thru, %	98%	0%	0%	62%
Vol Right, %	0%	0%	100%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	200	25	575
LT Vol	310	0	0	355
Through Vol	0	0	25	220
RT Vol	5	200	0	0
Lane Flow Rate	350	222	28	639
Geometry Grp	2	7	7	2
Degree of Util (X)	0.561	0.464	0.048	0.918
Departure Headway (Hd)	5.774	7.509	6.282	5.171
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	623	478	567	696
Service Time	3.843	5.279	4.052	3.23
HCM Lane V/C Ratio	0.562	0.464	0.049	0.918
HCM Control Delay	16	16.7	9.4	39.8
HCM Lane LOS	C	C	A	E
HCM 95th-tile Q	3.5	2.4	0.2	12.3

Two Way Analysis cannot be performed on an All Way Stop Intersection.

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Approach	SE	NW	NE	SW
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1078	1552	542	63
Demand Flow Rate, veh/h	1121	1614	564	66
Vehicles Circulating, veh/h	520	103	1099	1636
Vehicles Exiting, veh/h	1182	1077	542	81
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	20.2	18.7	1.3	13.7
Approach LOS	C	C	A	B

Lane	Left	Right	Left	Right	Left	Bypass	Left
Designated Moves	LT	TR	LT	TR	LT	R	LTR
Assumed Moves	LT	TR	LT	TR	LT	R	LTR
RT Channelized						Free	
Lane Util	0.470	0.530	0.470	0.530	1.000		1.000
Critical Headway, s	4.293	4.113	4.293	4.113	4.113		4.113
Entry Flow, veh/h	527	594	759	855	81	483	66
Cap Entry Lane, veh/h	765	785	1046	1051	524	1976	360
Entry HV Adj Factor	0.961	0.962	0.961	0.962	0.962	0.962	0.957
Flow Entry, veh/h	506	571	730	823	78	464	63
Cap Entry, veh/h	735	755	1005	1012	504	1900	344
V/C Ratio	0.689	0.757	0.726	0.813	0.155	0.244	0.184
Control Delay, s/veh	18.5	21.8	16.0	21.0	9.2	0.0	13.7
LOS	C	C	C	C	A	A	B
95th %tile Queue, veh	6	7	7	9	1	1	1

HCM research expects at least one 'Stop' controlled approach at the intersection.

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	484	285	521
Demand Flow Rate, veh/h	503	296	541
Vehicles Circulating, veh/h	139	374	129
Vehicles Exiting, veh/h	531	268	541
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	10.3	9.6	10.9
Approach LOS	B	A	B

Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	503	296	541
Cap Entry Lane, veh/h	983	777	993
Entry HV Adj Factor	0.962	0.963	0.963
Flow Entry, veh/h	484	285	521
Cap Entry, veh/h	946	749	956
V/C Ratio	0.512	0.381	0.545
Control Delay, s/veh	10.3	9.6	10.9
LOS	B	A	B
95th %tile Queue, veh	3	2	3

HCM research expects at least one 'Stop' controlled approach at the intersection.

Appendix 7: Large Size Graphics of Alternatives

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\004_Goodwin_Rd.dgn		
TIME	3:51:15 PM	RELEASE FOR CONSTRUCTION RECORD	
DATE	3/11/2015		
PLOTTED BY	dbrinkmann		
DESIGNED BY			
ENTERED BY			
CHECKED BY			
DQAM AUDIT DATE:			
	DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN RD OPTION 1

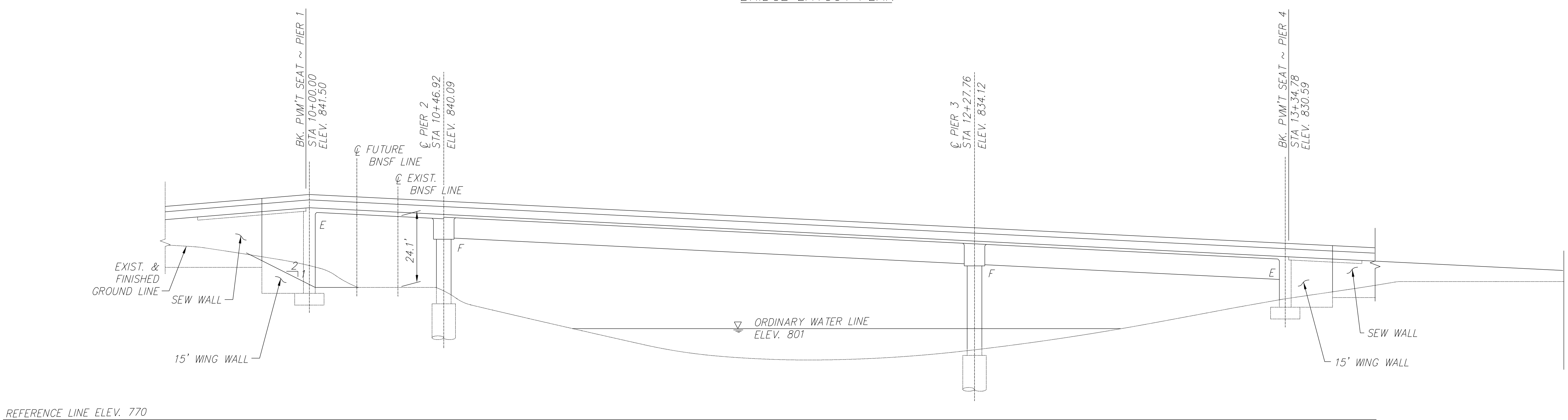
PLAN REF NO

SHEET

OF

SHEETS

BRIDGE LAYOUT PLAN



ELEVATION
GRADE ELEVATIONS SHOWN ARE FINISH GRADES
ALONG PROFILE GRADE LINE FOR GOODWIN LINE

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\005_BridgeLayout_BR1-1.dgn
TIME	3:52:57 PM
DATE	3/11/2015
PLOTTED BY	dbrinkmann
DESIGNED BY	
ENTERED BY	
CHECKED BY	
DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN BRIDGE WENATCHEE RIVER
BRIDGE LAYOUT OPTION 1

PLAN REF NO

SHEET
OF
SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\006_Goodwin_Rd _ALT.dgn			
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DATE	3/11/2015			
PLOTTED BY	dbrinkmann			
DESIGNED BY				
ENTERED BY				
CHECKED BY				
DQAM AUDIT DATE:				
		DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN RD OPTION 2

PLAN REF NO

SHEET

OF

SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\007_Goodwin_Rd_Over US2.dgn
TIME	3:55:35 PM
DATE	3/11/2015
PLOTTED BY	dbrinkmann
DESIGNED BY	
ENTERED BY	
CHECKED BY	
DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN RD OPTION 3

PLAN REF NO

SHEET

OF

SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\008_Goodwin_Rd_to_HayCanyon.dgn
TIME	8:10:31 AM
DATE	3/12/2015
PLOTTED BY	dbrinkmann
DESIGNED BY	
ENTERED BY	
CHECKED BY	
DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN RD OPTIONS 4

PLAN REF NO

SHEET

OF

SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\001_Orchard Dr.dgn		
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DATE	5/28/2015		
PLOTTED BY	dbrinkmann		
DESIGNED BY			
ENTERED BY			
CHECKED BY			
DQAM AUDIT DATE:			
	DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

ORCHARD DR ALIGNMENT OPTION 1

PLAN REF NO

SHEET

OF

SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\002_Orchard_Dr_ALT.dgn			
TIME	10:36:00 AM	RELEASE FOR CONSTRUCTION RECORD		
DATE	5/28/2015			
PLOTTED BY	dbrinkmann			
DESIGNED BY				
ENTERED BY				
CHECKED BY				
DQAM AUDIT DATE:				
		DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

COUNTY OF CHELAN EST. 1899

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

ORCHARD DR ALIGNMENT OPTION 2

PLAN REF NO

SHEET

OF

SHEETS

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DATE	5/28/2015
PLOTTED BY	dbrinkmann
DESIGNED BY	
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DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

COUNTY OF CHELAN EST. 1899

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

ORCHARD DR ALIGNMENT
WENATCHEE RIVER BRIDGE LAYOUT

PLAN REF NO

SHEET

OF

SHEETS

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DQAM AUDIT DATE:			
	DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

COUNTY OF CHELAN EST. 1899

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

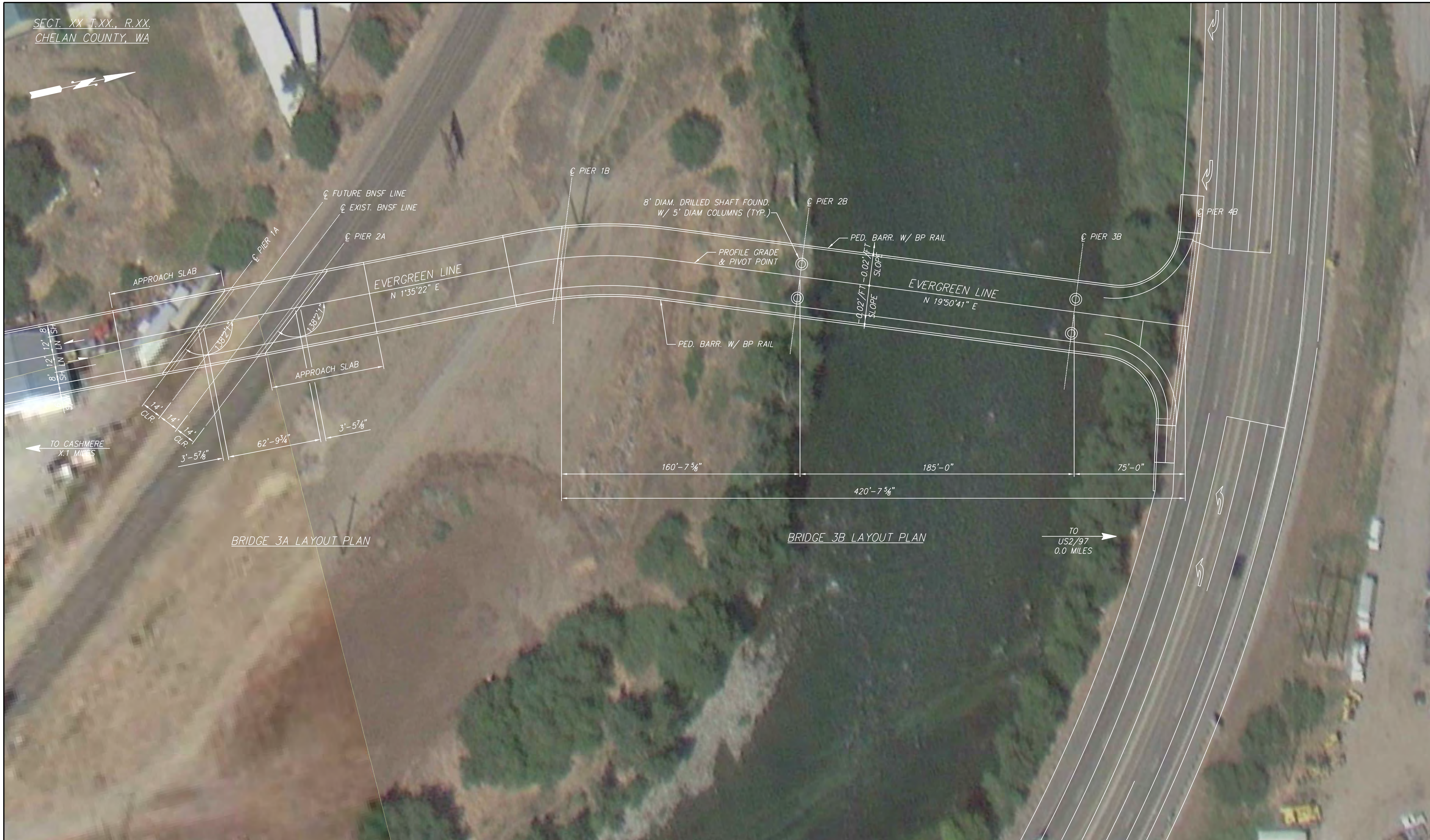
EVERGREEN DRIVE

PLAN REF NO

SHEET

OF

SHEETS



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DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

EVERGREEN ALIGNMENT
WENATCHEE RIVER BRIDGE LAYOUT

PLAN REF NO

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OF

SHEETS

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PLOTTED BY	dbrinkmann			
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CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

COTLETS WAY OPTION 1

PLAN REF NO

SHEET

OF

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FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\012_Cottage Ave_Alt1.dgn		
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	DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

COTLETS WAY OPTION 2

PLAN REF NO

SHEET

OF

SHEETS

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DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

COTLETS WAY OPTION 3

PLAN REF NO

SHEET

OF

SHEETS

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DESIGNED BY				
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		DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

COUNTY OF CHELAN EST. 1899

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

APLETS WAY OPTION 1

PLAN REF NO

SHEET

OF

SHEETS

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DATE	3/12/2015			
PLOTTED BY	dbrinkmann			
DESIGNED BY				
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DQAM AUDIT DATE:				
		DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

APLETS WAY OPTION 2

PLAN REF NO

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OF

SHEETS

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DATE	3/4/2015
PLOTTED BY	rhoward
DESIGNED BY	
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DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

COUNTY OF CHELAN EST. 1899

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN RD - SIGNAL OPTION

PLAN REF NO

SHEET
OF
SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Limits of Intersection Costs\Limit_Goodwin Rd _ALT.dgn			
TIME	11:26:53 AM	RELEASE FOR CONSTRUCTION RECORD		
DATE	3/4/2015			
PLOTTED BY	rhoward			
DESIGNED BY				
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DQAM AUDIT DATE:				
		DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

GOODWIN RD - ROUNDABOUT OPTION

PLAN REF NO

SHEET

OF

SHEETS

FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\EXHIBIT_Goodwin_Sunset Improvments.dgn			
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PLOTTED BY	rhoward			
DESIGNED BY				
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CHECKED BY				
DQAM AUDIT DATE:				
		DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

COUNTY OF CHELAN EST. 1899

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

SUNSET AND GOODWIN IMPROVMENTS

PLAN REF NO

SHEET

OF

SHEETS

Appendix 8: Cost Estimate

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **100.00** Ending ARM: **100.27** Length(mile): **0.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvements Only)**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**0**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$125**	**$167**
Right Of Way:	**$10**	**$13**
Environmental Mitigation:	**$89**	**$119**
Construction:	**$1,480**	**$1,974**
Total Project Cost:	**$1,705**	**$2,273**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **100.00** Ending ARM: **100.27** Length(mile): **0.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvements Only)**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

# of Build Lane(s) in NB/EB Direction: **0**

# of Build Lane(s) in SB/WB Direction: **0**

Improvement Type: **GP**

Terrain Type: **R**

CONTINGENCY $139,000

RIGHT-OF-WAY $11,000

CONSTRUCTION / PREPARATION

Mobilization:	$119,000
Utility Relocation:	$3,000
Grading:	$103,000
Staging:	$12,000
Construction Engineering:	$237,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$788,000
Noise Walls:	$0

PAVEMENT $50,000

ENVIRONMENTAL MITIGATION

Drainage:	$46,000
Stormwater Detention and Treatment:	$14,000
Temporary Water Pollution Control:	$12,000
Wetland Mitigation:	$0
Roadside Development:	$27,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$160,000
Workzone Traffic Control:	$59,000

ADDITIONAL ITEMS $0

SALES TAX $114,000

Project Cost Summary:

	Low	High
PE	$125,000	$167,000
ROW	$10,000	$13,000
CN	$1,570,000	$2,093,000
Total	$1,705,000	$2,273,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **100.00** EARM: **100.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvemen**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	0.48	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	0.27	$10,000	per Lump sum
Roadway excavation (CY):	7,159	$4	per CY
Gravel borrow/embankment compaction (Ton):	11,932	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	27	$1,600	per LF
Ditch excavation (LF):	371	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	21,000	$0.36	per SF
Water quality pond (SF of imperv surface):	25,200	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	10,500	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.00** EARM: **100.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	0	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	16,800	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	0.48	1,500	per Acre
Roadside Restoration (Lump sum):	0.27	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.00** EARM: **100.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	163	$13	per LF
Guardrail terminal (Each):	1	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	0.27	$200,000	per Lump sum
Signing (Lump sum):	0.27	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	2,800	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.40	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.00** EARM: **100.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$103,213**
	Clear and grub (Acre):	$334
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$2,652
	Roadway excavation (CY):	$28,636
	Gravel borrow/embankment compaction (Ton):	$71,591
DRAINAGE	**Drainage Total:**	**$45,765**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$42,424
	Ditch excavation (LF):	$3,341
STORMWATER DETENTION AND TREATMENT	**Total:**	**$13,608**
	Detention pond (SF of new impervious surface):	$7,560
	Water quality pond (SF of new impervious surface):	$6,048
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$787,500**
	Retaining walls (SF):	$787,500
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.00** EARM: **100.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$0**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$50,400**
Asphalt Concrete Pavement, ACP (SF):	$50,400
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$27,231**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$716
Roadside Restoration (Lump sum):	$26,515

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.00** EARM: **100.27**

Project Title: **West Cashmere Alignment Option 1 (West Approach Roadway Improvemen**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY		
	Traffic Total:	**$160,347**
	Guardrail (LF):	$2,116
	Guardrail terminal (Each):	$902
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$6,629
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$700
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$10,800**
	Vacant land (Acre):	$10,800
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **100.01** Ending ARM: **100.40** Length(mile): **0.39**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvements only)**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**2**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$331**	**$442**
Right Of Way:	**$10**	**$13**
Environmental Mitigation:	**$603**	**$804**
Construction:	**$3,445**	**$4,594**
Total Project Cost:	**$4,389**	**$5,852**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **100.01** Ending ARM: **100.40** Length(mile): **0.39**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvements only)**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

# of Build Lane(s) in NB/EB Direction: **2**

# of Build Lane(s) in SB/WB Direction: **2**

Improvement Type: **GP**

Terrain Type: **R**

CONTINGENCY $368,000

RIGHT-OF-WAY $11,000

CONSTRUCTION / PREPARATION

Mobilization: $314,000

Utility Relocation: $8,000

Grading: $762,000

Staging: $31,000

Construction Engineering: $515,000

STRUCTURES

Bridges and Tunnels: $0

Retaining Walls: $788,000

Noise Walls: $0

PAVEMENT $372,000

ENVIRONMENTAL MITIGATION

Drainage: $338,000

Stormwater Detention and Treatment: $100,000

Temporary Water Pollution Control: $31,000

Wetland Mitigation: $0

Roadside Development: $201,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety: $578,000

Workzone Traffic Control: $157,000

ADDITIONAL ITEMS $0

SALES TAX $302,000

Project Cost Summary:

	Low	High
PE	$331,000	$442,000
ROW	$10,000	$13,000
CN	$4,048,000	$5,398,000
Total	$4,389,000	$5,852,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **100.01** EARM: **100.40**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	3.52	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	1.96	$10,000	per Lump sum
Roadway excavation (CY):	52,859	$4	per CY
Gravel borrow/embankment compaction (Ton):	88,098	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	196	$1,600	per LF
Ditch excavation (LF):	2,741	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	155,052	$0.36	per SF
Water quality pond (SF of imperv surface):	186,062	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	10,500	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.01** EARM: **100.40**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvemen**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	0	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	124,041	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	3.52	1,500	per Acre
Roadside Restoration (Lump sum):	1.96	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.01** EARM: **100.40**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,348	$13	per LF
Guardrail terminal (Each):	4	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	1	$500,000	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	1.96	$200,000	per Lump sum
Signing (Lump sum):	1.96	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	20,674	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.40	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.01** EARM: **100.40**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$762,064**
	Clear and grub (Acre):	$2,467
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$19,577
	Roadway excavation (CY):	$211,434
	Gravel borrow/embankment compaction (Ton):	$528,586
DRAINAGE	**Drainage Total:**	**$337,903**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$313,236
	Ditch excavation (LF):	$24,667
STORMWATER DETENTION AND TREATMENT	**Total:**	**$100,474**
	Detention pond (SF of new impervious surface):	$55,819
	Water quality pond (SF of new impervious surface):	$44,655
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$787,500**
	Retaining walls (SF):	$787,500
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.01** EARM: **100.40**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Bridge Total:	**$0**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$372,124**
Asphalt Concrete Pavement, ACP (SF):	$372,124
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$201,058**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$5,286
Roadside Restoration (Lump sum):	$195,772

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.01** EARM: **100.40**

Project Title: **West Cashmere Alignment Option 2 (West Approach Roadway improvemen**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$578,287**
	Guardrail (LF):	$17,519
	Guardrail terminal (Each):	$6,656
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$0
	Roundabout (Each):	$500,000
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$48,943
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$5,168
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$10,800**
	Vacant land (Acre):	$10,800
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **100.41** Ending ARM: **100.74** Length(mile): **0.33**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of Build Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

# of Build Lane(s) in SB/WB Direction: **0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$282**	**$376**
Right Of Way:	**$4**	**$6**
Environmental Mitigation:	**$99**	**$132**
Construction:	**$3,346**	**$4,462**
Total Project Cost:	**$3,731**	**$4,975**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **100.41** Ending ARM: **100.74** Length(mile): **0.33**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane(s) in NB/EB Direction: **0** # of Build Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0** # of Build Lane(s) in SB/WB Direction: **0**

Improvement Type: **GP** Terrain Type: **R**

CONTINGENCY $313,000

RIGHT-OF-WAY $5,000

CONSTRUCTION / PREPARATION

Mobilization:	$267,000
Utility Relocation:	$7,000
Grading:	$100,000
Staging:	$27,000
Construction Engineering:	$439,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$2,280,000
Noise Walls:	$0

PAVEMENT $49,000

ENVIRONMENTAL MITIGATION

Drainage:	$44,000
Stormwater Detention and Treatment:	$13,000
Temporary Water Pollution Control:	$27,000
Wetland Mitigation:	$0
Roadside Development:	$26,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$160,000
Workzone Traffic Control:	$134,000

ADDITIONAL ITEMS $0

SALES TAX $257,000

Project Cost Summary:

	Low	High
PE	$282,000	$376,000
ROW	$4,000	$6,000
CN	$3,445,000	$4,594,000
Total	$3,731,000	$4,975,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	0.46	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	0.26	$10,000	per Lump sum
Roadway excavation (CY):	6,903	$4	per CY
Gravel borrow/embankment compaction (Ton):	11,506	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	26	$1,600	per LF
Ditch excavation (LF):	358	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	20,250	$0.36	per SF
Water quality pond (SF of imperv surface):	24,300	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	30,400	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	0	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	16,200	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	0.46	1,500	per Acre
Roadside Restoration (Lump sum):	0.26	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	169	$13	per LF
Guardrail terminal (Each):	1	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	0.26	$200,000	per Lump sum
Signing (Lump sum):	0.26	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	2,700	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.17	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$99,527**
	Clear and grub (Acre):	$322
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$2,557
	Roadway excavation (CY):	$27,614
	Gravel borrow/embankment compaction (Ton):	$69,034
DRAINAGE	**Drainage Total:**	**$44,131**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$40,909
	Ditch excavation (LF):	$3,222
STORMWATER DETENTION AND TREATMENT	**Total:**	**$13,122**
	Detention pond (SF of new impervious surface):	$7,290
	Water quality pond (SF of new impervious surface):	$5,832
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$2,280,000**
	Retaining walls (SF):	$2,280,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$0**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$48,600**
Asphalt Concrete Pavement, ACP (SF):	$48,600
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$26,259**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$690
Roadside Restoration (Lump sum):	$25,568

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Option 1 (Intersection Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **0** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$160,136**
	Guardrail (LF):	$2,200
	Guardrail terminal (Each):	$869
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$6,392
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$675
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$4,590**
	Vacant land (Acre):	$4,590
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **100.41** Ending ARM: **100.74** Length(mile): **0.33**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**2**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$474**	**$632**
Right Of Way:	**$170**	**$227**
Environmental Mitigation:	**$543**	**$724**
Construction:	**$5,160**	**$6,880**
Total Project Cost:	**$6,347**	**$8,462**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **100.41** Ending ARM: **100.74** Length(mile): **0.33**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane(s) in NB/EB Direction: **0**
# of Build Lane(s) in NB/EB Direction: **2**
# of NoBuild Lane(s) in SB/WB Direction: **0**
# of Build Lane(s) in SB/WB Direction: **2**
Improvement Type: **GP**
Terrain Type: **R**

CONTINGENCY $527,000

RIGHT-OF-WAY $189,000

CONSTRUCTION / PREPARATION

Mobilization: $450,000
Utility Relocation: $11,000
Grading: $665,000
Staging: $45,000
Construction Engineering: $633,000

STRUCTURES

Bridges and Tunnels: $0
Retaining Walls: $2,280,000
Noise Walls: $0

PAVEMENT $325,000

ENVIRONMENTAL MITIGATION

Drainage: $295,000
Stormwater Detention and Treatment: $88,000
Temporary Water Pollution Control: $45,000
Wetland Mitigation: $0
Roadside Development: $175,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety: $668,000
Workzone Traffic Control: $225,000

ADDITIONAL ITEMS $0

SALES TAX $432,000

Project Cost Summary:

	Low	High
PE	$474,000	$632,000
ROW	$170,000	$227,000
CN	$5,702,000	$7,603,000
Total	$6,347,000	$8,462,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	3.07	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	1.71	$10,000	per Lump sum
Roadway excavation (CY):	46,122	$4	per CY
Gravel borrow/embankment compaction (Ton):	76,871	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	171	$1,600	per LF
Ditch excavation (LF):	2,392	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	135,292	$0.36	per SF
Water quality pond (SF of imperv surface):	162,351	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	30,400	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	0	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	108,234	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	3.07	1,500	per Acre
Roadside Restoration (Lump sum):	1.71	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,186	$13	per LF
Guardrail terminal (Each):	3	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	1	$600,000	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	1.71	$200,000	per Lump sum
Signing (Lump sum):	1.71	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	18,039	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.17	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.50	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$664,947**
	Clear and grub (Acre):	$2,152
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$17,082
	Roadway excavation (CY):	$184,489
	Gravel borrow/embankment compaction (Ton):	$461,223
DRAINAGE	**Drainage Total:**	**$294,841**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$273,318
	Ditch excavation (LF):	$21,524
STORMWATER DETENTION AND TREATMENT	**Total:**	**$87,669**
	Detention pond (SF of new impervious surface):	$48,705
	Water quality pond (SF of new impervious surface):	$38,964
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$2,280,000**
	Retaining walls (SF):	$2,280,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Bridge Total:	**$0**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$324,701**
Asphalt Concrete Pavement, ACP (SF):	$324,701
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$175,436**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$4,612
Roadside Restoration (Lump sum):	$170,823

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **100.41** EARM: **100.74**

Project Title: **Goodwin Road Roundabout Option 2 (Intersection Improvements Only)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$668,441**
	Guardrail (LF):	$15,418
	Guardrail terminal (Each):	$5,808
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$0
	Roundabout (Each):	$600,000
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$42,706
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$4,510
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$188,590**
	Vacant land (Acre):	$4,590
	Residential land (Acre):	$0
	Commercial land (Acre):	$184,000
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002**	Beginning ARM: **101.51**	Ending ARM: **101.82**	Length(mile): **0.31**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**2**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$373**	**$497**
Right Of Way:	**$67**	**$89**
Environmental Mitigation:	**$692**	**$923**
Construction:	**$3,867**	**$5,156**
Total Project Cost:	**$4,999**	**$6,665**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

*** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **101.51** Ending ARM: **101.82** Length(mile): **0.31**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane(s) in NB/EB Direction: **0**   # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0**   # of Build Lane(s) in SB/WB Direction: **2**

Improvement Type: **GP**   Terrain Type: **R**

CONTINGENCY $414,000

RIGHT-OF-WAY $74,000

CONSTRUCTION / PREPARATION

Mobilization:	$354,000
Utility Relocation:	$9,000
Grading:	$875,000
Staging:	$35,000
Construction Engineering:	$580,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$510,000
Noise Walls:	$0

PAVEMENT $427,000

ENVIRONMENTAL MITIGATION

Drainage:	$388,000
Stormwater Detention and Treatment:	$115,000
Temporary Water Pollution Control:	$35,000
Wetland Mitigation:	$0
Roadside Development:	$231,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$989,000
Workzone Traffic Control:	$177,000

ADDITIONAL ITEMS $0

SALES TAX $340,000

Project Cost Summary:

	Low	High
PE	$373,000	$497,000
ROW	$67,000	$89,000
CN	$4,559,000	$6,079,000
Total	$4,999,000	$6,665,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **101.51** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	4.05	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	2.25	$10,000	per Lump sum
Roadway excavation (CY):	60,690	$4	per CY
Gravel borrow/embankment compaction (Ton):	101,150	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	225	$1,600	per LF
Ditch excavation (LF):	3,147	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	178,024	$0.36	per SF
Water quality pond (SF of imperv surface):	213,629	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	6,800	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.51** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75 per SF
Bridge widening (SF):	0	250 per SF
Bridge - span up to 140' (SF):	0	150 per SF
Bridge - span up to 200' (SF):	0	200 per SF
Bridge - span up to 400' (SF):	0	300 per SF
Bridge - span more than 400' (SF):	0	325 per SF
Floating bridge (SF):	0	440 per SF
Movable bridge (SF):	0	1,650 per SF
Lids without Ventilation (SF):	0	150 per SF
Tunnel (LF):	0	71,500 per LF
Pedestrian Bridge (SF):	0	140 per SF
Railroad bridge replacement (LF):	0	11,000 per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	142,419	$3.00 per SF
PCC Pavement (SF):	0	$5.52 per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15 per LF
Seeding, mulching and fertilizing (Acre):	4.05	1,500 per Acre
Roadside Restoration (Lump sum):	2.25	100,000 per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.51** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,456	$13	per LF
Guardrail terminal (Each):	4	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	1	$750,000	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	2.25	$200,000	per Lump sum
Signing (Lump sum):	2.25	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	23,737	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	2.75	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.51** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$874,969**
	Clear and grub (Acre):	$2,832
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$22,478
	Roadway excavation (CY):	$242,760
	Gravel borrow/embankment compaction (Ton):	$606,899
DRAINAGE	**Drainage Total:**	**$387,966**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$359,644
	Ditch excavation (LF):	$28,322
STORMWATER DETENTION AND TREATMENT	**Total:**	**$115,359**
	Detention pond (SF of new impervious surface):	$64,089
	Water quality pond (SF of new impervious surface):	$51,271
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$510,000**
	Retaining walls (SF):	$510,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.51** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES		
	Bridge Total:	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$427,257**
	Asphalt Concrete Pavement, ACP (SF):	$427,257
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$230,847**
	Fencing (LF):	$0
	Seeding, mulching and fertilizing (Acre):	$6,069
	Roadside Restoration (Lump sum):	$224,778

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.51** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave Roundabout & signal option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$988,701**
	Guardrail (LF):	$18,930
	Guardrail terminal (Each):	$7,642
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$750,000
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$56,194
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$5,934
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$74,250**
	Vacant land (Acre):	$74,250
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002**	Beginning ARM: **101.50**	Ending ARM: **101.82**	Length(mile): **0.32**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	2
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	2

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$418**	**$558**
Right Of Way:	**$67**	**$89**
Environmental Mitigation:	**$707**	**$942**
Construction:	**$4,407**	**$5,876**
Total Project Cost:	**$5,599**	**$7,465**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

****** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **101.50** Ending ARM: **101.82** Length(mile): **0.32**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane(s) in NB/EB Direction: **0** # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0** # of Build Lane(s) in SB/WB Direction: **2**

Improvement Type: **GP** Terrain Type: **R**

CONTINGENCY $465,000

RIGHT-OF-WAY $74,000

CONSTRUCTION / PREPARATION

Mobilization: $397,000

Utility Relocation: $10,000

Grading: $888,000

Staging: $40,000

Construction Engineering: $651,000

STRUCTURES

Bridges and Tunnels: $0

Retaining Walls: $510,000

Noise Walls: $0

PAVEMENT $433,000

ENVIRONMENTAL MITIGATION

Drainage: $394,000

Stormwater Detention and Treatment: $117,000

Temporary Water Pollution Control: $40,000

Wetland Mitigation: $0

Roadside Development: $234,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety: $1,390,000

Workzone Traffic Control: $198,000

ADDITIONAL ITEMS $0

SALES TAX $381,000

Project Cost Summary:

	Low	High
PE	$418,000	$558,000
ROW	$67,000	$89,000
CN	$5,114,000	$6,818,000
Total	$5,599,000	$7,465,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	Quantity	Unit Cost	Unit
Clear and grub (Acre):	4.10	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	2.28	$10,000	per Lump sum
Roadway excavation (CY):	61,565	$4	per CY
Gravel borrow/embankment compaction (Ton):	102,608	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	228	$1,600	per LF
Ditch excavation (LF):	3,192	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	180,591	$0.36	per SF
Water quality pond (SF of imperv surface):	216,709	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	6,800	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75 per SF
Bridge widening (SF):	0	250 per SF
Bridge - span up to 140' (SF):	0	150 per SF
Bridge - span up to 200' (SF):	0	200 per SF
Bridge - span up to 400' (SF):	0	300 per SF
Bridge - span more than 400' (SF):	0	325 per SF
Floating bridge (SF):	0	440 per SF
Movable bridge (SF):	0	1,650 per SF
Lids without Ventilation (SF):	0	150 per SF
Tunnel (LF):	0	71,500 per LF
Pedestrian Bridge (SF):	0	140 per SF
Railroad bridge replacement (LF):	0	11,000 per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	144,473	$3.00 per SF
PCC Pavement (SF):	0	$5.52 per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15 per LF
Seeding, mulching and fertilizing (Acre):	4.10	1,500 per Acre
Roadside Restoration (Lump sum):	2.28	100,000 per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Project Quantity and Unit Cost

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,479	$13	per LF
Guardrail terminal (Each):	5	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	2	$650,000	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	2.28	$200,000	per Lump sum
Signing (Lump sum):	2.28	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	24,079	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	2.75	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$887,585**
	Clear and grub (Acre):	$2,873
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$22,802
	Roadway excavation (CY):	$246,260
	Gravel borrow/embankment compaction (Ton):	$615,650
DRAINAGE	**Drainage Total:**	**$393,560**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$364,830
	Ditch excavation (LF):	$28,730
STORMWATER DETENTION AND TREATMENT	**Total:**	**$117,023**
	Detention pond (SF of new impervious surface):	$65,013
	Water quality pond (SF of new impervious surface):	$52,010
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$510,000**
	Retaining walls (SF):	$510,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**
# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES	**Bridge Total:**	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$433,418**
	Asphalt Concrete Pavement, ACP (SF):	$433,418
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$234,175**
	Fencing (LF):	$0
	Seeding, mulching and fertilizing (Acre):	$6,157
	Roadside Restoration (Lump sum):	$228,019

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Ave two Roundabouts Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$1,390,002**
	Guardrail (LF):	$19,225
	Guardrail terminal (Each):	$7,753
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$0
	Roundabout (Each):	$1,300,000
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$57,005
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$6,020
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$74,250**
	Vacant land (Acre):	$74,250
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **101.50** Ending ARM: **101.82** Length(mile): **0.32**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane(s) in NB/EB Direction: **0** # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0** # of Build Lane(s) in SB/WB Direction: **2**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$313**	**$418**
Right Of Way:	**$67**	**$89**
Environmental Mitigation:	**$698**	**$931**
Construction:	**$3,131**	**$4,175**
Total Project Cost:	**$4,209**	**$5,612**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

** This estimate is based on little or no design work, and hence intended for use for planning purposes only.*

Date Printed: ***Monday, January 05, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **101.50** Ending ARM: **101.82** Length(mile): **0.32**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane(s) in NB/EB Direction: **0** # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0** # of Build Lane(s) in SB/WB Direction: **2**

Improvement Type: **GP** Terrain Type: **R**

CONTINGENCY $348,000

RIGHT-OF-WAY $74,000

CONSTRUCTION / PREPARATION

Mobilization: $297,000

Utility Relocation: $7,000

Grading: $889,000

Staging: $30,000

Construction Engineering: $487,000

STRUCTURES

Bridges and Tunnels: $0

Retaining Walls: $510,000

Noise Walls: $0

PAVEMENT $434,000

ENVIRONMENTAL MITIGATION

Drainage: $394,000

Stormwater Detention and Treatment: $117,000

Temporary Water Pollution Control: $30,000

Wetland Mitigation: $0

Roadside Development: $235,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety: $390,000

Workzone Traffic Control: $148,000

ADDITIONAL ITEMS $0

SALES TAX $285,000

Project Cost Summary:

	Low	High
PE	$313,000	$418,000
ROW	$67,000	$89,000
CN	$3,830,000	$5,106,000
Total	$4,209,000	$5,612,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	4.11	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	2.28	$10,000	per Lump sum
Roadway excavation (CY):	61,662	$4	per CY
Gravel borrow/embankment compaction (Ton):	102,770	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	228	$1,600	per LF
Ditch excavation (LF):	3,197	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	180,876	$0.36	per SF
Water quality pond (SF of imperv surface):	217,051	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	6,800	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75 per SF
Bridge widening (SF):	0	250 per SF
Bridge - span up to 140' (SF):	0	150 per SF
Bridge - span up to 200' (SF):	0	200 per SF
Bridge - span up to 400' (SF):	0	300 per SF
Bridge - span more than 400' (SF):	0	325 per SF
Floating bridge (SF):	0	440 per SF
Movable bridge (SF):	0	1,650 per SF
Lids without Ventilation (SF):	0	150 per SF
Tunnel (LF):	0	71,500 per LF
Pedestrian Bridge (SF):	0	140 per SF
Railroad bridge replacement (LF):	0	11,000 per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	144,701	$3.00 per SF
PCC Pavement (SF):	0	$5.52 per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15 per LF
Seeding, mulching and fertilizing (Acre):	4.11	1,500 per Acre
Roadside Restoration (Lump sum):	2.28	100,000 per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,481	$13	per LF
Guardrail terminal (Each):	5	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	2	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	2.28	$200,000	per Lump sum
Signing (Lump sum):	2.28	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	24,117	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	2.75	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$888,987**
	Clear and grub (Acre):	$2,878
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$22,838
	Roadway excavation (CY):	$246,649
	Gravel borrow/embankment compaction (Ton):	$616,622
DRAINAGE	**Drainage Total:**	**$394,182**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$365,406
	Ditch excavation (LF):	$28,776
STORMWATER DETENTION AND TREATMENT	**Total:**	**$117,208**
	Detention pond (SF of new impervious surface):	$65,115
	Water quality pond (SF of new impervious surface):	$52,092
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$510,000**
	Retaining walls (SF):	$510,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES	**Bridge Total:**	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$434,102**
	Asphalt Concrete Pavement, ACP (SF):	$434,102
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$234,545**
	Fencing (LF):	$0
	Seeding, mulching and fertilizing (Acre):	$6,166
	Roadside Restoration (Lump sum):	$228,379

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Project Cost: Detailed Report

SR: **002** BARM: **101.50** EARM: **101.82**

Project Title: **US 2/97 Cashmere Area (Cottage Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$390,147**
	Guardrail (LF):	$19,258
	Guardrail terminal (Each):	$7,765
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$300,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$57,095
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$6,029
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$74,250**
	Vacant land (Acre):	$74,250
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **101.01** Ending ARM: **101.38** Length(mile): **0.37**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**2**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$458**	**$611**
Right Of Way:	**$56**	**$74**
Environmental Mitigation:	**$618**	**$824**
Construction:	**$4,888**	**$6,517**
Total Project Cost:	**$6,020**	**$8,027**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

** This estimate is based on little or no design work, and hence intended for use for planning purposes only.*

Date Printed: ***Monday, January 05, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **101.01** Ending ARM: **101.38** Length(mile): **0.37**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane(s) in NB/EB Direction: **0**   # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0**   # of Build Lane(s) in SB/WB Direction: **2**

Improvement Type: **GP**   Terrain Type: **R**

CONTINGENCY	$509,000
RIGHT-OF-WAY	$62,000
CONSTRUCTION / PREPARATION	
Mobilization:	$434,000
Utility Relocation:	$11,000
Grading:	$768,000
Staging:	$43,000
Construction Engineering:	$611,000
STRUCTURES	
Bridges and Tunnels:	$0
Retaining Walls:	$1,725,000
Noise Walls:	$0
PAVEMENT	$375,000

ENVIRONMENTAL MITIGATION	
Drainage:	$340,000
Stormwater Detention and Treatment:	$101,000
Temporary Water Pollution Control:	$43,000
Wetland Mitigation:	$0
Roadside Development:	$203,000
TRAFFIC/TRAIL	
Traffic/Trail Services and Safety:	$829,000
Workzone Traffic Control:	$217,000
ADDITIONAL ITEMS	$0
SALES TAX	$417,000

Project Cost Summary:

	Low	High
PE	$458,000	$611,000
ROW	$56,000	$74,000
CN	$5,506,000	$7,342,000
Total	$6,020,000	$8,027,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **101.01** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	3.55	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	1.97	$10,000	per Lump sum
Roadway excavation (CY):	53,255	$4	per CY
Gravel borrow/embankment compaction (Ton):	88,758	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	197	$1,600	per LF
Ditch excavation (LF):	2,761	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	156,214	$0.36	per SF
Water quality pond (SF of imperv surface):	187,457	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	23,000	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.01** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75 per SF
Bridge widening (SF):	0	250 per SF
Bridge - span up to 140' (SF):	0	150 per SF
Bridge - span up to 200' (SF):	0	200 per SF
Bridge - span up to 400' (SF):	0	300 per SF
Bridge - span more than 400' (SF):	0	325 per SF
Floating bridge (SF):	0	440 per SF
Movable bridge (SF):	0	1,650 per SF
Lids without Ventilation (SF):	0	150 per SF
Tunnel (LF):	0	71,500 per LF
Pedestrian Bridge (SF):	0	140 per SF
Railroad bridge replacement (LF):	0	11,000 per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	124,972	$3.00 per SF
PCC Pavement (SF):	0	$5.52 per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15 per LF
Seeding, mulching and fertilizing (Acre):	3.55	1,500 per Acre
Roadside Restoration (Lump sum):	1.97	100,000 per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.01** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,361	$13	per LF
Guardrail terminal (Each):	4	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	1	$750,000	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	1.97	$200,000	per Lump sum
Signing (Lump sum):	1.97	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	20,829	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	2.30	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.01** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$767,778**
	Clear and grub (Acre):	$2,485
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$19,724
	Roadway excavation (CY):	$213,020
	Gravel borrow/embankment compaction (Ton):	$532,549
DRAINAGE	**Drainage Total:**	**$340,437**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$315,585
	Ditch excavation (LF):	$24,852
STORMWATER DETENTION AND TREATMENT	**Total:**	**$101,227**
	Detention pond (SF of new impervious surface):	$56,237
	Water quality pond (SF of new impervious surface):	$44,990
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$1,725,000**
	Retaining walls (SF):	$1,725,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.01** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES	**Bridge Total:**	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$374,915**
	Asphalt Concrete Pavement, ACP (SF):	$374,915
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$202,566**
	Fencing (LF):	$0
	Seeding, mulching and fertilizing (Acre):	$5,325
	Roadside Restoration (Lump sum):	$197,240

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.01** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Roundabout Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$828,918**
	Guardrail (LF):	$17,695
	Guardrail terminal (Each):	$6,706
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$0
	Roundabout (Each):	$750,000
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$49,310
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$5,207
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$62,100**
	Vacant land (Acre):	$62,100
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **101.00** Ending ARM: **101.38** Length(mile): **0.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane(s) in NB/EB Direction: **0** # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0** # of Build Lane(s) in SB/WB Direction: **2**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$418**	**$557**
Right Of Way:	**$56**	**$74**
Environmental Mitigation:	**$683**	**$911**
Construction:	**$4,421**	**$5,894**
Total Project Cost:	**$5,577**	**$7,436**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

This estimate is based on little or no design work, and hence intended for use for planning purposes only.

Date Printed: ***Monday, January 05, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **101.00** Ending ARM: **101.38** Length(mile): **0.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

Improvement Type: **GP**

# of Build Lane(s) in NB/EB Direction: **2**

# of Build Lane(s) in SB/WB Direction: **2**

Terrain Type: **R**

CONTINGENCY	$464,000
RIGHT-OF-WAY	$62,000
CONSTRUCTION / PREPARATION	
Mobilization:	$396,000
Utility Relocation:	$10,000
Grading:	$857,000
Staging:	$40,000
Construction Engineering:	$650,000
STRUCTURES	
Bridges and Tunnels:	$0
Retaining Walls:	$1,725,000
Noise Walls:	$0
PAVEMENT	$419,000
ENVIRONMENTAL MITIGATION	
Drainage:	$380,000
Stormwater Detention and Treatment:	$113,000
Temporary Water Pollution Control:	$40,000
Wetland Mitigation:	$0
Roadside Development:	$226,000
TRAFFIC/TRAIL	
Traffic/Trail Services and Safety:	$238,000
Workzone Traffic Control:	$198,000
ADDITIONAL ITEMS	$0
SALES TAX	$381,000

Project Cost Summary:

	Low	High
PE	$418,000	$557,000
ROW	$56,000	$74,000
CN	$5,104,000	$6,805,000
Total	$5,577,000	$7,436,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, January 05, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **101.00** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	3.96	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	2.20	$10,000	per Lump sum
Roadway excavation (CY):	59,449	$4	per CY
Gravel borrow/embankment compaction (Ton):	99,081	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	220	$1,600	per LF
Ditch excavation (LF):	3,083	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	174,383	$0.36	per SF
Water quality pond (SF of imperv surface):	209,260	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	23,000	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Project Quantity and Unit Cost

SR: **002** BARM: **101.00** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES

Removal of existing bridges (SF):	0	75 per SF
Bridge widening (SF):	0	250 per SF
Bridge - span up to 140' (SF):	0	150 per SF
Bridge - span up to 200' (SF):	0	200 per SF
Bridge - span up to 400' (SF):	0	300 per SF
Bridge - span more than 400' (SF):	0	325 per SF
Floating bridge (SF):	0	440 per SF
Movable bridge (SF):	0	1,650 per SF
Lids without Ventilation (SF):	0	150 per SF
Tunnel (LF):	0	71,500 per LF
Pedestrian Bridge (SF):	0	140 per SF
Railroad bridge replacement (LF):	0	11,000 per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	139,507	$3.00 per SF
PCC Pavement (SF):	0	$5.52 per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15 per LF
Seeding, mulching and fertilizing (Acre):	3.96	1,500 per Acre
Roadside Restoration (Lump sum):	2.20	100,000 per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **101.00** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,522	$13	per LF
Guardrail terminal (Each):	4	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	2.20	$200,000	per Lump sum
Signing (Lump sum):	2.20	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	23,251	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	2.30	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.00** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

GRADING	**Grading Total:**	**$857,075**
	Clear and grub (Acre):	$2,774
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$22,018
	Roadway excavation (CY):	$237,795
	Gravel borrow/embankment compaction (Ton):	$594,488
DRAINAGE	**Drainage Total:**	**$380,032**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$352,289
	Ditch excavation (LF):	$27,743
STORMWATER DETENTION AND TREATMENT	**Total:**	**$113,000**
	Detention pond (SF of new impervious surface):	$62,778
	Water quality pond (SF of new impervious surface):	$50,222
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$1,725,000**
	Retaining walls (SF):	$1,725,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.00** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

BRIDGES	**Bridge Total:**	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$418,520**
	Asphalt Concrete Pavement, ACP (SF):	$418,520
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$226,126**
	Fencing (LF):	$0
	Seeding, mulching and fertilizing (Acre):	$5,945
	Roadside Restoration (Lump sum):	$220,181

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

Project Cost: Detailed Report

SR: **002** BARM: **101.00** EARM: **101.38**

Project Title: **US 2/97 Cashmere Area (Aplets Way Signal Option)**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **2**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$238,126**
	Guardrail (LF):	$19,782
	Guardrail terminal (Each):	$7,486
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$55,045
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$5,813
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$62,100**
	Vacant land (Acre):	$62,100
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, January 05, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002**	Beginning ARM: **10.20**	Ending ARM: **10.41**	Length(mile): **0.21**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersection**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$894**	**$1,192**
Right Of Way:	**$80**	**$107**
Environmental Mitigation:	**$286**	**$382**
Construction:	**$10,457**	**$13,943**
Total Project Cost:	**$11,717**	**$15,623**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

***** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **10.20** Ending ARM: **10.41** Length(mile): **0.21**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersection**

# of NoBuild Lane(s) in NB/EB Direction: **0** # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0** # of Build Lane(s) in SB/WB Direction: **0**

Improvement Type: **GP** Terrain Type: **R**

CONTINGENCY $993,000

RIGHT-OF-WAY $89,000

CONSTRUCTION / PREPARATION

Mobilization:	$847,000
Utility Relocation:	$21,000
Grading:	$278,000
Staging:	$85,000
Construction Engineering:	$1,192,000

STRUCTURES

Bridges and Tunnels:	$4,200,000
Retaining Walls:	$2,706,000
Noise Walls:	$0

PAVEMENT $136,000

ENVIRONMENTAL MITIGATION

Drainage:	$123,000
Stormwater Detention and Treatment:	$37,000
Temporary Water Pollution Control:	$85,000
Wetland Mitigation:	$0
Roadside Development:	$73,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$178,000
Workzone Traffic Control:	$423,000

ADDITIONAL ITEMS $739,284

SALES TAX $814,000

Project Cost Summary:

	Low	High
PE	$894,000	$1,192,000
ROW	$80,000	$107,000
CN	$10,743,000	$14,324,000
Total	$11,717,000	$15,623,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **10.20** EARM: **10.41**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersectio**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	1.28	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	0.71	$10,000	per Lump sum
Roadway excavation (CY):	19,266	$4	per CY
Gravel borrow/embankment compaction (Ton):	32,110	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	71	$1,600	per LF
Ditch excavation (LF):	999	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	56,514	$0.36	per SF
Water quality pond (SF of imperv surface):	67,817	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	36,080	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **10.20** EARM: **10.41**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersectio**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	16,800	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	45,211	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	1.28	1,500	per Acre
Roadside Restoration (Lump sum):	0.71	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **10.20** EARM: **10.41**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersectio**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	460	$13	per LF
Guardrail terminal (Each):	1	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	0.71	$200,000	per Lump sum
Signing (Lump sum):	0.71	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	7,535	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	3.30	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.20** EARM: **10.41**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersectio**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$277,761**
	Clear and grub (Acre):	$899
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$7,136
	Roadway excavation (CY):	$77,065
	Gravel borrow/embankment compaction (Ton):	$192,661
DRAINAGE	**Drainage Total:**	**$123,161**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$114,170
	Ditch excavation (LF):	$8,991
STORMWATER DETENTION AND TREATMENT	**Total:**	**$36,621**
	Detention pond (SF of new impervious surface):	$20,345
	Water quality pond (SF of new impervious surface):	$16,276
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$2,706,000**
	Retaining walls (SF):	$2,706,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.20** EARM: **10.41**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersectio**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$4,200,000**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$4,200,000
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$135,634**
Asphalt Concrete Pavement, ACP (SF):	$135,634
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$73,283**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$1,927
Roadside Restoration (Lump sum):	$71,356

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.20** EARM: **10.41**

Project Title: **Goodwin New bridge Option 1 (w/5% grade) Includes Signalized Intersectio**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$178,134**
	Guardrail (LF):	$5,985
	Guardrail terminal (Each):	$2,426
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$17,839
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$1,884
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$89,100**
	Vacant land (Acre):	$89,100
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$739,284

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **10.62** Ending ARM: **10.83** Length(mile): **0.21**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersection**

# of NoBuild Lane(s) in NB/EB Direction: **0**   # of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0**   # of Build Lane(s) in SB/WB Direction: **0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$850**	**$1,134**
Right Of Way:	**$80**	**$107**
Environmental Mitigation:	**$280**	**$373**
Construction:	**$9,940**	**$13,254**
Total Project Cost:	**$11,151**	**$14,868**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **10.62** Ending ARM: **10.83** Length(mile): **0.21**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersection**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of Build Lane(s) in NB/EB Direction: **2**

# of NoBuild Lane(s) in SB/WB Direction: **0**

# of Build Lane(s) in SB/WB Direction: **0**

Improvement Type: **GP**

Terrain Type: **R**

CONTINGENCY $945,000

RIGHT-OF-WAY $89,000

CONSTRUCTION / PREPARATION

Mobilization: $806,000

Utility Relocation: $20,000

Grading: $274,000

Staging: $81,000

Construction Engineering: $1,134,000

STRUCTURES

Bridges and Tunnels: $4,200,000

Retaining Walls: $2,452,000

Noise Walls: $0

PAVEMENT $134,000

ENVIRONMENTAL MITIGATION

Drainage: $122,000

Stormwater Detention and Treatment: $36,000

Temporary Water Pollution Control: $81,000

Wetland Mitigation: $0

Roadside Development: $72,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety: $177,000

Workzone Traffic Control: $403,000

ADDITIONAL ITEMS $590,400

SALES TAX $775,000

Project Cost Summary:

	Low	High
PE	$850,000	$1,134,000
ROW	$80,000	$107,000
CN	$10,220,000	$13,627,000
Total	$11,151,000	$14,868,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **10.62** EARM: **10.83**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersect**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	1.27	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	0.70	$10,000	per Lump sum
Roadway excavation (CY):	19,010	$4	per CY
Gravel borrow/embankment compaction (Ton):	31,684	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	70	$1,600	per LF
Ditch excavation (LF):	986	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	55,764	$0.36	per SF
Water quality pond (SF of imperv surface):	66,917	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	32,700	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **10.62** EARM: **10.83**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersect**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	16,800	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	44,611	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	1.27	1,500	per Acre
Roadside Restoration (Lump sum):	0.70	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **10.62** EARM: **10.83**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersect**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	372	$13	per LF
Guardrail terminal (Each):	1	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	0.70	$200,000	per Lump sum
Signing (Lump sum):	0.70	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	7,435	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	3.30	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.62** EARM: **10.83**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersect**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$274,074**
	Clear and grub (Acre):	$887
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$7,041
	Roadway excavation (CY):	$76,042
	Gravel borrow/embankment compaction (Ton):	$190,105
DRAINAGE	**Drainage Total:**	**$121,526**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$112,655
	Ditch excavation (LF):	$8,872
STORMWATER DETENTION AND TREATMENT	**Total:**	**$36,135**
	Detention pond (SF of new impervious surface):	$20,075
	Water quality pond (SF of new impervious surface):	$16,060
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$2,452,500**
	Retaining walls (SF):	$2,452,500
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.62** EARM: **10.83**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersect**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$4,200,000**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$4,200,000
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$133,834**
Asphalt Concrete Pavement, ACP (SF):	$133,834
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$72,310**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$1,901
Roadside Restoration (Lump sum):	$70,409

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.62** EARM: **10.83**

Project Title: **Goodwin New Bridge Option 1 (w-6.5% grade) Includes Signalized Intersect**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$176,688**
	Guardrail (LF):	$4,833
	Guardrail terminal (Each):	$2,394
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$17,602
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$1,859
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$89,100**
	Vacant land (Acre):	$89,100
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$590,400

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **10.00** Ending ARM: **10.25** Length(mile): **0.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$1,003**	**$1,337**
Right Of Way:	**$80**	**$107**
Environmental Mitigation:	**$319**	**$425**
Construction:	**$11,534**	**$15,379**
Total Project Cost:	**$12,936**	**$17,248**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **10.00** Ending ARM: **10.25** Length(mile): **0.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane(s) in NB/EB Direction: **0**
# of Build Lane(s) in NB/EB Direction: **2**
# of NoBuild Lane(s) in SB/WB Direction: **0**
# of Build Lane(s) in SB/WB Direction: **0**
Improvement Type: **GP**
Terrain Type: **R**

CONTINGENCY $1,114,000

RIGHT-OF-WAY $89,000

CONSTRUCTION / PREPARATION

Mobilization: $950,000
Utility Relocation: $24,000
Grading: $309,000
Staging: $95,000
Construction Engineering: $1,114,000

STRUCTURES

Bridges and Tunnels: $7,402,000
Retaining Walls: $900,000
Noise Walls: $0

PAVEMENT $151,000

ENVIRONMENTAL MITIGATION

Drainage: $137,000
Stormwater Detention and Treatment: $41,000
Temporary Water Pollution Control: $95,000
Wetland Mitigation: $0
Roadside Development: $81,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety: $181,000
Workzone Traffic Control: $475,000

ADDITIONAL ITEMS $300,000

SALES TAX $914,000

Project Cost Summary:

	Low	High
PE	$1,003,000	$1,337,000
ROW	$80,000	$107,000
CN	$11,853,000	$15,804,000
Total	$12,936,000	$17,248,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Thursday, March 26, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **10.00** EARM: **10.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	1.43	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	0.79	$10,000	per Lump sum
Roadway excavation (CY):	21,426	$4	per CY
Gravel borrow/embankment compaction (Ton):	35,710	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	79	$1,600	per LF
Ditch excavation (LF):	1,111	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	62,850	$0.36	per SF
Water quality pond (SF of imperv surface):	75,420	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	12,000	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.00** EARM: **10.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$308,901**
	Clear and grub (Acre):	$1,000
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$7,936
	Roadway excavation (CY):	$85,705
	Gravel borrow/embankment compaction (Ton):	$214,261
DRAINAGE	**Drainage Total:**	**$136,969**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$126,970
	Ditch excavation (LF):	$9,999
STORMWATER DETENTION AND TREATMENT	**Total:**	**$40,727**
	Detention pond (SF of new impervious surface):	$22,626
	Water quality pond (SF of new impervious surface):	$18,101
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$900,000**
	Retaining walls (SF):	$900,000
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.00** EARM: **10.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$7,402,500**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$7,402,500
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$150,840**
Asphalt Concrete Pavement, ACP (SF):	$150,840
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$81,499**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$2,143
Roadside Restoration (Lump sum):	$79,356

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Cost: Detailed Report

SR: **002** BARM: **10.00** EARM: **10.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$181,345**
	Guardrail (LF):	$6,713
	Guardrail terminal (Each):	$2,698
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$19,839
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$2,095
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$89,100**
	Vacant land (Acre):	$89,100
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$300,000

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **10.00** EARM: **10.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	75	per SF
Bridge widening (SF):	29,610	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	50,280	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	1.43	1,500	per Acre
Roadside Restoration (Lump sum):	0.79	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **10.00** EARM: **10.25**

Project Title: **Goodwin Option 3**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	516	$13	per LF
Guardrail terminal (Each):	2	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	0.79	$200,000	per Lump sum
Signing (Lump sum):	0.79	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	8,380	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	3.30	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Thursday, March 26, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **52.00** Ending ARM: **52.30** Length(mile): **0.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	**High (in $1000s)**
Preliminary Engineering:	**$1,123**	**$1,498**
Right Of Way:	**$112**	**$149**
Environmental Mitigation:	**$574**	**$766**
Construction:	**$12,706**	**$16,942**
Total Project Cost:	**$14,515**	**$19,354**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

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Date Printed: ***Tuesday, March 24, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **52.00** Ending ARM: **52.30** Length(mile): **0.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

Improvement Type: **GP**

# of Build Lane(s) in NB/EB Direction: **2**

# of Build Lane(s) in SB/WB Direction: **0**

Terrain Type: **M**

CONTINGENCY $1,248,000

RIGHT-OF-WAY $124,000

CONSTRUCTION / PREPARATION

Mobilization:	$1,065,000
Utility Relocation:	$27,000
Grading:	$847,000
Staging:	$106,000
Construction Engineering:	$1,248,000

STRUCTURES

Bridges and Tunnels:	$7,858,000
Retaining Walls:	$889,000
Noise Walls:	$0

PAVEMENT $310,000

ENVIRONMENTAL MITIGATION

Drainage:	$281,000
Stormwater Detention and Treatment:	$84,000
Temporary Water Pollution Control:	$106,000
Wetland Mitigation:	$0
Roadside Development:	$167,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$212,000
Workzone Traffic Control:	$532,000

ADDITIONAL ITEMS $0

SALES TAX $1,024,000

Project Cost Summary:

	Low	High
PE	$1,123,000	$1,498,000
ROW	$112,000	$149,000
CN	$13,280,000	$17,707,000
Total	$14,515,000	$19,354,000

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Date Printed: ***Tuesday, March 24, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **52.00** EARM: **52.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING	**Quantity**	**Unit Cost**	**Unit**
Clear and grub (Acre):	2.93	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	1.63	$10,000	per Lump sum
Roadway excavation (CY):	60,321	$4	per CY
Gravel borrow/embankment compaction (Ton):	97,818	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	163	$1,600	per LF
Ditch excavation (LF):	2,282	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	129,120	$0.36	per SF
Water quality pond (SF of imperv surface):	154,944	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	11,850	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **52.00** EARM: **52.30**

Project Title: **Goodwin RD over US 2 Option 4**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	9,000	75	per SF
Bridge widening (SF):	0	250	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	200	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	22,100	325	per SF
Floating bridge (SF):	0	440	per SF
Movable bridge (SF):	0	1,650	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	71,500	per LF
Pedestrian Bridge (SF):	0	140	per SF
Railroad bridge replacement (LF):	0	11,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	103,296	$3.00	per SF
PCC Pavement (SF):	0	$5.52	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15	per LF
Seeding, mulching and fertilizing (Acre):	2.93	1,500	per Acre
Roadside Restoration (Lump sum):	1.63	100,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **52.00** EARM: **52.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	861	$13	per LF
Guardrail terminal (Each):	3	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	1	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	1.63	$200,000	per Lump sum
Signing (Lump sum):	1.63	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	17,216	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	4.60	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **52.00** EARM: **52.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$846,550**
	Clear and grub (Acre):	$2,054
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$16,303
	Roadway excavation (CY):	$241,285
	Gravel borrow/embankment compaction (Ton):	$586,909
DRAINAGE	**Drainage Total:**	**$281,390**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$260,848
	Ditch excavation (LF):	$20,542
STORMWATER DETENTION AND TREATMENT	**Total:**	**$83,670**
	Detention pond (SF of new impervious surface):	$46,483
	Water quality pond (SF of new impervious surface):	$37,187
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$888,750**
	Retaining walls (SF):	$888,750
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **52.00** EARM: **52.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$7,857,500**
Removal of existing bridges (SF):	$675,000
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$7,182,500
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$309,888**
Asphalt Concrete Pavement, ACP (SF):	$309,888
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$167,432**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$4,402
Roadside Restoration (Lump sum):	$163,030

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **52.00** EARM: **52.30**

Project Title: **Goodwin RD over US 2 Option 4**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$211,795**
	Guardrail (LF):	$11,190
	Guardrail terminal (Each):	$5,543
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$150,000
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$40,758
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$4,304
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$124,200**
	Vacant land (Acre):	$124,200
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **50.70** Ending ARM: **51.33** Length(mile): **0.63**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$550**	**$733**
Right Of Way:	**$0**	**$0**
Environmental Mitigation:	**$1,602**	**$2,136**
Construction:	**$5,041**	**$6,721**
Total Project Cost:	**$7,193**	**$9,590**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

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Date Printed: ***Tuesday, March 24, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **50.70** Ending ARM: **51.33** Length(mile): **0.63**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

Improvement Type: **Freight**

# of Build Lane(s) in NB/EB Direction: **2**

# of Build Lane(s) in SB/WB Direction: **0**

Terrain Type: **L**

CONTINGENCY $611,000

RIGHT-OF-WAY $0

CONSTRUCTION / PREPARATION

Mobilization:	$250,000
Utility Relocation:	$150,000
Grading:	$727,000
Staging:	$200,000
Construction Engineering:	$733,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$0
Noise Walls:	$0

PAVEMENT $2,016,000

ENVIRONMENTAL MITIGATION

Drainage:	$673,000
Stormwater Detention and Treatment:	$706,000
Temporary Water Pollution Control:	$150,000
Wetland Mitigation:	$0
Roadside Development:	$251,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$635,000
Workzone Traffic Control:	$351,000

ADDITIONAL ITEMS $0

SALES TAX $538,000

Project Cost Summary:

	Low	High
PE	$550,000	$733,000
ROW	$0	$0
CN	$6,643,000	$8,857,000
Total	$7,193,000	$9,590,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Tuesday, March 24, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **50.70** EARM: **51.33**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	4.55	$7,400	per Acre
Building demolition (Lump sum):	1.52	$70,000	per Lump sum
Removal of structures (Lump sum):	1.52	$80,000	per Lump sum
Pavement removal (SY):	0	$9	per SY
Roadside cleanup (Lump sum):	1.52	$5,000	per Lump sum
Roadway excavation (CY):	15,152	$11	per CY
Gravel borrow/embankment compaction (Ton):	26,515	$11	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	9	$300	per Each
Conveyance: 24" RCSSP (LF):	2,424	$70	per LF
Catch basin: Type 2-48" (Each):	9	$3,000	per Each
Collection pipe:12" PCSSP (LF):	455	$45	per LF
Large culvert (LF):	227	$1,600	per LF
Ditch excavation (LF):	5,606	$16	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	60,000	$1.38	per SF
Water quality pond (SF of imperv surface):	72,000	$0.55	per SF
Detention vault (SF of new impervious surface):	60,000	$8.85	per SF
Filtration water treatment (SF of imperv surface):	72,000	$0.73	per SF
WALLS			
Retaining walls (SF):	0	110	per SF
Noise walls (LF):	0	335	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **50.70** EARM: **51.33**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	50	per SF
Bridge widening (SF):	0	300	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	170	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	300	per SF
Floating bridge (SF):	0	480	per SF
Movable bridge (SF):	0	1,500	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	65,000	per LF
Pedestrian Bridge (SF):	0	150	per SF
Railroad bridge replacement (LF):	0	10,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	96,000	$21.00	per SF
PCC Pavement (SF):	0	$27.00	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	909	19	per LF
Seeding, mulching and fertilizing (Acre):	4.55	1,500	per Acre
Roadside Restoration (Lump sum):	1.52	150,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **50.70** EARM: **51.33**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,600	$20	per LF
Guardrail terminal (Each):	24	$1,800	per Each
Concrete barrier(LF):	800	$35	per LF
Impact attenuator (Each):	1	$25,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	36	$8,000	per Each
ITS (Lump sum):	1.52	$165,000	per Lump sum
Signing (Lump sum):	1.52	$30,000	per Lump sum
Cantilever sign bridge (Each):	0	$50,000	per Each
Sign bridge (Each):	0	$185,000	per Each
Traffic marking (LF):	16,000	$1.00	per LF
Raised channelization (LF):	2,273	$19	per LF
Curb, gutter and sidewalk (LF):	2,273	$46	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.00	$616,000	per Acre
Residential land (Acre):	0.00	$2,318,000	per Acre
Commercial land (Acre):	0.00	$4,140,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **50.70** EARM: **51.33**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING — **Grading Total:**	**$726,818**
Clear and grub (Acre):	$33,636
Building demolition (Lump sum):	$106,061
Removal of structures (Lump sum):	$121,212
Pavement removal (SY):	$0
Roadside cleanup (Lump sum):	$7,576
Roadway excavation (CY):	$166,667
Gravel borrow/embankment compaction (Ton):	$291,667
DRAINAGE — **Drainage Total:**	**$673,205**
Removal of drainage Structure (Each):	$2,727
Conveyance: 24" RCSSP (LF):	$169,697
Catch basin: Type 2-48" (Each):	$27,273
Collection pipe:12" PCSSP (LF):	$20,455
Large culvert (LF):	$363,636
Ditch excavation (LF):	$89,417
STORMWATER DETENTION AND TREATMENT — **Total:**	**$705,960**
Detention pond (SF of new impervious surface):	$82,800
Water quality pond (SF of new impervious surface):	$39,600
Detention vault (SF of new impervious surface):	$531,000
Filtration water treatment (SF of new impervious surface):	$52,560
WALLS — **Walls Total:**	**$0**
Retaining walls (SF):	$0
Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **50.70** EARM: **51.33**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES	**Bridge Total:**	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$2,016,000**
	Asphalt Concrete Pavement, ACP (SF):	$2,016,000
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$251,364**
	Fencing (LF):	$17,273
	Seeding, mulching and fertilizing (Acre):	$6,818
	Roadside Restoration (Lump sum):	$227,273

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **50.70** EARM: **51.33**

Project Title: **Sunset-Goodwin Road Improvements**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Traffic Total:	**$634,977**
Guardrail (LF):	$32,000
Guardrail terminal (Each):	$43,636
Concrete barrier(LF):	$28,000
Impact attenuator (Each):	$31,250
Signal (Each):	$0
Roundabout (Each):	$0
Illumination (Each):	$290,909
ITS (Lump sum):	$0
Signing (Lump sum):	$45,455
Cantilever sign bridge (Each):	$0
Sign bridge (Each):	$0
Traffic marking (LF):	$16,000
Raised channelization (LF):	$43,182
Curb, gutter and sidewalk (LF):	$104,545

WETLAND MITIGATION

Wetland Total:	**$0**
Category I - High value wetland (Acre):	$0
Category II and III - Medium value wetland (Acre):	$0
Category IV - Low value wetland (Acre):	$0
Stream culvert (Each):	$0
Beach restoration (Each):	$0

RIGHT OF WAY

ROW Total:	**$0**
Vacant land (Acre):	$0
Residential land (Acre):	$0
Commercial land (Acre):	$0

OTHER ITEMS

User defined additional items:	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, March 24, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **51.33** Ending ARM: **51.47** Length(mile): **0.14**

Project Title: **Goodwin north of sunset**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$126**	**$168**
Right Of Way:	**$0**	**$0**
Environmental Mitigation:	**$365**	**$487**
Construction:	**$1,215**	**$1,620**
Total Project Cost:	**$1,706**	**$2,275**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, March 30, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **51.33** Ending ARM: **51.47** Length(mile): **0.14**

Project Title: **Goodwin north of sunset**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

# of Build Lane(s) in NB/EB Direction: **2**

# of Build Lane(s) in SB/WB Direction: **0**

Improvement Type: **Freight**

Terrain Type: **L**

CONTINGENCY $140,000

RIGHT-OF-WAY $0

CONSTRUCTION / PREPARATION

Mobilization:	$57,000
Utility Relocation:	$34,000
Grading:	$166,000
Staging:	$46,000
Construction Engineering:	$237,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$0
Noise Walls:	$0

PAVEMENT $461,000

ENVIRONMENTAL MITIGATION

Drainage:	$154,000
Stormwater Detention and Treatment:	$161,000
Temporary Water Pollution Control:	$34,000
Wetland Mitigation:	$0
Roadside Development:	$57,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$145,000
Workzone Traffic Control:	$80,000

ADDITIONAL ITEMS $0

SALES TAX $123,000

Project Cost Summary:

	Low	High
PE	$126,000	$168,000
ROW	$0	$0
CN	$1,580,000	$2,107,000
Total	$1,706,000	$2,275,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, March 30, 2015***

Project Cost: Detailed Report

SR: **002** BARM: **51.33** EARM: **51.47**

Project Title: **Goodwin north of sunset**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING	**Grading Total:**	**$166,114**
	Clear and grub (Acre):	$7,688
	Building demolition (Lump sum):	$24,240
	Removal of structures (Lump sum):	$27,703
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$1,731
	Roadway excavation (CY):	$38,092
	Gravel borrow/embankment compaction (Ton):	$66,660
DRAINAGE	**Drainage Total:**	**$153,860**
	Removal of drainage Structure (Each):	$623
	Conveyance: 24" RCSSP (LF):	$38,784
	Catch basin: Type 2-48" (Each):	$6,233
	Collection pipe:12" PCSSP (LF):	$4,675
	Large culvert (LF):	$83,109
	Ditch excavation (LF):	$20,436
STORMWATER DETENTION AND TREATMENT	**Total:**	**$161,347**
	Detention pond (SF of new impervious surface):	$18,924
	Water quality pond (SF of new impervious surface):	$9,051
	Detention vault (SF of new impervious surface):	$121,360
	Filtration water treatment (SF of new impervious surface):	$12,013
WALLS	**Walls Total:**	**$0**
	Retaining walls (SF):	$0
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Cost: Detailed Report

SR: **002** BARM: **51.33** EARM: **51.47**

Project Title: **Goodwin north of sunset**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES	**Bridge Total:**	**$0**
	Removal of existing bridges (SF):	$0
	Bridge widening (SF):	$0
	Bridge - span up to 140' (SF):	$0
	Bridge - span up to 200' (SF):	$0
	Bridge - span up to 400' (SF):	$0
	Bridge - span more than 400' (SF):	$0
	Floating bridge (SF):	$0
	Movable bridge (SF):	$0
	Lids without Ventilation (SF):	$0
	Tunnel (LF):	$0
	Pedestrian Bridge (SF):	$0
	Railroad bridge replacement (LF):	$0
PAVEMENTS	**Pavement Total:**	**$460,755**
	Asphalt Concrete Pavement, ACP (SF):	$460,755
	Portland Cement Concrete Pavement, PCCP (SF):	$0
ROADSIDE DEVELOPMENT	**Roadside Dev. Total:**	**$57,449**
	Fencing (LF):	$3,948
	Seeding, mulching and fertilizing (Acre):	$1,558
	Roadside Restoration (Lump sum):	$51,943

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Cost: Detailed Report

SR: **002** BARM: **51.33** EARM: **51.47**

Project Title: **Goodwin north of sunset**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$144,981**
	Guardrail (LF):	$7,314
	Guardrail terminal (Each):	$9,973
	Concrete barrier(LF):	$6,399
	Impact attenuator (Each):	$7,000
	Signal (Each):	$0
	Roundabout (Each):	$0
	Illumination (Each):	$66,487
	ITS (Lump sum):	$0
	Signing (Lump sum):	$10,389
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$3,657
	Raised channelization (LF):	$9,869
	Curb, gutter and sidewalk (LF):	$23,894
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$0**
	Vacant land (Acre):	$0
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **51.33** EARM: **51.47**

Project Title: **Goodwin north of sunset**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	1.04	$7,400	per Acre
Building demolition (Lump sum):	0.35	$70,000	per Lump sum
Removal of structures (Lump sum):	0.35	$80,000	per Lump sum
Pavement removal (SY):	0	$9	per SY
Roadside cleanup (Lump sum):	0.35	$5,000	per Lump sum
Roadway excavation (CY):	3,463	$11	per CY
Gravel borrow/embankment compaction (Ton):	6,060	$11	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	2	$300	per Each
Conveyance: 24" RCSSP (LF):	554	$70	per LF
Catch basin: Type 2-48" (Each):	2	$3,000	per Each
Collection pipe:12" PCSSP (LF):	104	$45	per LF
Large culvert (LF):	52	$1,600	per LF
Ditch excavation (LF):	1,281	$16	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	13,713	$1.38	per SF
Water quality pond (SF of imperv surface):	16,456	$0.55	per SF
Detention vault (SF of new impervious surface):	13,713	$8.85	per SF
Filtration water treatment (SF of imperv surface):	16,456	$0.73	per SF
WALLS			
Retaining walls (SF):	0	110	per SF
Noise walls (LF):	0	335	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **51.33** EARM: **51.47**

Project Title: **Goodwin north of sunset**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	50	per SF
Bridge widening (SF):	0	300	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	170	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	300	per SF
Floating bridge (SF):	0	480	per SF
Movable bridge (SF):	0	1,500	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	65,000	per LF
Pedestrian Bridge (SF):	0	150	per SF
Railroad bridge replacement (LF):	0	10,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	21,941	$21.00	per SF
PCC Pavement (SF):	0	$27.00	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	208	19	per LF
Seeding, mulching and fertilizing (Acre):	1.04	1,500	per Acre
Roadside Restoration (Lump sum):	0.35	150,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **51.33** EARM: **51.47**

Project Title: **Goodwin north of sunset**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	366	$20	per LF
Guardrail terminal (Each):	6	$1,800	per Each
Concrete barrier(LF):	183	$35	per LF
Impact attenuator (Each):	0	$25,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	8	$8,000	per Each
ITS (Lump sum):	0.35	$165,000	per Lump sum
Signing (Lump sum):	0.35	$30,000	per Lump sum
Cantilever sign bridge (Each):	0	$50,000	per Each
Sign bridge (Each):	0	$185,000	per Each
Traffic marking (LF):	3,657	$1.00	per LF
Raised channelization (LF):	519	$19	per LF
Curb, gutter and sidewalk (LF):	519	$46	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.00	$616,000	per Acre
Residential land (Acre):	0.00	$2,318,000	per Acre
Commercial land (Acre):	0.00	$4,140,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **51.47** Ending ARM: **51.96** Length(mile): **0.49**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	**High** (in $1000s)
Preliminary Engineering:	**$457**	**$610**
Right Of Way:	**$0**	**$0**
Environmental Mitigation:	**$1,332**	**$1,776**
Construction:	**$4,188**	**$5,584**
Total Project Cost:	**$5,977**	**$7,969**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, March 30, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **51.47** Ending ARM: **51.96** Length(mile): **0.49**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**
Improvement Type:	**Freight**	Terrain Type:	**L**

CONTINGENCY $508,000

RIGHT-OF-WAY $0

CONSTRUCTION / PREPARATION

Mobilization:	$208,000
Utility Relocation:	$125,000
Grading:	$604,000
Staging:	$166,000
Construction Engineering:	$609,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$0
Noise Walls:	$0

PAVEMENT $1,675,000

ENVIRONMENTAL MITIGATION

Drainage:	$559,000
Stormwater Detention and Treatment:	$587,000
Temporary Water Pollution Control:	$125,000
Wetland Mitigation:	$0
Roadside Development:	$209,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$528,000
Workzone Traffic Control:	$291,000

ADDITIONAL ITEMS $0

SALES TAX $447,000

Project Cost Summary:

	Low	High
PE	$457,000	$610,000
ROW	$0	$0
CN	$5,520,000	$7,360,000
Total	$5,977,000	$7,969,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Monday, March 30, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **51.47** EARM: **51.96**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	3.78	$7,400	per Acre
Building demolition (Lump sum):	1.26	$70,000	per Lump sum
Removal of structures (Lump sum):	1.26	$80,000	per Lump sum
Pavement removal (SY):	0	$9	per SY
Roadside cleanup (Lump sum):	1.26	$5,000	per Lump sum
Roadway excavation (CY):	12,589	$11	per CY
Gravel borrow/embankment compaction (Ton):	22,030	$11	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	8	$300	per Each
Conveyance: 24" RCSSP (LF):	2,014	$70	per LF
Catch basin: Type 2-48" (Each):	8	$3,000	per Each
Collection pipe:12" PCSSP (LF):	378	$45	per LF
Large culvert (LF):	189	$1,600	per LF
Ditch excavation (LF):	4,658	$16	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	49,851	$1.38	per SF
Water quality pond (SF of imperv surface):	59,821	$0.55	per SF
Detention vault (SF of new impervious surface):	49,851	$8.85	per SF
Filtration water treatment (SF of imperv surface):	59,821	$0.73	per SF
WALLS			
Retaining walls (SF):	0	110	per SF
Noise walls (LF):	0	335	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **51.47** EARM: **51.96**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	50	per SF
Bridge widening (SF):	0	300	per SF
Bridge - span up to 140' (SF):	0	150	per SF
Bridge - span up to 200' (SF):	0	170	per SF
Bridge - span up to 400' (SF):	0	300	per SF
Bridge - span more than 400' (SF):	0	300	per SF
Floating bridge (SF):	0	480	per SF
Movable bridge (SF):	0	1,500	per SF
Lids without Ventilation (SF):	0	150	per SF
Tunnel (LF):	0	65,000	per LF
Pedestrian Bridge (SF):	0	150	per SF
Railroad bridge replacement (LF):	0	10,000	per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	79,761	$21.00	per SF
PCC Pavement (SF):	0	$27.00	per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	755	19	per LF
Seeding, mulching and fertilizing (Acre):	3.78	1,500	per Acre
Roadside Restoration (Lump sum):	1.26	150,000	per Lump sum

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **51.47** EARM: **51.96**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	1,329	$20	per LF
Guardrail terminal (Each):	20	$1,800	per Each
Concrete barrier(LF):	665	$35	per LF
Impact attenuator (Each):	1	$25,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	30	$8,000	per Each
ITS (Lump sum):	1.26	$165,000	per Lump sum
Signing (Lump sum):	1.26	$30,000	per Lump sum
Cantilever sign bridge (Each):	0	$50,000	per Each
Sign bridge (Each):	0	$185,000	per Each
Traffic marking (LF):	13,294	$1.00	per LF
Raised channelization (LF):	1,888	$19	per LF
Curb, gutter and sidewalk (LF):	1,888	$46	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.00	$616,000	per Acre
Residential land (Acre):	0.00	$2,318,000	per Acre
Commercial land (Acre):	0.00	$4,140,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Cost: Detailed Report

SR: **002** BARM: **51.47** EARM: **51.96**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

GRADING

Grading Total:	**$603,876**
Clear and grub (Acre):	$27,947
Building demolition (Lump sum):	$88,120
Removal of structures (Lump sum):	$100,709
Pavement removal (SY):	$0
Roadside cleanup (Lump sum):	$6,294
Roadway excavation (CY):	$138,475
Gravel borrow/embankment compaction (Ton):	$242,331

DRAINAGE

Drainage Total:	**$559,331**
Removal of drainage Structure (Each):	$2,266
Conveyance: 24" RCSSP (LF):	$140,992
Catch basin: Type 2-48" (Each):	$22,660
Collection pipe:12" PCSSP (LF):	$16,995
Large culvert (LF):	$302,127
Ditch excavation (LF):	$74,292

STORMWATER DETENTION AND TREATMENT

Total:	**$586,546**
Detention pond (SF of new impervious surface):	$68,794
Water quality pond (SF of new impervious surface):	$32,902
Detention vault (SF of new impervious surface):	$441,180
Filtration water treatment (SF of new impervious surface):	$43,669

WALLS

Walls Total:	**$0**
Retaining walls (SF):	$0
Noise walls (LF):	$0

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Date Printed: Monday, March 30, 2015

Project Cost: Detailed Report

SR: **002** BARM: **51.47** EARM: **51.96**

Project Title: **Sunset & Evergreen Dr.**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Bridge Total:	**$0**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$1,674,990**
Asphalt Concrete Pavement, ACP (SF):	$1,674,990
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$208,845**
Fencing (LF):	$14,351
Seeding, mulching and fertilizing (Acre):	$5,665
Roadside Restoration (Lump sum):	$188,829

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015

Project Cost: Detailed Report

SR: **002** BARM: **51.47** EARM: **51.96**

Project Title: **Sunset & Evergreen Dr.**

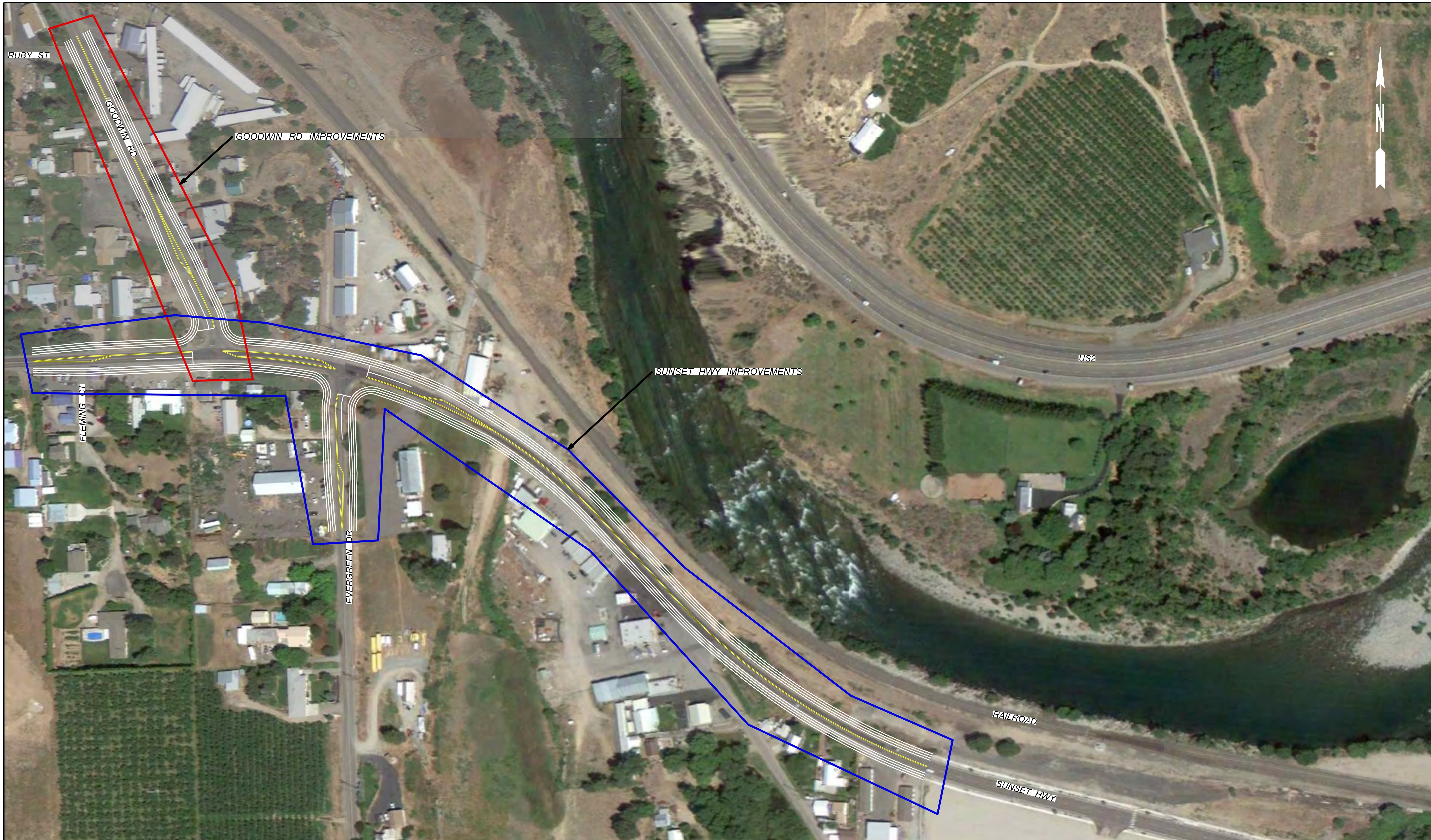
# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$528,106**
	Guardrail (LF):	$26,587
	Guardrail terminal (Each):	$36,255
	Concrete barrier(LF):	$23,264
	Impact attenuator (Each):	$26,500
	Signal (Each):	$0
	Roundabout (Each):	$0
	Illumination (Each):	$241,701
	ITS (Lump sum):	$0
	Signing (Lump sum):	$37,766
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$13,294
	Raised channelization (LF):	$35,878
	Curb, gutter and sidewalk (LF):	$86,861
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$0**
	Vacant land (Acre):	$0
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Monday, March 30, 2015



FILE NAME	I:\BLV\PRJ\000010073\Design\Exhibits\Rev_031015\EXHIBIT_Goodwin_Sunset Improvments.dgn
TIME	11:48:06 AM
DATE	3/30/2015
PLOTTED BY	rhoward
DESIGNED BY	
ENTERED BY	
CHECKED BY	
DQAM AUDIT DATE:	

RELEASE FOR CONSTRUCTION RECORD

DESCRIPTION	DATE	NO.

LOCHNER

THE HEART OF CASHMERE WASHINGTON

EST. 1899 COUNTY OF CHELAN

CHELAN COUNTY
US2/97 CASHMERE AREA
TRANSPORTATION STUDY

SUNSET AND GOODWIN IMPROVEMENTS

PLAN REF NO

SHEET

OF

SHEETS

*Planning Level Cost Estimate**

(2014 dollars)

SR: **002** Beginning ARM: **50.10** Ending ARM: **50.80** Length(mile): **0.70**

Project Title: **Nahahum Canyon Road** —

# of NoBuild Lane(s) in NB/EB Direction:	**0**	# of Build Lane(s) in NB/EB Direction:	**2**
# of NoBuild Lane(s) in SB/WB Direction:	**0**	# of Build Lane(s) in SB/WB Direction:	**0**

PROJECT COST SUMMARY

	Low (in $1000s)	High (in $1000s)
Preliminary Engineering:	**$140**	**$186**
Right Of Way:	**$0**	**$0**
Environmental Mitigation:	**$424**	**$565**
Construction:	**$1,322**	**$1,763**
Total Project Cost:	**$1,886**	**$2,514**

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

**** This estimate is based on little or no design work, and hence intended for use for planning purposes only.***

Date Printed: ***Tuesday, February 24, 2015***

Planning Level Cost Estimate Summary*

(2014 dollars)

SR: **002** Beginning ARM: **50.10** Ending ARM: **50.80** Length(mile): **0.70**

Project Title: **Nahahum Canyon Road**

# of NoBuild Lane(s) in NB/EB Direction: **0**

# of NoBuild Lane(s) in SB/WB Direction: **0**

# of Build Lane(s) in NB/EB Direction: **2**

# of Build Lane(s) in SB/WB Direction: **0**

Improvement Type: **Misc**

Terrain Type: **R**

CONTINGENCY $155,000

RIGHT-OF-WAY $0

CONSTRUCTION / PREPARATION

Mobilization:	$132,000
Utility Relocation:	$3,000
Grading:	$545,000
Staging:	$13,000
Construction Engineering:	$263,000

STRUCTURES

Bridges and Tunnels:	$0
Retaining Walls:	$0
Noise Walls:	$0

PAVEMENT $266,000

ENVIRONMENTAL MITIGATION

Drainage:	$242,000
Stormwater Detention and Treatment:	$72,000
Temporary Water Pollution Control:	$13,000
Wetland Mitigation:	$0
Roadside Development:	$144,000

TRAFFIC/TRAIL

Traffic/Trail Services and Safety:	$53,000
Workzone Traffic Control:	$66,000

ADDITIONAL ITEMS $0

SALES TAX $127,000

Project Cost Summary:

	Low	High
PE	$140,000	$186,000
ROW	$0	$0
CN	$1,746,000	$2,328,000
Total	$1,886,000	$2,514,000

Note: Generally planning estimates are done with no design information. Therefore, many unknown factors may lead to changes in the estimates later on. This is why a range approach has been used in reporting project costs. Low is 10% below and high is 20% above the estimated cost.

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Date Printed: ***Tuesday, February 24, 2015***

Project Quantity and Unit Cost

SR: **002** BARM: **50.10** EARM: **50.80**

Project Title: **Nahahum Canyon Road**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

	Quantity	Unit Cost	Unit
GRADING			
Clear and grub (Acre):	2.52	$700	per Acre
Building demolition (Lump sum):	0.00	$10,000	per Lump sum
Removal of structures (Lump sum):	0.00	$25,000	per Lump sum
Pavement removal (SY):	0	$3	per SY
Roadside cleanup (Lump sum):	1.40	$10,000	per Lump sum
Roadway excavation (CY):	37,800	$4	per CY
Gravel borrow/embankment compaction (Ton):	63,000	$6	per Ton
DRAINAGE			
Removal of drainage Structure (Each):	0	$650	per Each
Conveyance: 24" RCSSP (LF):	0	$60	per LF
Catch basin: Type 2-48" (Each):	0	$3,000	per Each
Collection pipe:12" PCSSP (LF):	0	$45	per LF
Large culvert (LF):	140	$1,600	per LF
Ditch excavation (LF):	1,960	$9	per LF
STORMWATER DETENTION AND TREATMENT			
Detention pond (SF of imperv surface):	110,880	$0.36	per SF
Water quality pond (SF of imperv surface):	133,056	$0.24	per SF
Detention vault (SF of new impervious surface):	0	$3.00	per SF
Filtration water treatment (SF of imperv surface):	0	$0.00	per SF
WALLS			
Retaining walls (SF):	0	75	per SF
Noise walls (LF):	0	300	per SF

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, February 24, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **50.10** EARM: **50.80**

Project Title: **Nahahum Canyon Road**

# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

BRIDGES

Removal of existing bridges (SF):	0	75 per SF
Bridge widening (SF):	0	250 per SF
Bridge - span up to 140' (SF):	0	150 per SF
Bridge - span up to 200' (SF):	0	200 per SF
Bridge - span up to 400' (SF):	0	300 per SF
Bridge - span more than 400' (SF):	0	325 per SF
Floating bridge (SF):	0	440 per SF
Movable bridge (SF):	0	1,650 per SF
Lids without Ventilation (SF):	0	150 per SF
Tunnel (LF):	0	71,500 per LF
Pedestrian Bridge (SF):	0	140 per SF
Railroad bridge replacement (LF):	0	11,000 per LF

PAVEMENTS

Asphalt Concrete Pavement, ACP (SF):	88,704	$3.00 per SF
PCC Pavement (SF):	0	$5.52 per SF

ROADSIDE DEVELOPMENT

Fencing (LF):	0	15 per LF
Seeding, mulching and fertilizing (Acre):	2.52	1,500 per Acre
Roadside Restoration (Lump sum):	1.40	100,000 per Lump sum

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Date Printed: Tuesday, February 24, 2015

Project Quantity and Unit Cost

SR: **002** BARM: **50.10** EARM: **50.80**

Project Title: **Nahahum Canyon Road**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY

Guardrail (LF):	739	$13	per LF
Guardrail terminal (Each):	3	$1,700	per Each
Concrete barrier(LF):	0	$25	per LF
Impact attenuator (Each):	0	$30,000	per Each
Signal (Each):	0	$150,000	per Each
Roundabout (Each):	0	$0	per Each
Illumination (Each):	0	$8,000	per Each
ITS (Lump sum):	1.40	$200,000	per Lump sum
Signing (Lump sum):	1.40	$25,000	per Lump sum
Cantilever sign bridge (Each):	0	$30,000	per Each
Sign bridge (Each):	0	$80,000	per Each
Traffic marking (LF):	14,784	$0.25	per LF
Raised channelization (LF):	0	$6	per LF
Curb, gutter and sidewalk (LF):	0	$32	per LF

WETLAND MITIGATION

Category I - High value wetland (Acre):	0.00	$2,500,000	per Acre
Category II and III - Medium value wetland (Acre):	0.00	$1,900,000	per Acre
Category IV - Low value wetland (Acre):	0.00	$300,000	per Acre
Stream culvert (Each):	0	$1,500,000	per Each
Beach restoration (Each):	0	$1,000,000	per Each

RIGHT OF WAY

Vacant land (Acre):	0.00	$27,000	per Acre
Residential land (Acre):	0.00	$336,000	per Acre
Commercial land (Acre):	0.00	$368,000	per Acre

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, February 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **50.10** EARM: **50.80**

Project Title: **Nahahum Canyon Road**

# of NoBuild Lane in NB/EB direction:	0	# of NoBuild Lane in SB/WB direction:	0
# of Build Lane in NB/EB direction:	2	# of Build Lane in SB/WB direction:	0

GRADING	**Grading Total:**	**$544,965**
	Clear and grub (Acre):	$1,764
	Building demolition (Lump sum):	$0
	Removal of structures (Lump sum):	$0
	Pavement removal (SY):	$0
	Roadside cleanup (Lump sum):	$14,000
	Roadway excavation (CY):	$151,200
	Gravel borrow/embankment compaction (Ton):	$378,000
DRAINAGE	**Drainage Total:**	**$241,640**
	Removal of drainage Structure (Each):	$0
	Conveyance: 24" RCSSP (LF):	$0
	Catch basin: Type 2-48" (Each):	$0
	Collection pipe:12" PCSSP (LF):	$0
	Large culvert (LF):	$224,000
	Ditch excavation (LF):	$17,640
STORMWATER DETENTION AND TREATMENT	**Total:**	**$71,850**
	Detention pond (SF of new impervious surface):	$39,917
	Water quality pond (SF of new impervious surface):	$31,933
	Detention vault (SF of new impervious surface):	$0
	Filtration water treatment (SF of new impervious surface):	$0
WALLS	**Walls Total:**	**$0**
	Retaining walls (SF):	$0
	Noise walls (LF):	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, February 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **50.10** EARM: **50.80**

Project Title: **Nahahum Canyon Road**

# of NoBuild Lane in NB/EB direction:	**0**	# of NoBuild Lane in SB/WB direction:	**0**
# of Build Lane in NB/EB direction:	**2**	# of Build Lane in SB/WB direction:	**0**

BRIDGES

Bridge Total:	**$0**
Removal of existing bridges (SF):	$0
Bridge widening (SF):	$0
Bridge - span up to 140' (SF):	$0
Bridge - span up to 200' (SF):	$0
Bridge - span up to 400' (SF):	$0
Bridge - span more than 400' (SF):	$0
Floating bridge (SF):	$0
Movable bridge (SF):	$0
Lids without Ventilation (SF):	$0
Tunnel (LF):	$0
Pedestrian Bridge (SF):	$0
Railroad bridge replacement (LF):	$0

PAVEMENTS

Pavement Total:	**$266,112**
Asphalt Concrete Pavement, ACP (SF):	$266,112
Portland Cement Concrete Pavement, PCCP (SF):	$0

ROADSIDE DEVELOPMENT

Roadside Dev. Total:	**$143,780**
Fencing (LF):	$0
Seeding, mulching and fertilizing (Acre):	$3,780
Roadside Restoration (Lump sum):	$140,000

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Date Printed: Tuesday, February 24, 2015

Project Cost: Detailed Report

SR: **002** BARM: **50.10** EARM: **50.80**

Project Title: **Nahahum Canyon Road**

\# of NoBuild Lane in NB/EB direction: **0** # of NoBuild Lane in SB/WB direction: **0**

\# of Build Lane in NB/EB direction: **2** # of Build Lane in SB/WB direction: **0**

TRAFFIC SERVICES AND SAFETY	**Traffic Total:**	**$53,066**
	Guardrail (LF):	$9,610
	Guardrail terminal (Each):	$4,760
	Concrete barrier(LF):	$0
	Impact attenuator (Each):	$0
	Signal (Each):	$0
	Roundabout (Each):	$0
	Illumination (Each):	$0
	ITS (Lump sum):	$0
	Signing (Lump sum):	$35,000
	Cantilever sign bridge (Each):	$0
	Sign bridge (Each):	$0
	Traffic marking (LF):	$3,696
	Raised channelization (LF):	$0
	Curb, gutter and sidewalk (LF):	$0
WETLAND MITIGATION	**Wetland Total:**	**$0**
	Category I - High value wetland (Acre):	$0
	Category II and III - Medium value wetland (Acre):	$0
	Category IV - Low value wetland (Acre):	$0
	Stream culvert (Each):	$0
	Beach restoration (Each):	$0
RIGHT OF WAY	**ROW Total:**	**$0**
	Vacant land (Acre):	$0
	Residential land (Acre):	$0
	Commercial land (Acre):	$0
OTHER ITEMS	**User defined additional items:**	$0

These quantities have been calculated by using quantities per lane-mile from WSDOT's past projects.

Date Printed: Tuesday, February 24, 2015