

Preliminary Development Plan Requirements

Exhibit #21.

K.C. Dept. of Public Works Transportation Concurrency Application



KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS

TRANSPORTATION CONCURRENCY
MANAGEMENT APPLICATION

Rec # 3610

Concurrency Review: \$3,690.00

Payment Method: Check 1260 Cash

Owner Name Teanaway Ridge LLC Pat Deneen

Permit # _____

Mailing Address PO Box 808 Cle Elum WA 98922

Phone Number 509-260-0462

Email Address Pat@patrickdeneen.com

Agent Name Terra Design Group Inc. Chad Bala

Mailing Address PO Box 686 Cle Elum WA 98922

Phone Number 509-607-0617

Email Address bala.ce@gmail.com

RECEIVED
NOV 28 2018

KITTITAS COUNTY
DEPT OF PUBLIC WORKS
DATE STAMP

Application Information:

Number of Lots to be created: 49

Tax Parcel No.: 621033 & 12586

Assessor's Map No.: 18-18-28000-0040 & 18-18-22030-0010

Plat or Project Name: Palomino Trails P.U.D

Roads Serving Project: Faust & Dry Creek Roads

Proposed Land Use: Residential Commercial Agricultural

Proposed Land Use Project: Short Plat Long Plat Building Permit

Other Planned Unit Development for 49 lots with a initial short plat.

Total Number of Lots/Dwelling Units: 49

Commercial/Agricultural Building Area in square feet: _____

If known, ADT and ITE land use code: _____

Narrative project description: 49 residential lots and open space

Describe present use of property: existing homestead and farming.

Are there any other pending applications or issues associated with this property?

YES NO If yes, describe: _____

Applicant will be contacted by Public Works to coordinate a meeting with the Director of Public Works and/or the County Engineer to discuss terms of the Transportation Evaluation.

Application is hereby made for permit(s) to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to enter the above-described location to inspect the proposed and or completed work.

Signature of Authorized Agent:

X

Date:

11-12-18

Signature of Land Owner of Record:
(Required for application submittal)

X

Date:

11-13-18



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Redmond, WA 98052-6628
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www.tsinw.com

TEANAWAY RIDGE PLAT

Kittitas County, Washington

Transportation Impact Analysis

February 2008

Prepared for:
Terra Design Group
PO Box 686
Cle Elum, WA 98922
and
Kittitas County

Prepared by:
Transportation Solutions, Inc.



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PROPOSED DEVELOPMENT

This report documents the traffic conditions associated with the construction and occupation of the Teanaway Ridge Plat residential development in Kittitas County, Washington.

PURPOSE OF REPORT AND STUDY OBJECTIVES

The purpose of this report is to identify potential traffic related impacts generated by occupancy of the proposed development and, where appropriate, outline improvements to minimize or eliminate such impacts.

This study follows the guidelines set forth by Kittitas County's Traffic Impact Analysis Requirements and conforms to the general format and intent of the State Environmental Policy Act (SEPA) guidelines. As part of this analysis, TSI consulted with Kittitas County staff and participated in a scoping meeting on August 29, 2007, to determine the extents of this analysis.

DESCRIPTION OF DEVELOPMENT

Terra Design Group is proposing a residential development, known as Teanaway Ridge Plat, in unincorporated Kittitas County, northwest of the City of Ellensburg. The development is proposed for property located west of Reecer Creek Rd and north of Bowers Rd. A vicinity map is included as Figure 1.

This proposal includes 14-unit single-family homes. The site access to the local road network is proposed at the intersection of Reecer Creek Rd at Bowers Rd. A preliminary lot layout is included as Figure 2.

Completion of construction and full-occupancy of Teanaway Ridge Plat is anticipated by 2012.

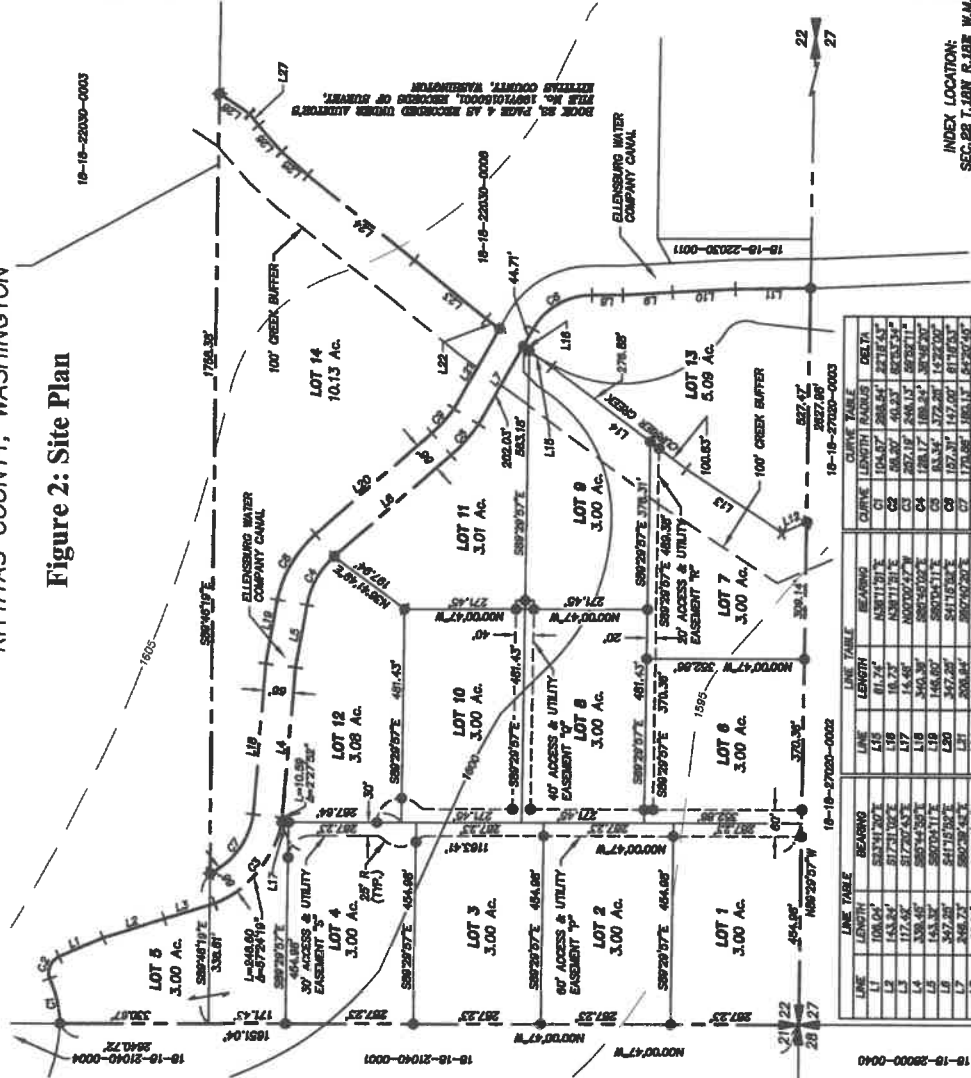


Figure 1: Vicinity Map

**Teanaway Ridge
Kittitas County, WA**

TEANAWAY RIDGE PLAT
A PORTION OF SW 1/4 OF SECTION 22, TOWNSHIP 18N, RANGE 18E, W.M.
KITITAS COUNTY, WASHINGTON

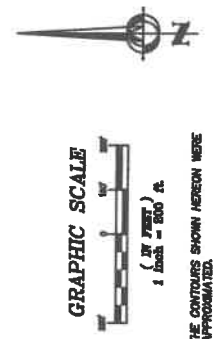
Figure 2: Site Plan



SURVEY NOTES:

1. THE PURPOSE OF THIS SURVEY IS TO PLAT PAGES HEREON.
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10. THE PROPERTY OF THIS SURVEY IS TO BE PLAT PAGES HEREON.

- LEGEND**
- ✚ SECTION CORNER AS NOTED
 - ✚ QUARTER CORNER AS NOTED
 - SET 1/4" REBAR LSH 18002



CERTIFICATE OF CASCADE IRRIGATION DISTRICT
THIS SUBDIVISION MEETS ALL MINIMUM REQUIREMENTS AND STANDARDS OF THE CASCADE IRRIGATION DISTRICT.

DATED THIS ___ DAY OF ___ A.D., 200__

CASCADE IRRIGATION DISTRICT

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98222
PHONE: (509) 674-7453
FAX: (509) 674-7419

TEANAWAY RIDGE PLAT
A PORTION OF SW 1/4 OF SECTION 22, T 18N, R 18E, W.M., KITITAS COUNTY, WASHINGTON

DWN BY	M. RADIC	DATE	07/2007	JOB NO.	07165
CHKD BY	D. NELSON	SCALE	1"=200'	SHEET	1 of 2

INDEX LOCATION:
SEC-22 T-18N R-18E W.M.

LINE	LENGTH	BEARING	LINE TABLE	CURVE TABLE
L1	100.00'	S89°45'17"E	100000.47 W	C1 100.00' 288.84' 271.63'
L2	153.81'	S72°00'00"W	100000.47 W	C2 153.81' 288.84' 271.63'
L3	117.52'	S17°20'53"E	100000.47 W	C3 117.52' 288.84' 271.63'
L4	332.46'	S87°54'30"E	100000.47 W	C4 332.46' 288.84' 271.63'
L5	500.00'	S89°45'17"E	100000.47 W	C5 500.00' 288.84' 271.63'
L6	542.20'	S89°45'17"E	100000.47 W	C6 542.20' 288.84' 271.63'
L7	248.73'	S89°45'17"E	100000.47 W	C7 248.73' 288.84' 271.63'
L8	110.07'	S02°22'58"E	100000.47 W	C8 110.07' 288.84' 271.63'
L9	141.17'	S02°22'58"E	100000.47 W	C9 141.17' 288.84' 271.63'
L10	168.50'	S00°01'00"W	100000.47 W	C10 168.50' 288.84' 271.63'
L11	81.16'	S43°30'21"E	100000.47 W	C11 81.16' 288.84' 271.63'
L12	258.57'	N43°30'21"E	100000.47 W	C12 258.57' 288.84' 271.63'
L13	372.71'	N17°26'31"E	100000.47 W	C13 372.71' 288.84' 271.63'



SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of...**TEANAWAY RIDGE, LLC**...
DATE: 07/20/07
DAVID P. NELSON
Certificate No. 18092

RECORDER'S CERTIFICATE

Filed for record this...day of...at...
In book...of...at page...at the request of...
DAVID P. NELSON
Surveyor's Name
County Auditor
Deputy County Auditor

VICINITY MAP - N.T.S.

APPROVALS

KITITAS COUNTY DEPARTMENT OF PUBLIC WORKS
EXAMINED AND APPROVED THIS ___ DAY OF ___ A.D., 200__

KITITAS COUNTY ENGINEER

KITITAS COUNTY HEALTH DEPARTMENT
I HEREBY CERTIFY THAT THE TEANAWAY RIDGE PLAT HAS BEEN EXAMINED BY ME AND I FIND THAT THE SEWERAGE AND WATER SYSTEM HEREON SHOWN DOES MEET AND COMPLY WITH ALL REQUIREMENTS OF THE COUNTY HEALTH DEPARTMENT.
DATED THIS ___ DAY OF ___ A.D., 200__

KITITAS COUNTY HEALTH OFFICER

CERTIFICATE OF COUNTY PLANNING DIRECTOR
I HEREBY CERTIFY THAT THE TEANAWAY RIDGE PLAT HAS BEEN EXAMINED BY ME AND I FIND THAT IT CONFORMS TO THE COMPREHENSIVE PLAN OF THE KITITAS COUNTY PLANNING COMMISSION.
DATED THIS ___ DAY OF ___ A.D., 200__

KITITAS COUNTY PLANNING DIRECTOR

CERTIFICATE OF KITITAS COUNTY TREASURER
I HEREBY CERTIFY THAT THE TAXES AND ASSESSMENTS ARE PAID FOR THE PRECEDING YEARS AND FOR THIS YEAR IN WHICH THE PLAT IS NOW TO BE PLAT.
PARCEL NOS. 18-18-22030-0010 (12896)
DATED THIS ___ DAY OF ___ A.D., 200__

KITITAS COUNTY TREASURER

CERTIFICATE OF KITITAS COUNTY ASSESSOR
I HEREBY CERTIFY THAT THE TEANAWAY RIDGE PLAT HAS BEEN EXAMINED BY ME AND I FIND THE PROPERTY TO BE IN AN ACCEPTABLE CONDITION FOR PLATING.
PARCEL NOS. 18-18-22030-0010 (12896)
DATED THIS ___ DAY OF ___ A.D., 200__

KITITAS COUNTY ASSESSOR

KITITAS COUNTY BOARD OF COMMISSIONERS
EXAMINED AND APPROVED THIS ___ DAY OF ___ A.D., 200__

BOARD OF COUNTY COMMISSIONERS
KITITAS COUNTY, WASHINGTON

BY: _____
CHAIRMAN
ATTEN: _____
CLERK OF THE BOARD

NOTES: THE APPROVAL OF THIS PLAT IS NOT A GUARANTEE THAT FUTURE PERMITS WILL BE GRANTED.



EXISTING CONDITIONS

This section of the report describes existing transportation conditions near the proposed development and includes a description of the local zoning, street network, traffic controls, traffic volumes, transit service, pedestrian facilities, and safety components. This section serves as a basis for subsequent analysis of forecasted transportation conditions with the development.

STUDY AREA

The site is located in Kittitas County, Washington, generally north of Bowers Rd and west of Reecer Creek Rd. This site is northwest of central Ellensburg, and just north of Interstate 90. The site is currently zoned Agricultural-3. The study area includes adjacent roadways as well as nearby roadways connecting directly to either Reecer Creek Rd or Faust Rd.

SITE ACCESSIBILITY

Study Area Roadway System

The study area for this analysis includes the seven intersections described in Table 1, including the site accesses off of Reecer Creek Rd. Significant roadways within this study area and near the site are described in Table 2.

TABLE 1: INTERSECTION INVENTORY

ID	Intersection	Control
1	Reecer Creek Rd at University Way	One-Way Stop
2	Reecer Creek Rd at Old Hwy 10	One-Way Stop
3	Reecer Creek Rd at Dry Creek Rd	Two-Way Stop
4	Reecer Creek Rd at Bender Rd	One-Way Stop
5	Reecer Creek Rd at Bowers Rd	One-Way Stop
6	Faust Rd at Old Hwy 10	All-Way Stop
7	Faust Rd at Dry Creek Rd	Two-Way Stop

Existing Traffic Volumes

At the request of Kittitas County staff, TSI evaluated this development's impacts during the morning (AM) and afternoon (PM) peak hour periods. The traditional AM peak hour occurs between 7:00 and 9:00 AM and the traditional PM peak hour occurs between 4:00 and 6:00 PM. The peak hour within these two-hour periods is identified as the 60-minute interval associated with the greatest four consecutive 15-minute traffic volumes. The PM peak hour period typically represents the time when the combination of background and development-generated traffic volumes are highest, thus resulting in the greatest potential traffic impact.



TABLE 2: ROAD NETWORK

Street Name	Classification	Orientation	Cross Section
Reecer Creek Rd	Major Collector	North/South	2 Lanes
Old Hwy 10	Reecer Creek Rd at Old Hwy 10	Northwest /Southeast	2 Lanes
Dry Creek Rd	Major Collector	Northwest /Southeast	2 Lanes
Bender Rd	Major Collector	East/West	2 Lanes
Bowers Rd	Major Collector	East/West	2 Lanes
Faust Rd	Major Collector	North/South	2 Lanes
University Way	Other Principal Arterial	Northwest /Southeast to Southwest /Northeast	2 Lanes
Interstate 90	Interstate Highway	Northwest /Southeast	4 Lanes

TSI obtained existing AM and PM peak hour traffic volumes based on turning movement counts conducted by Trafficcount on Wednesday, October 3 and Thursday, October 4, 2007. These counts were conducted during the same period listed above. Figure 3 and Figure 4 illustrate the AM and PM 2007 existing peak hour traffic volumes.

Existing Safety and Capacity Deficiencies

No capacity or geometric deficiencies were noted on the roadways or intersections listed in Tables 1 and 2 above. Existing intersection operations are noted later in this report.

Collision Analysis

Collisions occurring in the last three years (2004 to 2006) within this development’s study area are summarized in Table 3. There were 15 total collisions at intersections in this study area during this period. Collision and ADT data were obtained from Kittitas County and the Washington State Department of Transportation.

An intersection with a collision rate of greater than 1.0 collisions per million entering vehicles is generally considered unsafe. The collision data do not indicate any high accident locations within this study area.

Public Transportation Service

Public transit is relatively limited in the study area. Central Transit operates a morning and an evening route in central Ellensburg. The nearest stop location to this development is located at E 14th Ave and D Street.

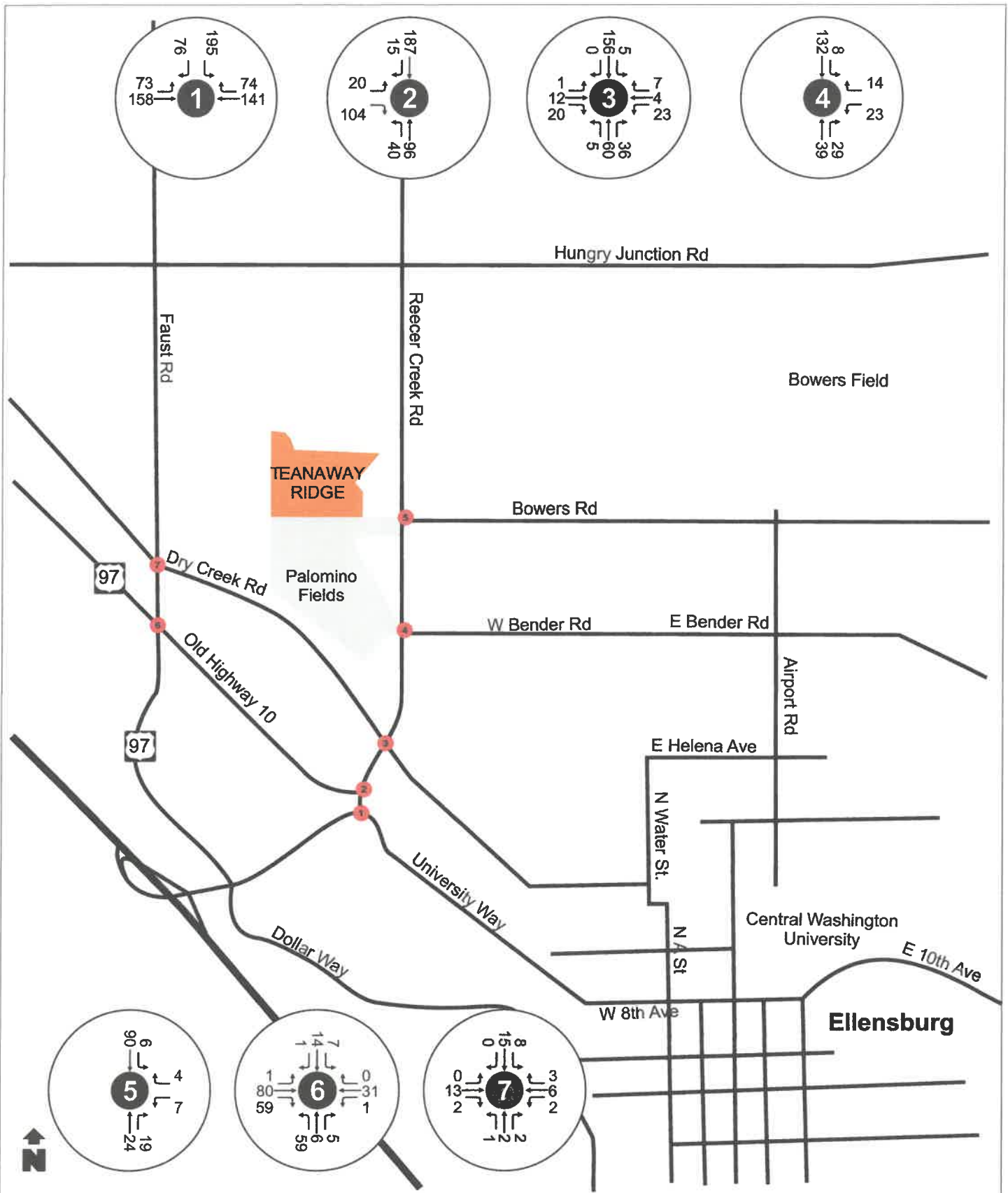


Figure 3: 2007 Existing AM Peak Hour Volumes

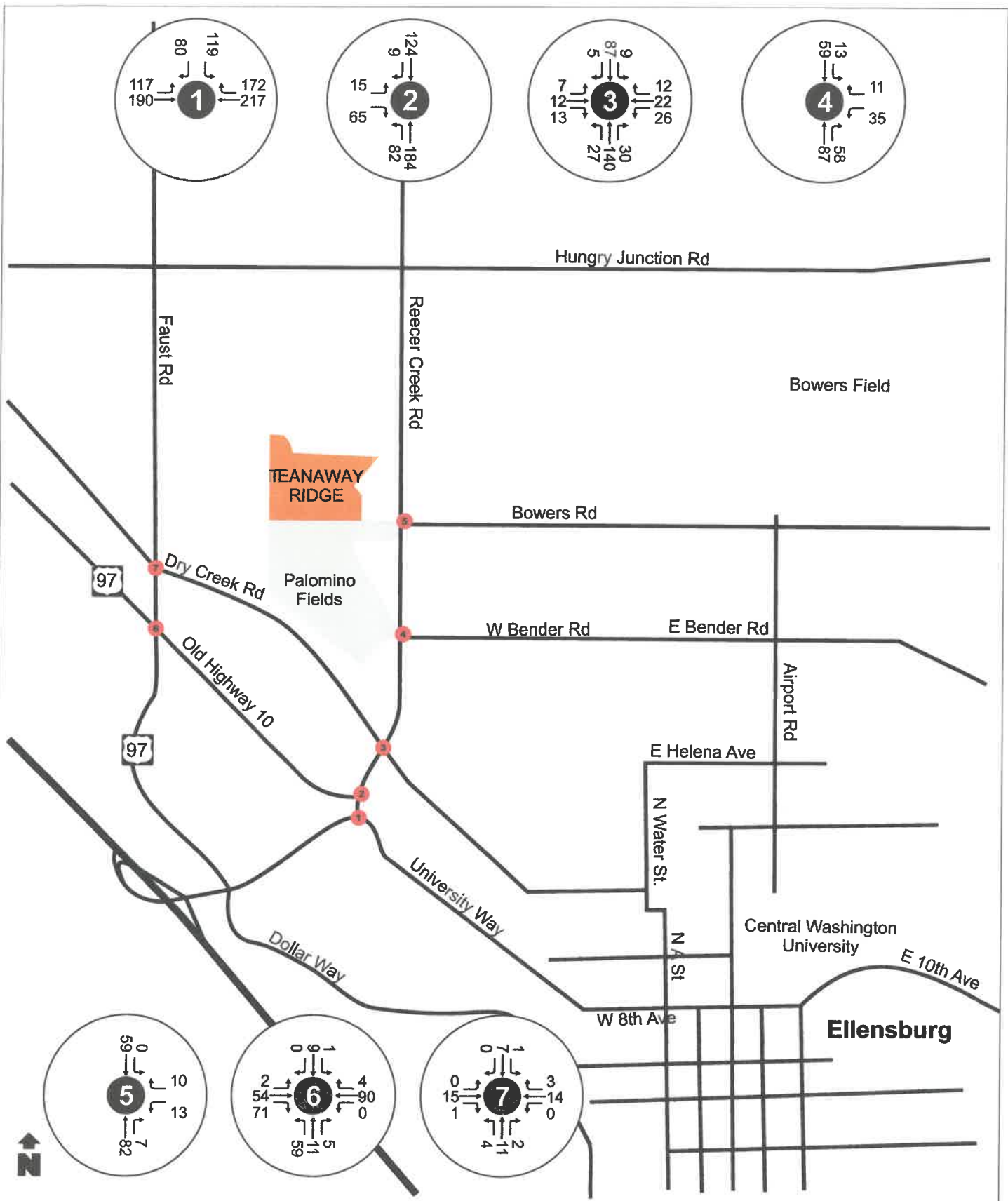


Figure 4: 2007 Existing PM Peak Hour Volumes



TABLE 3: COLLISION HISTORY

ID	Intersection	Collisions	ADT of Cross Streets	Annual Collision Rate ³
1	Reecer Creek Rd at University Way	3	3883 ²	0.71
2	Reecer Creek Rd at Old Hwy 10	5	5131	0.89
3	Reecer Creek Rd at Dry Creek Rd	3	3240	0.85
4	Reecer Creek Rd at Bender Rd	2	3383	0.54
5	Reecer Creek Rd at Bowers Rd	1	1674	0.55
6	Faust Rd at Old Hwy 10	1 ¹	3642	0.25
7	Faust Rd at Dry Creek Rd	No Data	No Data	--

¹ Data provided by WSDOT.

² No ADT volumes available for University Way; thus the collision rate at this location should be considerably lower than presented here.

³ Collision rate is expressed in terms of million entering vehicles (MEV).

Non-Motorized Transportation

This development is located in a suburban/rural setting. Roadways near the site are built according to the County's rural standard, which includes gravel shoulders and no bike lanes or sidewalks.

The John Wayne Trail is to the south of the site, and offers pedestrian and bicycle opportunities.

Other Transportation Modes

Bowers Field is a local airport located approximately 1.5 miles east of the site and north of Ellensburg. The airport does not offer national or international connections.

FORECASTED TRAFFIC

Teaway Ridge Plat is anticipated to be constructed and occupied by 2012. County staff requested a 5-year analysis period for evaluating development generated impacts. Thus, this section outlines the assumptions and steps taken to forecast 2012 future traffic volumes without and with the development. Included in this section are discussions of the potential impacts of additional automobile traffic in the site vicinity generated by growth in the area and the incremental traffic volumes associated with this development.

BACKGROUND TRAFFIC VOLUMES

This section of the report describes 2012 'without' Teaway Ridge Plat (background) traffic volumes. Background traffic volumes are those traffic volumes present on the roadways without any of the new traffic volumes generated from the



proposed development. Background traffic volumes are made up of regional traffic growth and pipeline development traffic. Pipeline development traffic volumes are the trips generated by other development applications approved though not yet constructed. This section will serve as a basis for evaluating cumulative traffic impacts and isolating development specific impacts for the future 'with' development condition.

County staff indicated a 5.0% annual background growth rate be used in this analysis.

Two pipeline developments: Black Horse at Whiskey Creek and Palomino Fields were identified to potentially generate traffic near the Teanaway Ridge Plat site. Black Horse at Whiskey Creek is a 375 single-family home development proposed at the intersection of Reece Creek Rd and Bender Rd. This development was forecasted to generate 3,579 weekday daily trips, 281 AM peak hour trips (70 in and 210 out)¹, and 378 PM peak hour trips (238 in and 140 out). As a condition of this development a traffic signal is required at the intersection of Reece Creek Rd and University Way.

Palomino Fields is a 120 single-family home development proposed just south of this development. Palomino Fields is anticipated to be occupied by 2012 and is forecast to generate 1,230 weekday daily trips, 93 AM peak hour trips (23 in and 70 out), and 127 PM peak hour trips (80 in and 47 out).²

Kittitas County staff have indicated a 5.0% annual background growth rate be used in this analysis.

The localized impact of the trips associated with the adjacent proposed Black Horse at Whiskey Creek and Palomino Fields developments are included in the future conditions analysis on top of the 5.0% growth rate. While this suggests some "double counting," the effects should be minor and this enhances the conservative nature of the analysis. The background growth is added to the existing traffic volumes resulting in background year 2012 AM and PM peak hour traffic volumes which are illustrated in Figures 5 and Figure 6.

¹ The AM peak hour trips generated by Black Horse at Whiskey Creek were not included in this pipeline development's traffic analysis. The AM peak hour trip generation was calculated by TSI using trip rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation, 7th Edition* for single-family land uses.

² Trip generation for Palomino Fields is included in the February 2008 Palomino Field TIA prepared by TSI. Trip generation for this development was calculated using ITE trip generation data.

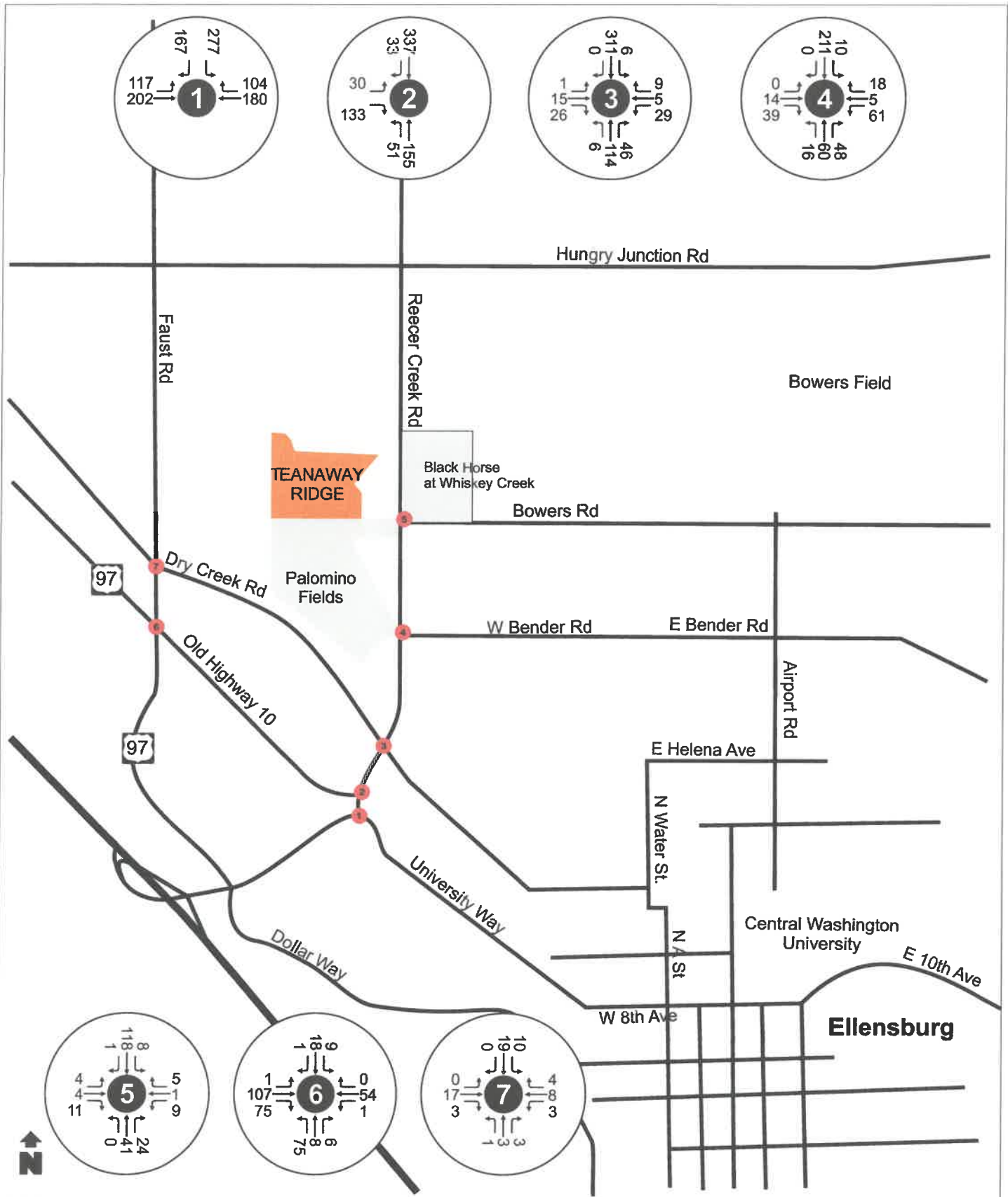


Figure 5: 2012 Future Background AM Peak Hour Volumes

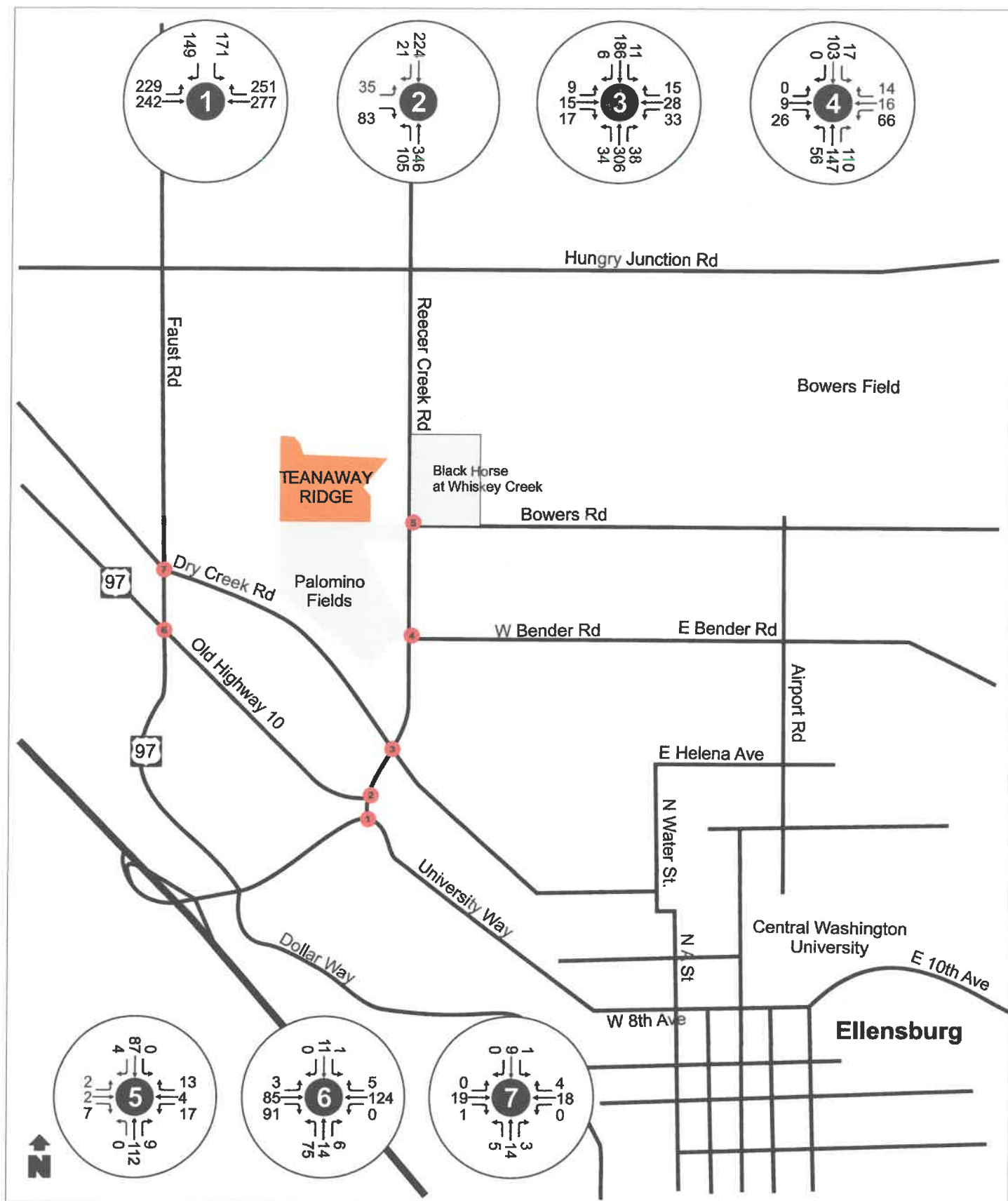


Figure 6: 2012 Future Background PM Peak Hour Volumes



SITE TRAFFIC

This section of the report analyzes the forecasted traffic volumes associated with Teanaway Ridge Plat. The forecasted conditions with the development will be compared with the background traffic conditions to determine any associated impacts with the addition of the proposed development.

TSI uses a generally accepted transportation planning approach that includes the following steps for forecasting travel demand:

- *Trip Generation*: Trips produced by the occupancy of the development.
- *Mode Split*: Proportion of trips by travel mode (automobile, transit, other).
- *Trip Distribution*: Origins/destinations and routes of trips.
- *Travel Assignment*: Number of new trips using the street network by route.

Trip Generation and Mode Split

Trip rates from ITE's *Trip Generation* were used to calculate vehicle trips associated with the development of Teanaway Ridge Plat. Teanaway Ridge Plat is to include 14 single-family homes. The ITE LUC used to describe the proposed use is LUC 210, "Single-Family Detached Housing." Table 4 summarizes the weekday daily, AM peak hour and PM peak hour trip generation for Teanaway Ridge Plat.

TABLE 4: PROPOSED DEVELOPMENT TRIP GENERATION SUMMARY

Period	Dwelling Units	ITE Rate	Distribution		Total Trips		
			in	out	in	out	Total
Weekday	14	12.17	50%	50%	85	85	170
AM Peak Hour	14	1.37	25%	75%	5	14	19
PM Peak Hour	14	1.30	63%	37%	12	7	18

The future 2012 impact from this development onto the surrounding road network is 170 new weekday daily trips, 19 new AM peak hour trips (5 in and 14 out), and 18 new PM peak hour trips (12 in and 7 out).

For this analysis, the mode split travel to and from this development were considered to take place by personal automobile without any deduction for pedestrian, bicycle, or transit trips.

Trip Distribution and Travel Assignment

Trip distribution for this development is based on the trip generation used in the Palomino Fields TIA.



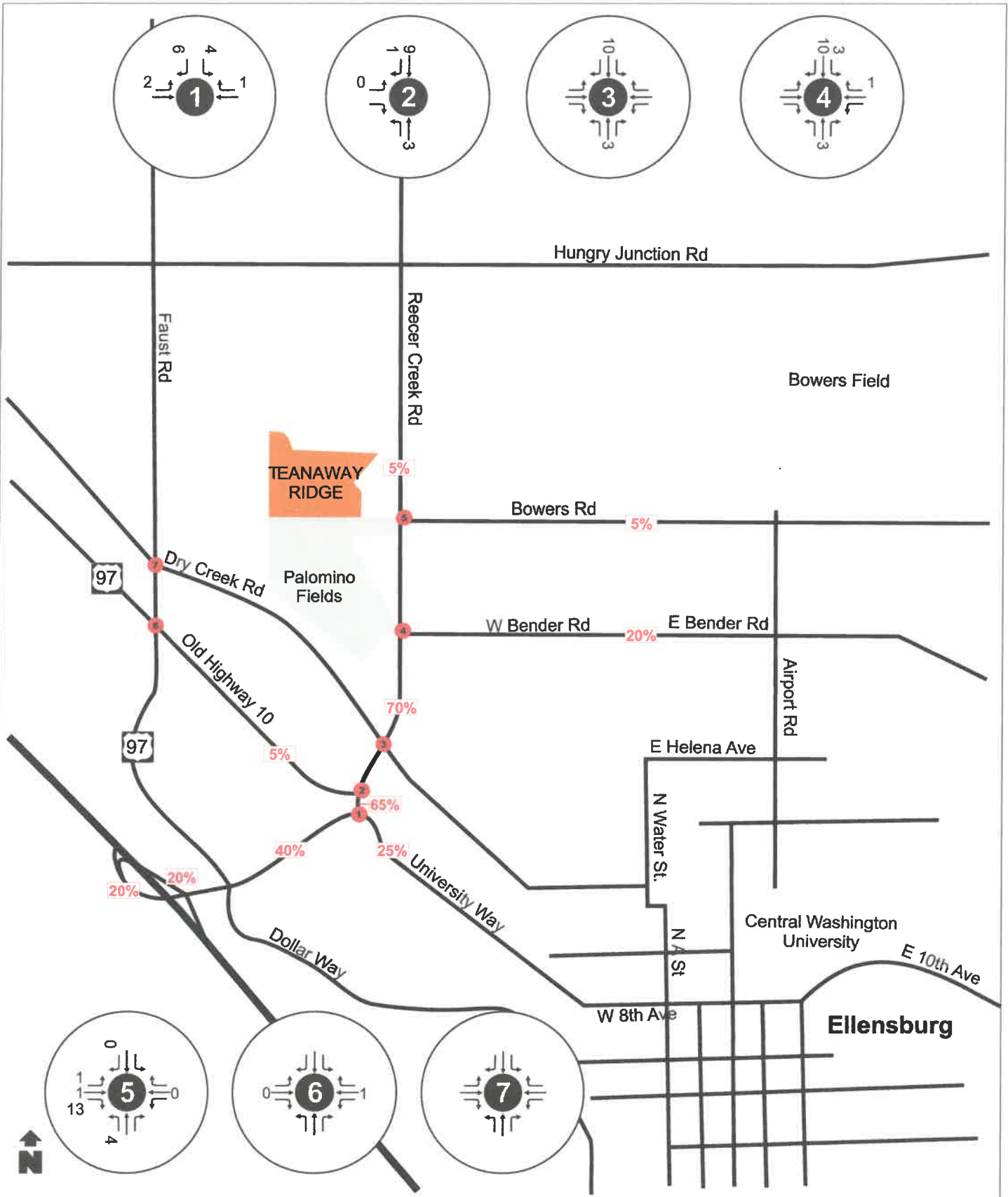
Palomino Fields trips were distributed through the roadway network initially based on the trip distribution used in the Black Horse at Whiskey Creek TIA. The trip distribution from Black Horse at Whiskey Creek was adjusted for both Palomino Fields and Teanaway Ridge Plat based on a field visit and intersection turning movement volumes. Compared to the Black Horse at Whiskey Creek trip distribution more Palomino Fields and Teanaway Ridge Plat trips are assumed to and from Interstate 90 and to and from Ellensburg via University Way; whereas, most Black Horse at Whiskey Creek trips are assumed to and from Ellensburg via W Bender Rd.

The Palomino Fields development will be constructing the west-legs of the Reecer Creek Rd at Bowers Rd and Reecer Creek Rd at Bender Rd for its site accesses. Teanaway Ridge Plat will share the Bowers Rd access with Palomino Fields. Due to the relatively small amount of trips generated by Teanaway Ridge Plat it is assumed that all Teanaway Ridge Plat trips will access the site at Reecer Creek Rd and Bowers Rd. It is unlikely that some, if any, Teanaway Ridge Plat trips will gain access to their site via Reecer Creek Rd at Bender Rd through Palomino Fields.

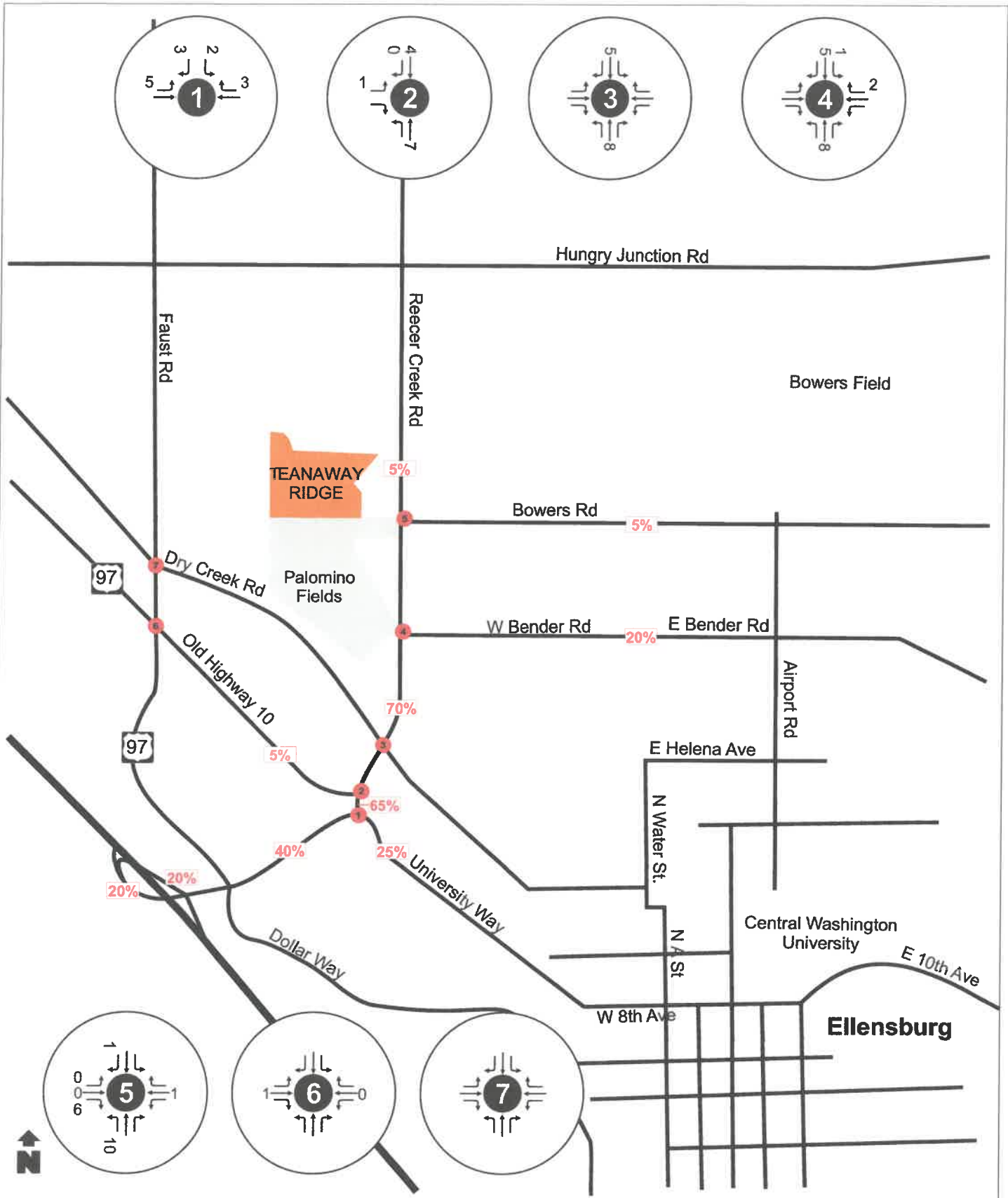
The peak hour trip distributions and travel assignments for the proposed development are shown in Figure 7 and Figure 8. The AM and PM peak hour trip distributions are assumed to be similar.

TOTAL NETWORK TRAFFIC

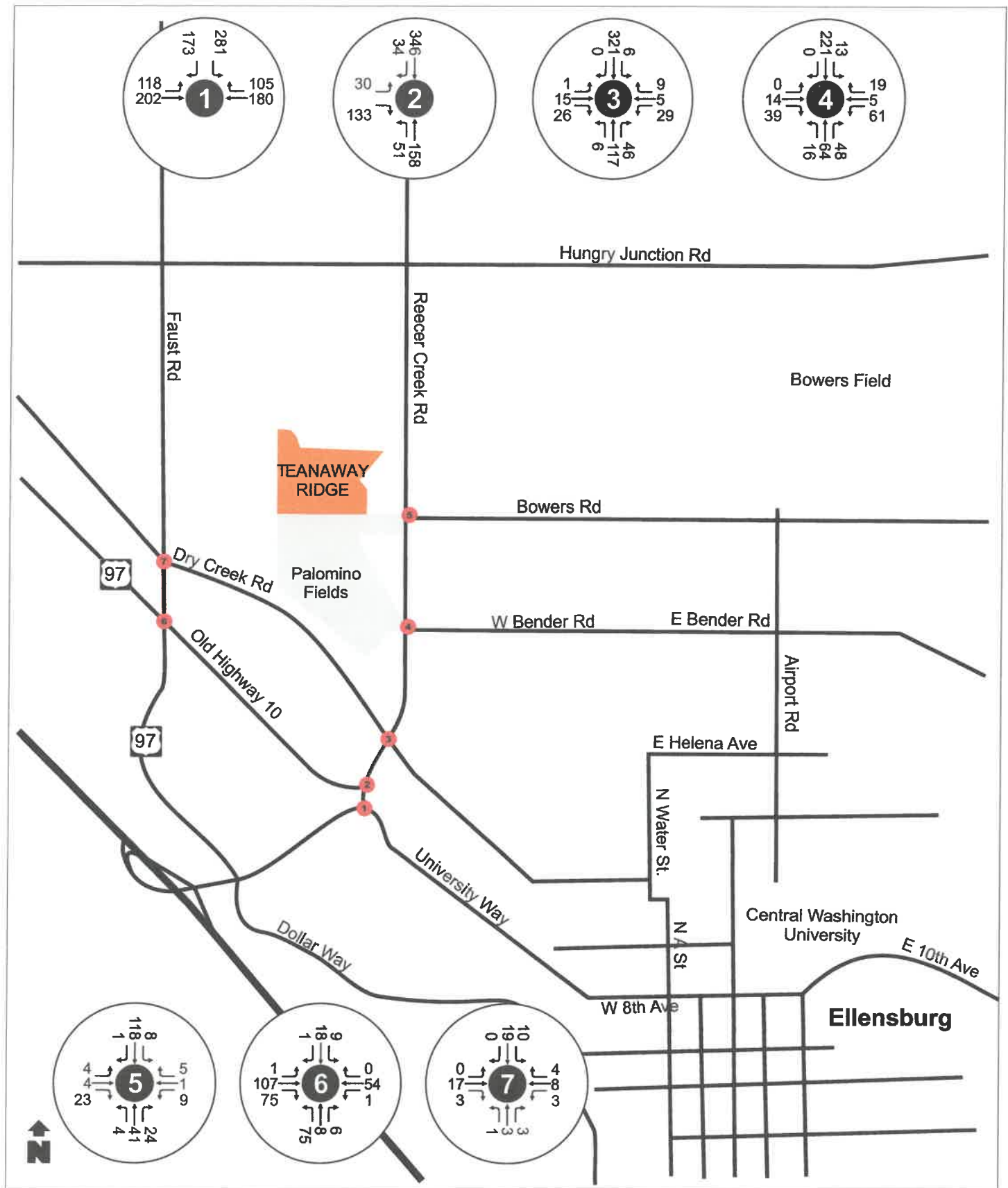
The new peak hour trips generated to and from this development, shown in Figure 7 and Figure 8, were superimposed onto the background traffic volumes (Figure 4 and Figure 5) to forecast the future 2012 traffic conditions with Teanaway Ridge Plat. The peak hour future 2012 traffic conditions with Teanaway Ridge Plat are illustrated in Figure 9 and Figure 10.



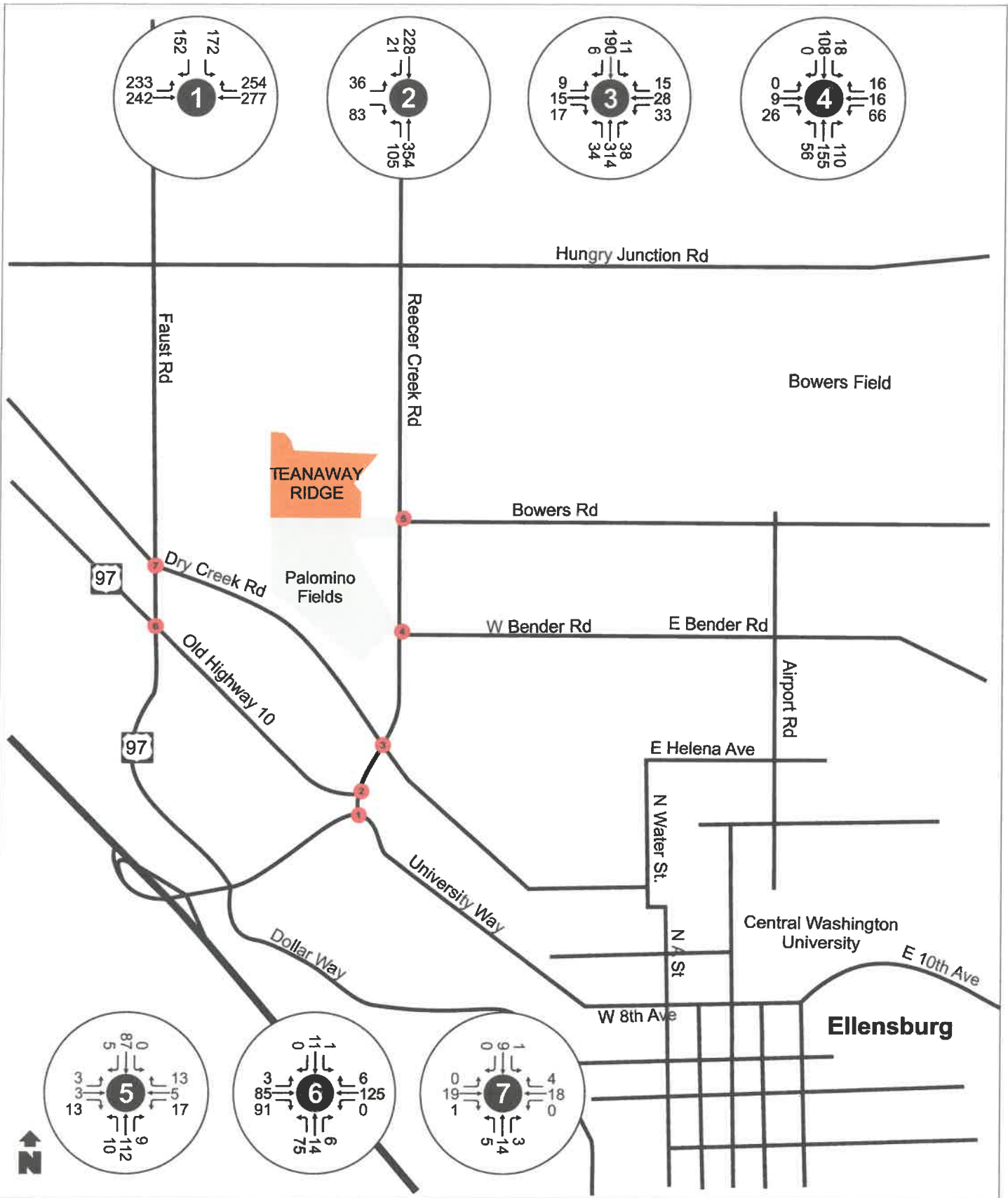
**Figure 7: AM Peak Hour
Trip Distribution and Assignment**



**Figure 8: PM Peak Hour
Trip Distribution and Assignment**



**Figure 9: 2012 Future With the Development
AM Peak Hour Volumes**



**Figure 10: 2012 Future With the Development
PM Peak Hour Volumes**



TRAFFIC ANALYSIS

This section of the report considers traffic operations at the site accesses and intersections listed in Table 1 under existing, future background and future with Teanaway Ridge Plat conditions. Traffic safety, site circulation and queuing are also considered.

CAPACITY AND LEVEL OF SERVICE

Level of service is a measure of the ability of a given intersection to serve the traffic volumes using the street network. The Transportation Research Board developed the LOS methodology used in making this evaluation, and it is described in the *Highway Capacity Manual (HCM)*, 2000 update. Intersection LOS calculations were performed using the Synchro, version 7, computer program.

For signalized and all-way stop-sign controlled intersections, LOS is based on the average vehicle delay for all movements. For two-way and one-way stop-sign controlled intersections, LOS is based on the vehicle delay of the most congested approach. Vehicular delays for both signalized and unsignalized intersections are divided into grade levels ranging from LOS-A, which indicates little or no congestion and delay, to LOS-F, which reflects overcapacity conditions with long delays. Although these letter designations provide a simple basis for comparison, seconds of controlled delay should be used as the exact measure of comparison.

Kittitas County considers LOS-D acceptable for intersections in an urban environment, and LOS-C acceptable for intersections in a rural environment. Where intersections border the urban area boundary, the higher standard (LOS-C) applies. All intersections in the study area were considered rural based upon County road classifications, and the LOS-C standard was applied for this analysis.

Level of service (LOS) analysis under existing, future background and future with development conditions was performed for the intersections identified in Table 1. A summary of LOS and seconds of delay is shown below in Table 5. All three conditions are shown side by side for comparison.

For analysis of future background and future with development LOS conditions, a traffic signal was assumed at the Reecer Creek Rd and University Way intersection as identified from the Black Horse at Whiskey River pipeline development.



TABLE 5: LEVEL OF SERVICE SUMMARY

ID	AM PEAK HOUR		Existing 2007		Background 2012		With Development 2012	
	Intersection ¹		LOS	Delay ²	LOS	Delay ²	LOS	Delay ²
1	Reecer Creek Rd at University Way	SB/Avg.	C ³	15.8	A ³	7.4	A ³	7.4
2	Reecer Creek Rd at Old Hwy 10	EB	B	10.3	B	12.4	B	12.6
3	Reecer Creek Rd at Dry Creek Rd	EB	B	10.0	B	11.8	B	11.9
		WB	B	10.7	B	13.5	B	13.7
4	Reecer Creek Rd at Bender Rd	EB	-	-	B	10.5	B	10.7
		WB	A	9.5	B	12.8	B	13.1
5	Reecer Creek Rd at Bowers Rd	EB	-	-	A	9.5	A	9.4
		WB	A	9.0	A	9.6	A	9.8
6	Faust Rd at Old Hwy 10	Avg.	A	7.8	A	8.2	A	8.2
7	Faust Rd at Dry Creek Rd	NB	A	8.8	A	8.9	A	8.9
		SB	A	9.1	A	9.2	A	9.2

ID	PM PEAK HOUR		Existing 2007		Background 2012		With Development 2012	
	Intersection ¹		LOS	Delay ²	LOS	Delay ²	LOS	Delay ²
1	Reecer Creek Rd at University Way	SB/Avg.	C ³	18.6	A ³	8.1	A ³	8.2
2	Reecer Creek Rd at Old Hwy 10	EB	A	9.9	B	12.8	B	12.2
3	Reecer Creek Rd at Dry Creek Rd	EB	B	10.7	B	13.7	B	13.8
		WB	B	11.7	C	16.8	C	17.1
4	Reecer Creek Rd at Bender Rd	EB	-	-	B	10.3	B	10.4
		WB	A	9.8	B	15.1	B	15.3
5	Reecer Creek Rd at Bowers Rd	EB	-	-	A	9.4	A	9.4
		WB	A	9.2	A	9.9	B	10.1
6	Faust Rd at Old Hwy 10	Avg.	A	7.8	A	8.3	A	8.3
7	Faust Rd at Dry Creek Rd	NB	A	9.1	A	9.1	A	9.1
		SB	A	9.3	A	9.3	A	9.3

1. Level of service and delay are reported for each controlled approach for unsignalized intersections.

2. Delay is expressed in seconds.

3. In the existing condition this intersection is unsignalized and the southbound approach LOS is reported. In the 2012 background and with development conditions this intersection is signalized and the average LOS is reported.

Table 5 shows that, in general, intersection delays increase slightly between the future background and future with the development conditions. All intersections perform at LOS-C or better with the development in place, which indicates that these intersections have more than adequate capacity with this development occupied.

The only intersection forecast to operate at LOS-C with the development is Reecer Creek Rd at Dry Creek Road. This intersection operates at LOS-C during the PM



peak hour under the background condition. Less than a second of delay is added to this intersection between the background and with development conditions.

Traffic flow and intersection operations improve from LOS-C to LOS-A at the intersection of Reecer Creek Rd and University Way between the existing and background conditions. The improved operations are due to the installation of a traffic signal conditioned with the Black Horse at Whiskey Creek development.

TRAFFIC SAFETY

This section will evaluate the future with the proposed development forecasted safety conditions, including the potential effects of future collisions resulting from added development traffic and the potential impacts of sight distance at the proposed site access.

Development-Generated Collisions

The proposed development would add 19 new AM peak hour trips and 18 new PM peak hour trips to the surrounding road network, which is a small increase compared to the background traffic present without this development. The small increase in the traffic volumes within the study area caused by Teanaway Ridge Plat coupled with the excess capacity of the semi-rural road network indicates no new collision problems should be anticipated with this development.

Sight Distance Analysis

There are no sight distance issues along Reecer Creek Rd at the Access at Bowers Rd. Reecer Creek Rd extends north and south from the site with no significant shifts in the horizontal alignment of the roadway.

SITE CIRCULATION

As indicated in Figure 2, Teanaway Ridge Plat will access the local road network via the eastbound leg to the Bowers Rd at Reecer Creek Road intersection. All 14 lots are expected to utilize this connection.

QUEUING

As mentioned previously Teanaway Ridge Plat will share access to Reecer Creek Rd at Bowers Rd with the Palomino Fields development. Palomino Fields has two accesses to Reecer Creek Rd at Bender Rd and Bower Rd. Traffic generated by Teanaway Ridge Plat at the Reecer Creek Rd intersection with Bowers Rd and past the Reecer Creek Rd intersection with Bender Rd will affect operations for both



developments. Thus, the two Reecer Creek Rd intersections with Bender Road and Bowers Rd were evaluated in terms of queuing using SimTraffic software.

SimTraffic uses a 20 foot car length as the default design vehicle and vehicle spacing of 5 feet for queuing simulations. The anticipated 95th percentile queues on each controlled approach are indicated in Table 6. The analysis shows all queues are less than three car lengths, not significant to cause circulation problems. Occupation of both Palomino Fields and Teanaway Ridge Plat is not anticipated cause any significant queuing problem(s) for each site.

TABLE 6: QUEUING SUMMARY

ID	Intersection	95 th % Queue		
		AM	PM	
4	Reecer Creek Rd at Bender Rd	EB	47 feet	70 feet
		WB	55 feet	54 feet
5	Reecer Creek Rd at Bowers Rd	EB	43 feet	44 feet
		WB	34 feet	58 feet

LEFT-TURN LANE WARRANT: REECER CREEK RD AT BENDER RD

Kittitas County staff requested left-turn lane warrants³ be evaluated at the Reecer Creek Rd and Bender Rd intersection as a part of the Palomino Fields TIA. Granted this development does not directly impact the northbound left-turn movement at this intersection, Teanaway Ridge Plat and Palomino Fields are being development by the same developer and thus the northbound left turn-lane warrant was revisited.

The 2012 future with development northbound left-turn volume forecast at this intersection, 16 AM peak hour vehicles (Figure 9) and 56 PM peak hour vehicles (Figure 10), do not warrant construction of a left-turn lane at this intersection. Figure 11 illustrates the left-turn storage lane warrant criteria and includes the forecasted 2012 with development volumes.

The Reecer Creek Rd intersection with Bender Rd has a higher northbound left-turn volume and higher intersection volume (about two times more vehicles) than at Bowers Rd and thus a turn-lane warrant analysis does not seem relevant at Teanaway Ridge Plat’s site access.

³ Left-turn storage lane warrants were evaluated using criteria included in the Highway Research Board of National Academies publication *Highway Research Record 211, Volume Warrants for Left-Turn Storage Lanes at Unsignalized Intersections*.

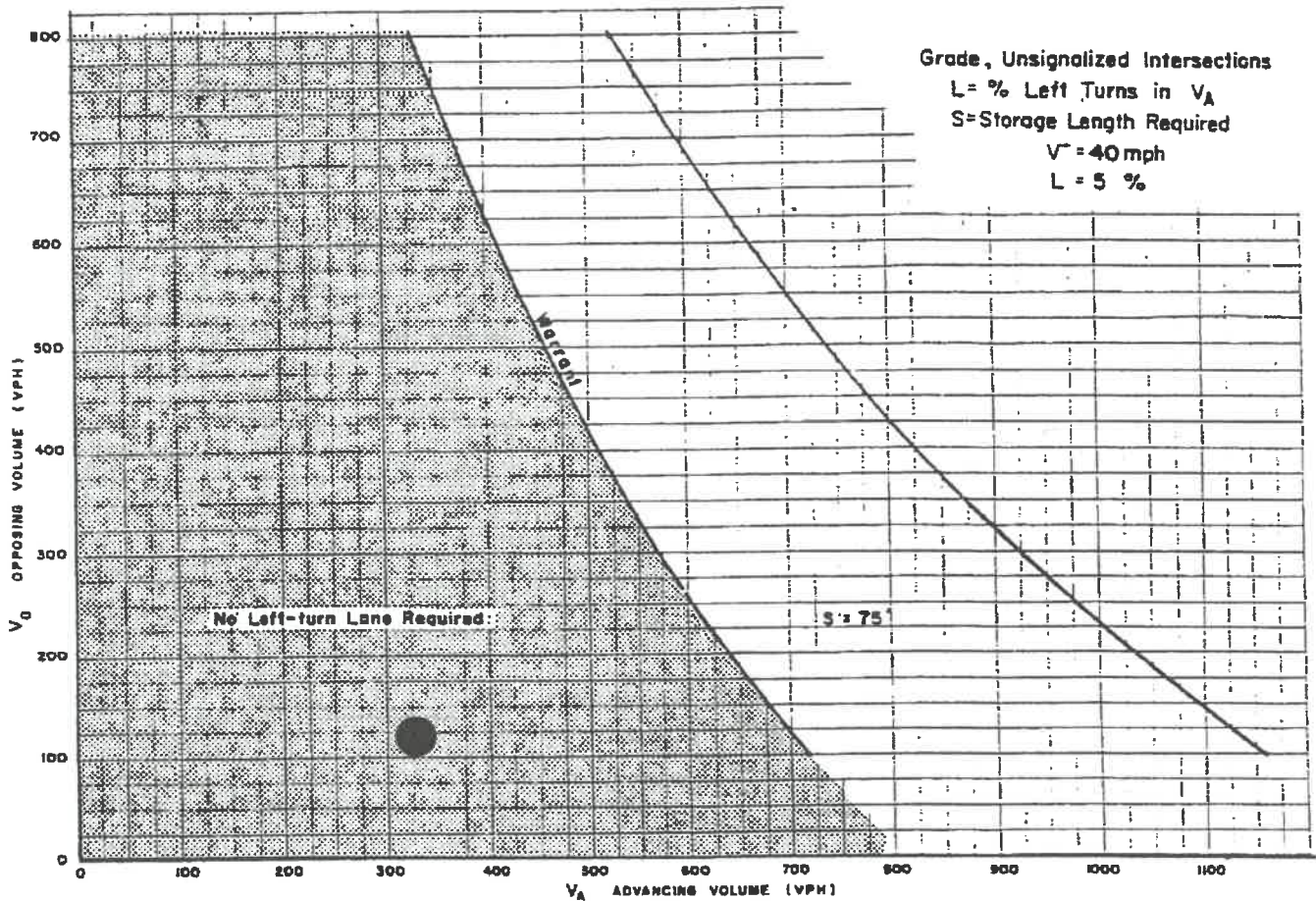


Figure 2. Warrant for left-turn storage lanes on two-lane highways.

L = 17%
 $V_A = 320$
 $V_O = 126$

Source: Highway Research Board of National Academies. *Highway Research Record 211, Volume Warrants for Left-Turn Storage Lanes at Unsignalized Intersections.*



FINDINGS AND CONCLUSIONS

Following are the conclusions of this analysis:

- This development is expected to generate 170 new weekday daily trips, 19 new AM peak hour trips (split 25% in and 75% out), and 18 new PM peak hour trips (split 63% in and 37% out).
- The site layout anticipates a connection to an extension of Bowers Rd west of Reecer Creek Rd.
- Queuing at the Bowers Rd/Reecer Creek Rd intersection is not expected to be problematic; vehicles exiting the site should not queue more than two vehicles at a time.
- The Bowers Rd/Reecer Creek Rd intersection is forecasted to operate at LOS-B or better in both the AM and PM peak hours.
- In the AM and PM peak hours with the development in place in 2012, all study intersections are forecast to operate at LOS-B or better. All study intersections satisfy the city's LOS standard of LOS-D.
- This development's impacts at the Reecer Creek Rd at University Way intersection are minimal. Under future background conditions, the intersection is expected to already operate below the LOS standard. Because there is a planned signal improvement at this intersection, this development can be expected to contribute a proportionate share toward the anticipated \$200,000 signal cost. Of the 1,331 PM peak hour trips through this intersection in 2012, 12 (0.9%) are attributable to this development. The proportionate share of the anticipated \$200,000 signal cost is then \$1,785.



APPENDIX A TURNING MOVEMENT COUNTS



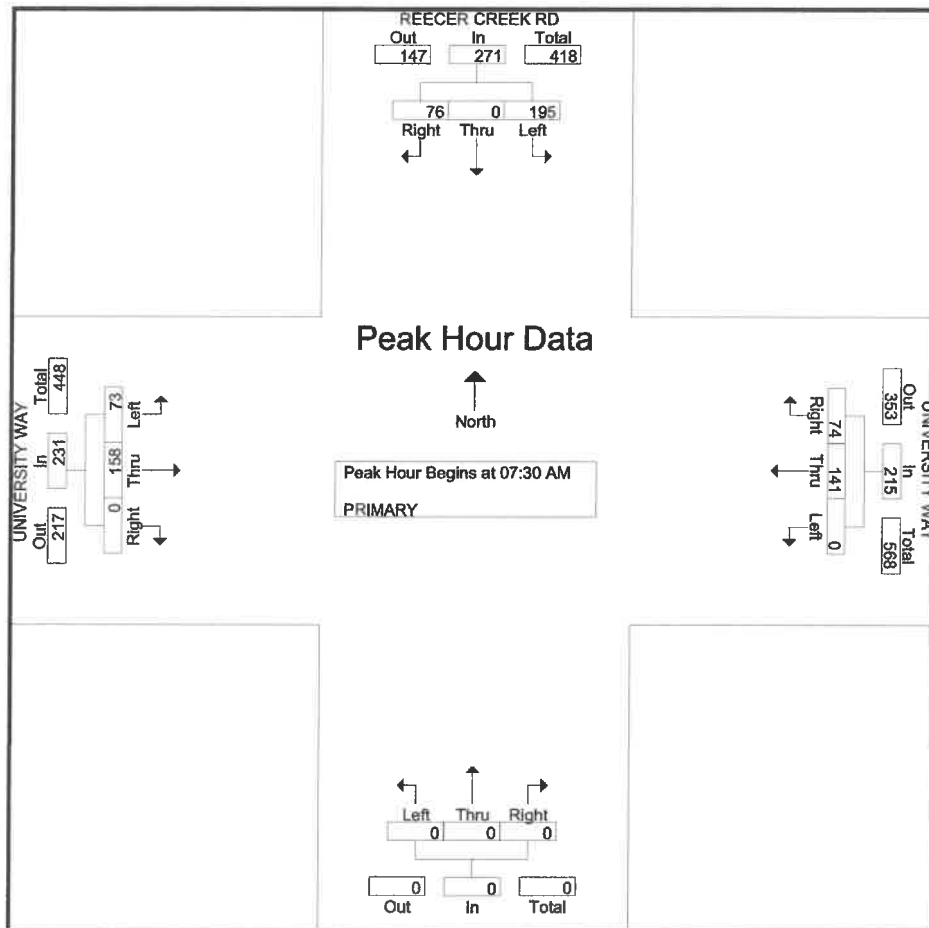
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 UNIVERSITY WAY
 LOC # 01A/ TSI07277M

File Name : TSI27701A
 Site Code : 00000001
 Start Date : 10/4/2007
 Page No : 2

Start Time	REECER CREEK RD From North				UNIVERSITYWAY From East				From South				UNIVERSITYWAY From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	19	0	62	81	21	38	0	59	0	0	0	0	0	39	17	56	186
07:45 AM	20	0	58	78	18	34	0	52	0	0	0	0	0	35	14	49	179
08:00 AM	22	0	35	57	16	34	0	50	0	0	0	0	0	47	25	72	179
08:15 AM	15	0	40	55	19	35	0	54	0	0	0	0	0	37	17	54	163
Total Volume	76	0	195	271	74	141	0	215	0	0	0	0	0	158	73	231	717
% App. Total	28	0	72		34.4	65.6	0		0	0	0	0	0	68.4	31.6		
RT-F	.864	.000	.786	.836	.881	.928	.000	.911	.000	.000	.000	.000	.000	.840	.790	.802	.915



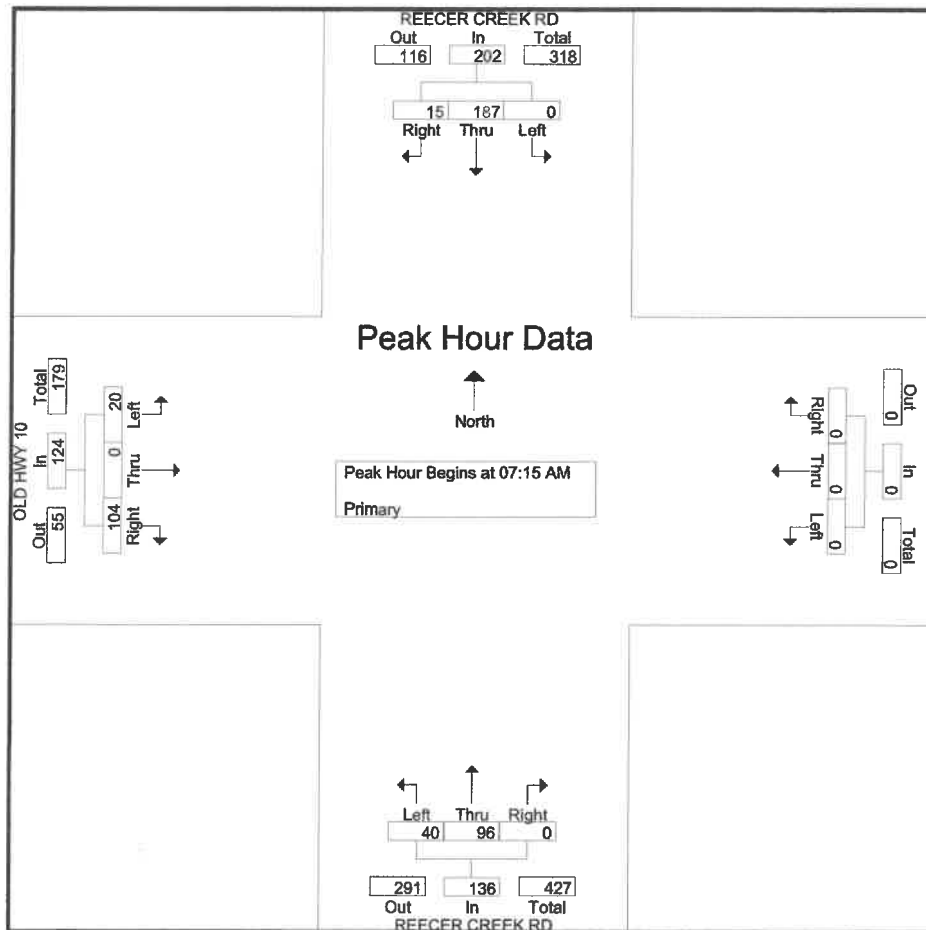
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 OLD HWY 10
 LOC # 02A TSI07271M

File Name : TSI27702A
 Site Code : 00000002
 Start Date : 10/4/2007
 Page No : 2

Start Time	REECER CREEK RD From North				From East				REECER CREEK RD From South				OLD HWY 10 From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	4	42	0	46	0	0	0	0	0	20	12	32	25	0	4	29	107
07:30 AM	6	56	0	62	0	0	0	0	0	26	12	38	29	0	8	37	137
07:45 AM	4	50	0	54	0	0	0	0	0	23	8	31	29	0	4	33	118
08:00 AM	1	39	0	40	0	0	0	0	0	27	8	35	21	0	4	25	100
Total Volume	15	187	0	202	0	0	0	0	0	96	40	136	104	0	20	124	462
% App. Total	7.4	92.6	0		0	0	0		0	70.6	29.4		83.9	0	16.1		
PHF	.625	.835	.000	.815	.000	.000	.000	.000	.000	.889	.833	.895	.897	.000	.625	.838	.843



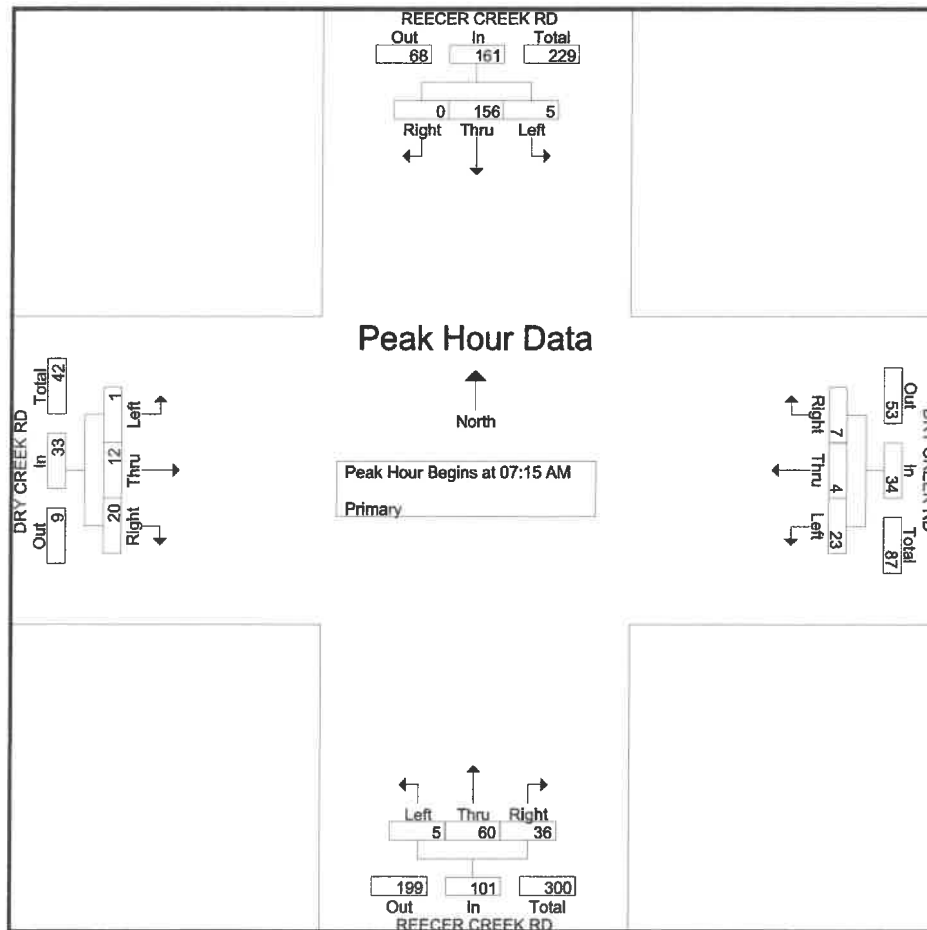
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 DRY CREEK RD
 LOC # 03A/ TSI07277M, GENE

File Name : TSI27603A
 Site Code : 00000003
 Start Date : 10/4/2007
 Page No : 2

Start Time	REECER CREEK RD From North				DRY CREEK RD From East				REECER CREEK RD From South				DRY CREEK RD From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	33	1	34	2	1	5	8	9	19	2	30	5	3	1	9	81
07:30 AM	0	41	1	42	0	1	8	9	8	14	0	22	6	2	0	8	81
07:45 AM	0	46	1	47	2	2	4	8	9	12	1	22	4	4	0	8	85
08:00 AM	0	36	2	38	3	0	6	9	10	15	2	27	5	3	0	8	82
Total Volume	0	156	5	161	7	4	23	34	36	60	5	101	20	12	1	33	329
% App. Total	0	96.9	3.1		20.6	11.8	67.6		35.6	59.4	5		60.6	36.4	3		
R-F	.000	.848	.625	.856	.583	.500	.719	.944	.900	.789	.625	.842	.833	.750	.250	.917	.968



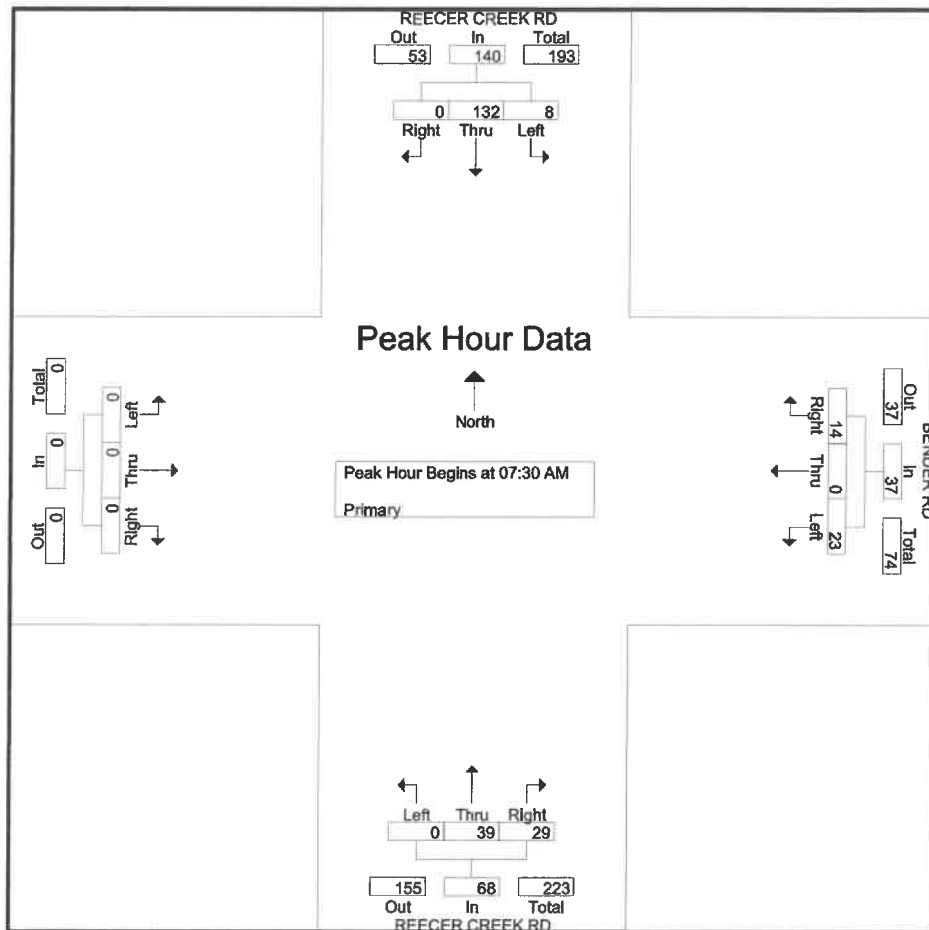
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 W BENDER RD
 LOC # 04A/ TSI07277M, GENE

File Name : TSI27704A
 Site Code : 00000004
 Start Date : 10/4/2007
 Page No : 2

Start Time	REECER CREEK RD From North				BENDER RD From East				REECER CREEK RD From South				From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	34	3	37	4	0	5	9	6	7	0	13	0	0	0	0	59
07:45 AM	0	39	2	41	5	0	6	11	4	12	0	16	0	0	0	0	68
08:00 AM	0	30	2	32	3	0	4	7	11	12	0	23	0	0	0	0	62
08:15 AM	0	29	1	30	2	0	8	10	8	8	0	16	0	0	0	0	56
Total Volume	0	132	8	140	14	0	23	37	29	39	0	68	0	0	0	0	245
% App. Total	0	94.3	5.7		37.8	0	62.2		42.6	57.4	0		0	0	0		
PFF	.000	.846	.667	.854	.700	.000	.719	.841	.659	.813	.000	.739	.000	.000	.000	.000	.901



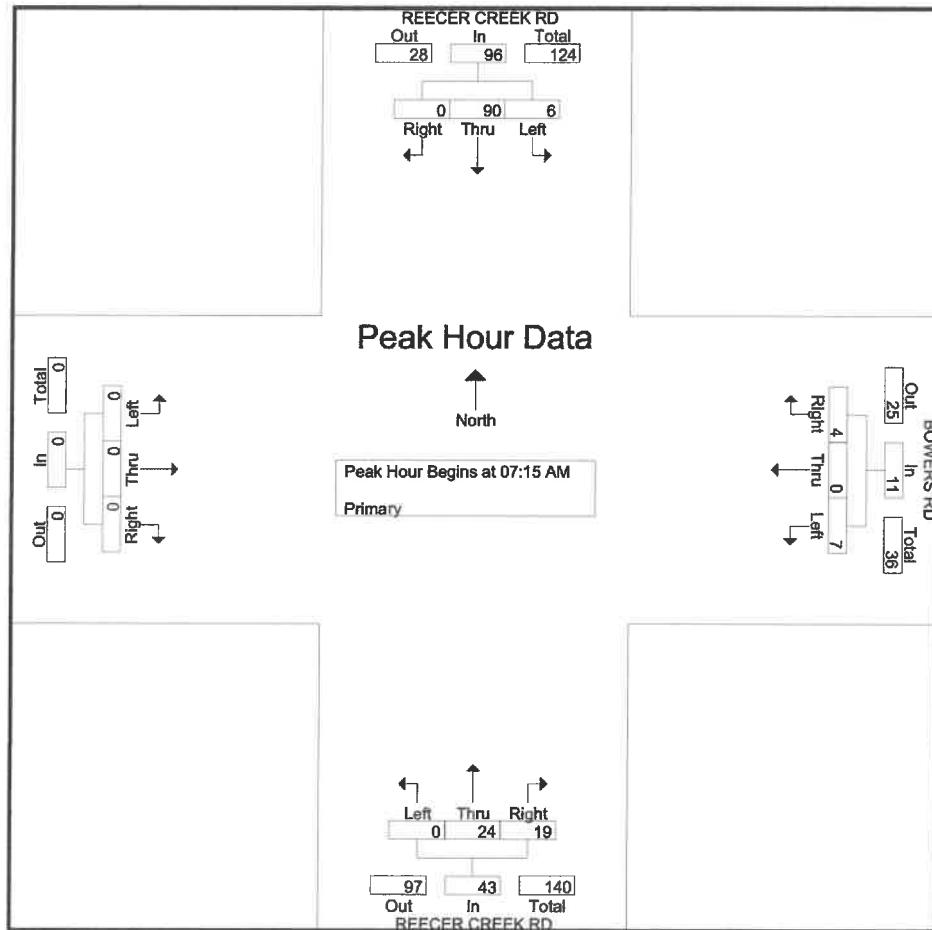
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 BOWERS RD
 LOC # 05A TSI07271M

File Name : TSI27605A
 Site Code : 00000005
 Start Date : 10/4/2007
 Page No : 2

Start Time	REECER CREEK RD From North				BOWERS RD From East				REECER CREEK RD From South				From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	22	2	24	3	0	1	4	4	5	0	9	0	0	0	0	37
07:30 AM	0	33	2	35	1	0	3	4	5	4	0	9	0	0	0	0	48
07:45 AM	0	18	1	19	0	0	2	2	8	8	0	16	0	0	0	0	37
08:00 AM	0	17	1	18	0	0	1	1	2	7	0	9	0	0	0	0	28
Total Volume	0	90	6	96	4	0	7	11	19	24	0	43	0	0	0	0	150
%App. Total	0	93.8	6.2		36.4	0	63.6		44.2	55.8	0		0	0	0		
PFF	.000	.682	.750	.686	.333	.000	.583	.688	.594	.750	.000	.672	.000	.000	.000	.000	.781



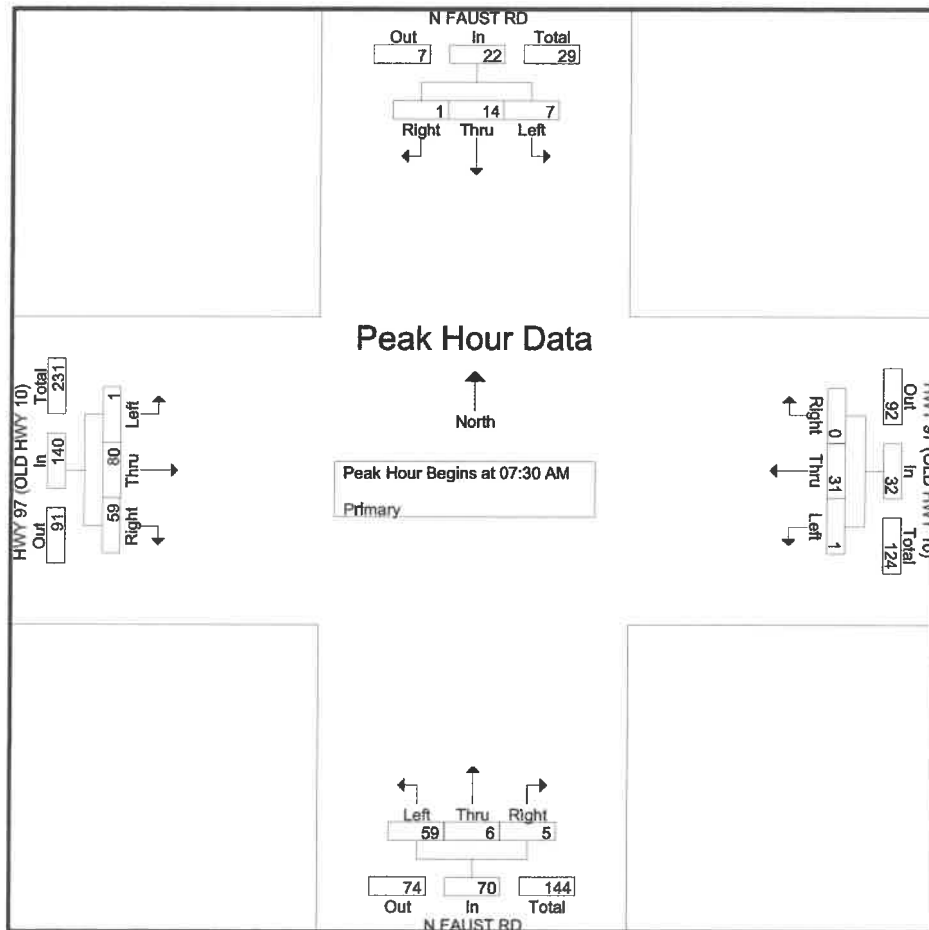
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ELLENSBURG, WASHINGTON
 N FAUST RD
 HWY 97 (OLD HWY 10)
 LOC # 06A TSI07271M

File Name : TSI27706A
 Site Code : 00000006
 Start Date : 10/4/2007
 Page No : 2

Start Time	NFAUSTRD From North				HWY97 (OLD HWY10) From East				NFAUSTRD From South				HWY97 (OLD HWY10) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	1	0	2	3	0	14	0	14	1	2	15	18	14	25	0	39	74
07:45 AM	0	8	1	9	0	6	1	7	1	2	12	15	13	23	0	36	67
08:00 AM	0	3	2	5	0	4	0	4	2	1	18	21	15	17	1	33	63
08:15 AM	0	3	2	5	0	7	0	7	1	1	14	16	17	15	0	32	60
Total Volume	1	14	7	22	0	31	1	32	5	6	59	70	59	80	1	140	264
% App. Total	4.5	63.6	31.8		0	96.9	3.1		7.1	8.6	84.3		42.1	57.1	0.7		
P-F	.250	.438	.875	.611	.000	.554	.250	.571	.625	.750	.819	.833	.868	.800	.250	.897	.892



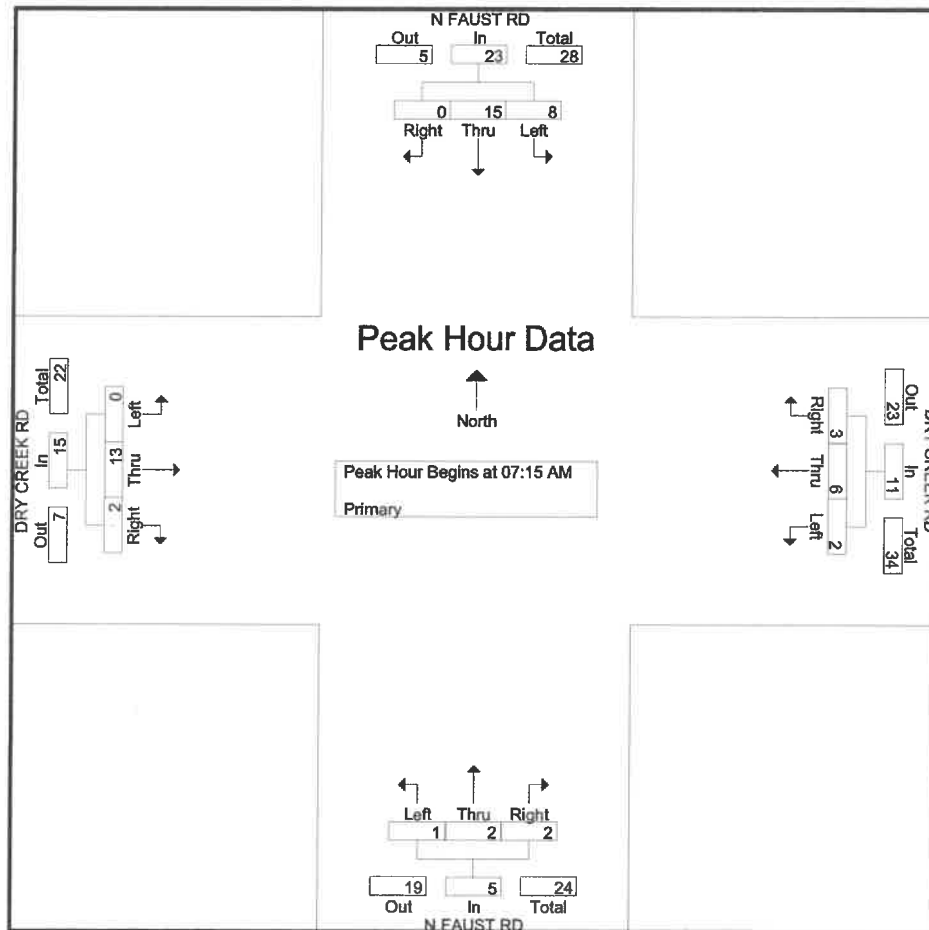
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ELLENSBURG, WASHINGTON
 N FAUST RD
 DRY CREEK RD
 LOC # 07/ TSI07277A, BRANDI

File Name : TSI27707A
 Site Code : 00000007
 Start Date : 10/4/2007
 Page No : 2

Start Time	NFAUSTRD From North				DRYCREEKRD From East				NFAUSTRD From South				DRYCREEKRD From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	2	1	3	0	1	0	1	0	1	0	1	0	4	0	4	9
07:30 AM	0	3	2	5	1	0	2	3	0	1	1	1	2	4	0	6	15
07:45 AM	0	6	2	8	1	1	0	2	0	1	0	1	0	4	0	4	15
08:00 AM	0	4	3	7	1	4	0	5	2	0	0	2	0	1	0	1	15
Total Volume	0	15	8	23	3	6	2	11	2	2	1	5	2	13	0	15	54
%App. Total	0	65.2	34.8		27.3	54.5	18.2		40	40	20		13.3	86.7	0		
P-F	.000	.625	.667	.719	.750	.375	.250	.550	.250	.500	.250	.625	.250	.813	.000	.625	.900



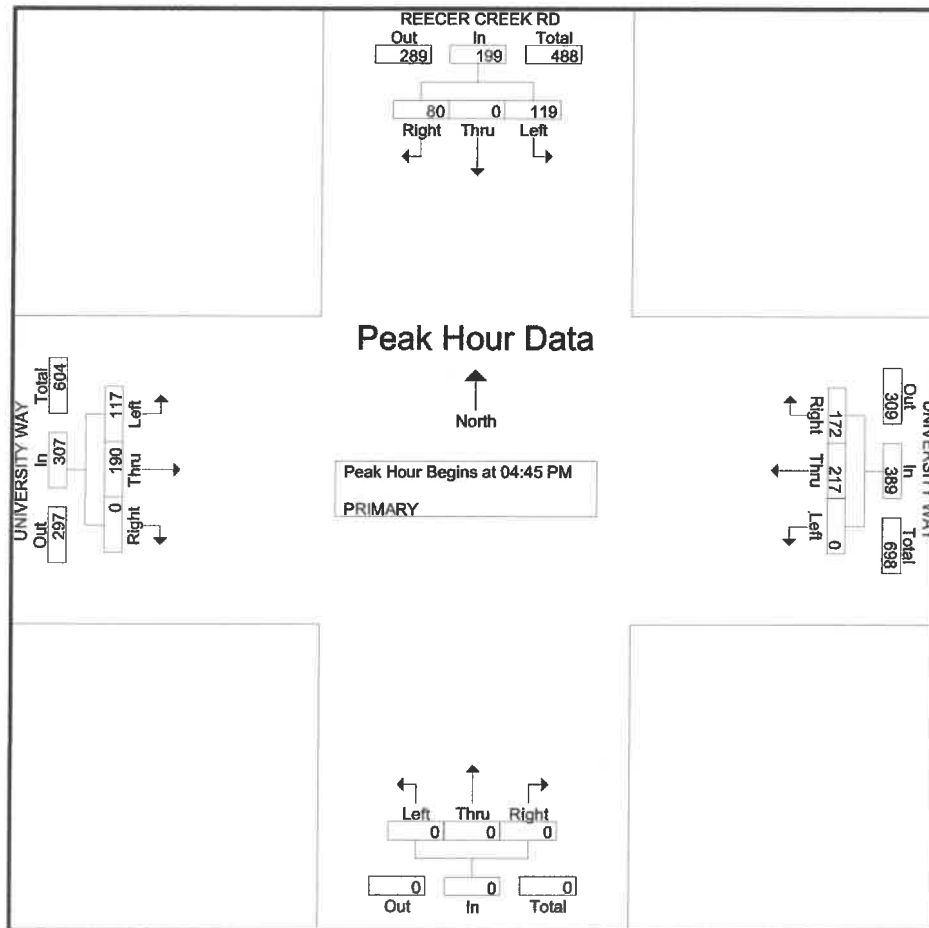
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 UNIVERSITY WAY
 LOC # 01P TSI07277M

File Name : TSI27601P
 Site Code : 00000001
 Start Date : 10/4/2007
 Page No : 2

Start Time	REECER CREEK RD From North				UNIVERSITYWAY From East				From South				UNIVERSITYWAY From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	17	0	19	36	41	48	0	89	0	0	0	0	0	49	24	73	198
05:00 PM	21	0	39	60	53	58	0	111	0	0	0	0	0	64	30	94	265
05:15 PM	18	0	37	55	40	63	0	103	0	0	0	0	0	38	39	77	235
05:30 PM	24	0	24	48	38	48	0	86	0	0	0	0	0	39	24	63	197
Total Volume	80	0	119	199	172	217	0	389	0	0	0	0	0	190	117	307	895
%App. Total	40.2	0	59.8		44.2	55.8	0		0	0	0	0	0	61.9	38.1		
PHF	.833	.000	.763	.829	.811	.861	.000	.876	.000	.000	.000	.000	.000	.742	.750	.816	.844



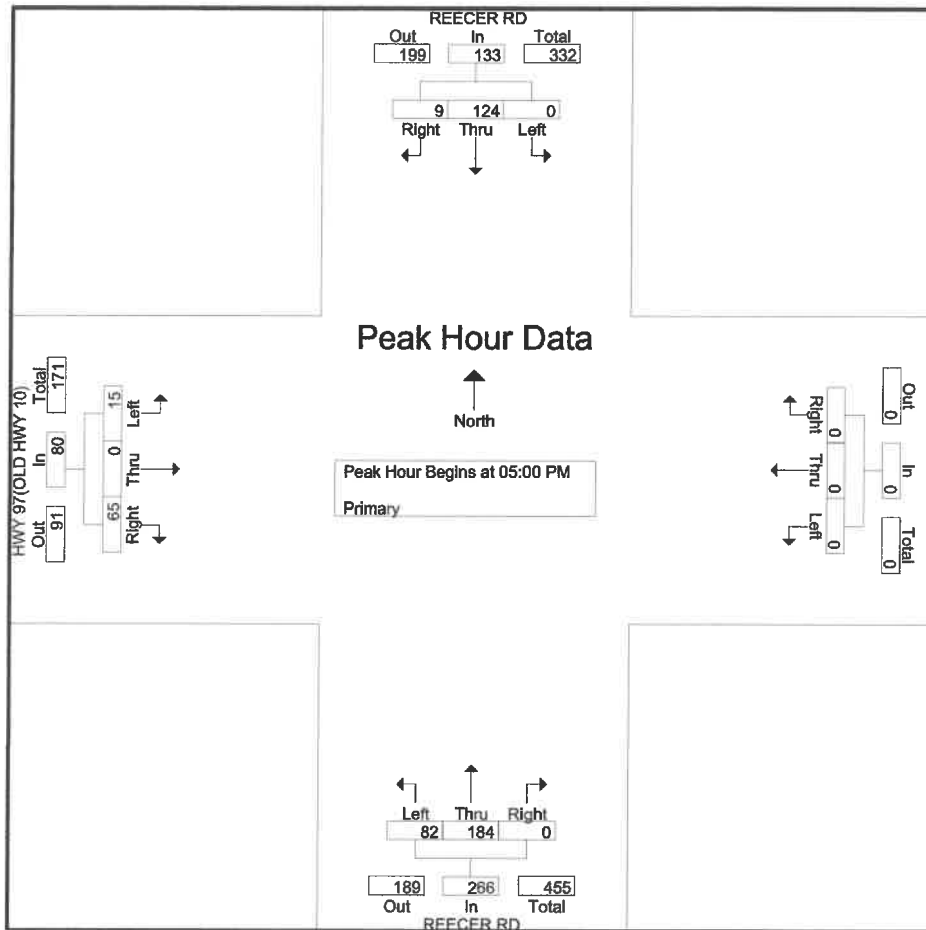
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 HWY 97 (OLD HWY 10)
 LOC # 02P TSI07276M

File Name : TSI27602P
 Site Code : 00000002
 Start Date : 10/3/2007
 Page No : 2

Start Time	REECER RD From North				From East				REECER RD From South				HWY97(OLD HWY10) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	2	29	0	31	0	0	0	0	0	50	27	77	21	0	2	23	131
05:15 PM	4	34	0	38	0	0	0	0	0	53	21	74	15	0	5	20	132
05:30 PM	1	32	0	33	0	0	0	0	0	43	19	62	15	0	5	20	115
05:45 PM	2	29	0	31	0	0	0	0	0	38	15	53	14	0	3	17	101
Total Volume	9	124	0	133	0	0	0	0	0	184	82	266	65	0	15	80	479
% App. Total	6.8	93.2	0		0	0	0		0	69.2	30.8		81.2	0	18.8		
P-F	.563	.912	.000	.875	.000	.000	.000	.000	.000	.868	.759	.864	.774	.000	.750	.870	.907



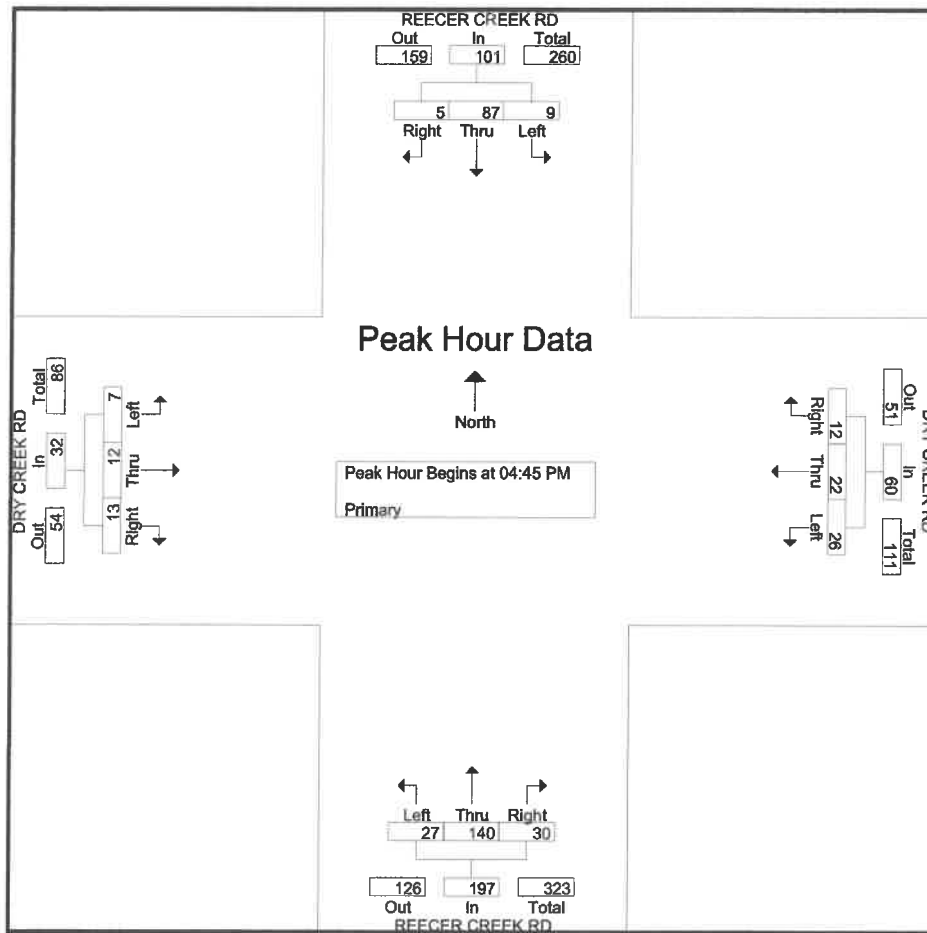
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 DRY CREEK RD
 LOC # 03P TSI07276M

File Name : TSI27603P
 Site Code : 00000003
 Start Date : 10/3/2007
 Page No : 2

Start Time	REECER CREEK RD From North				DRY CREEK RD From East				REECER CREEK RD From South				DRY CREEK RD From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	2	20	1	23	2	2	3	7	5	27	5	37	4	4	3	11	78
05:00 PM	3	20	4	27	4	7	5	16	8	34	6	48	2	5	1	8	99
05:15 PM	0	23	2	25	5	8	11	24	9	47	7	63	5	1	1	7	119
05:30 PM	0	24	2	26	1	5	7	13	8	32	9	49	2	2	2	6	94
Total Volume	5	87	9	101	12	22	26	60	30	140	27	197	13	12	7	32	390
% App. Total	5	86.1	8.9		20	36.7	43.3		15.2	71.1	13.7		40.6	37.5	21.9		
PHF	.417	.906	.563	.935	.600	.688	.591	.625	.833	.745	.750	.782	.650	.600	.583	.727	.819



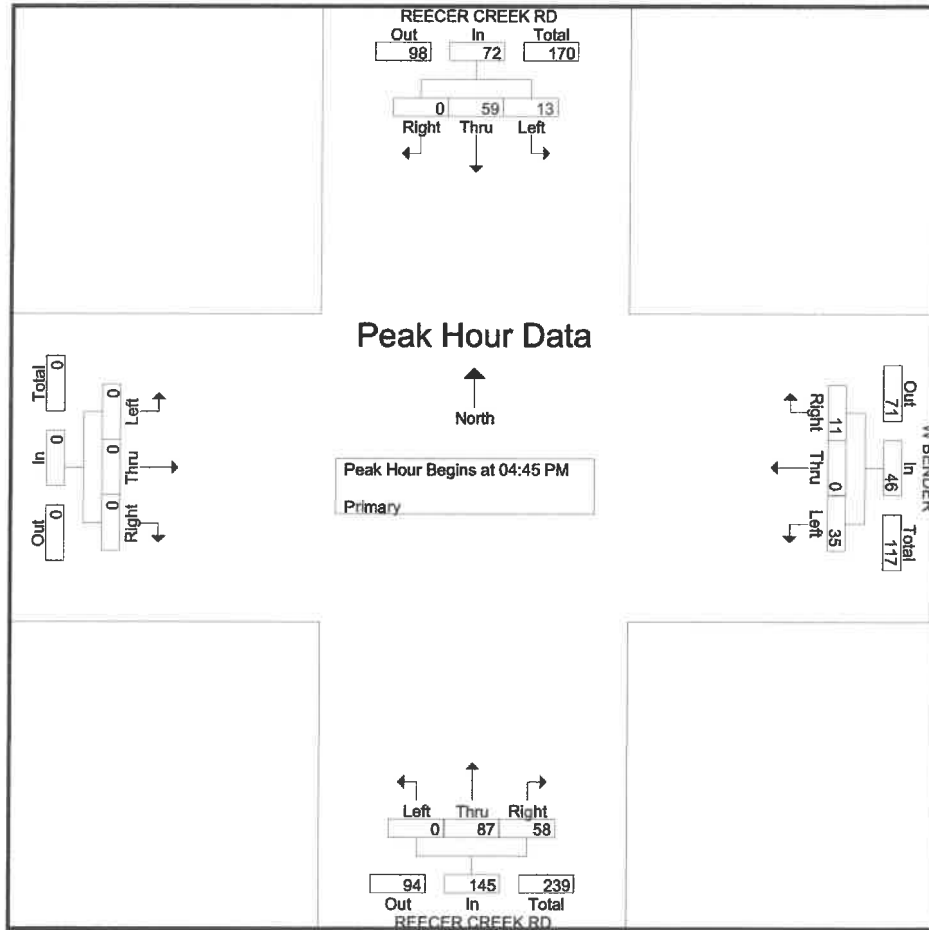
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 W BENDER RD
 LOC #04P TSI07276M

File Name : TSI27604P
 Site Code : 00000004
 Start Date : 10/3/2007
 Page No : 2

Start Time	REECER CREEK RD From North				WBENDER From East				REECER CREEK RD From South				From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	15	1	16	2	0	6	8	12	19	0	31	0	0	0	0	55
05:00 PM	0	16	2	18	4	0	12	16	9	32	0	41	0	0	0	0	75
05:15 PM	0	10	5	15	2	0	8	10	21	19	0	40	0	0	0	0	65
05:30 PM	0	18	5	23	3	0	9	12	16	17	0	33	0	0	0	0	68
Total Volume	0	59	13	72	11	0	35	46	58	87	0	145	0	0	0	0	263
% App. Total	0	81.9	18.1		23.9	0	76.1		40	60	0		0	0	0		
P-F	.000	.819	.650	.783	.688	.000	.729	.719	.690	.680	.000	.884	.000	.000	.000	.000	.877



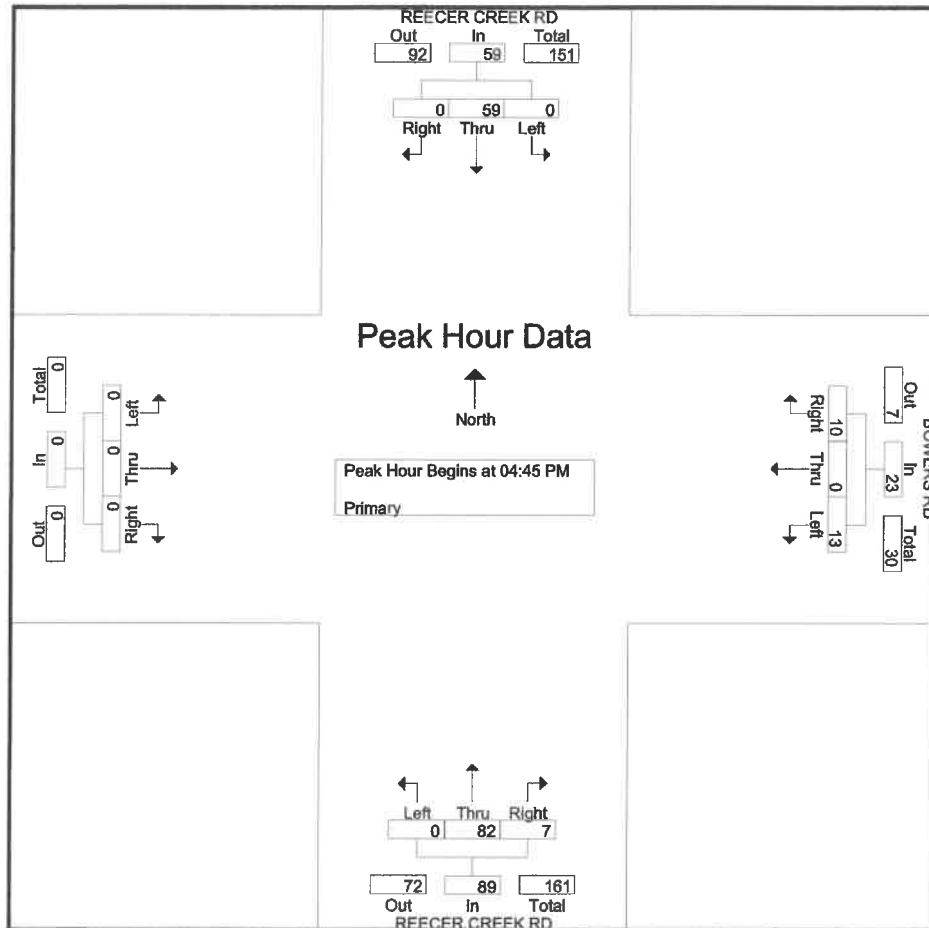
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ELLENSBURG, WASHINGTON
 REECER CREEK RD
 BOWERS RD
 LOC #05P TSI07277M

File Name : TSI27605P
 Site Code : 00000005
 Start Date : 10/3/2007
 Page No : 2

Start Time	REECER CREEK RD From North				BOWERS RD From East				REECER CREEK RD From South				From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	11	0	11	5	0	4	9	0	14	0	14	0	0	0	0	34
05:00 PM	0	20	0	20	2	0	1	3	1	27	0	28	0	0	0	0	51
05:15 PM	0	18	0	18	2	0	0	2	4	28	0	32	0	0	0	0	52
05:30 PM	0	10	0	10	1	0	8	9	2	13	0	15	0	0	0	0	34
Total Volume	0	59	0	59	10	0	13	23	7	82	0	89	0	0	0	0	171
% App. Total	0	100	0		43.5	0	56.5		7.9	92.1	0		0	0	0		
FF-F	.000	.738	.000	.738	.500	.000	.406	.639	.438	.732	.000	.695	.000	.000	.000	.000	.822



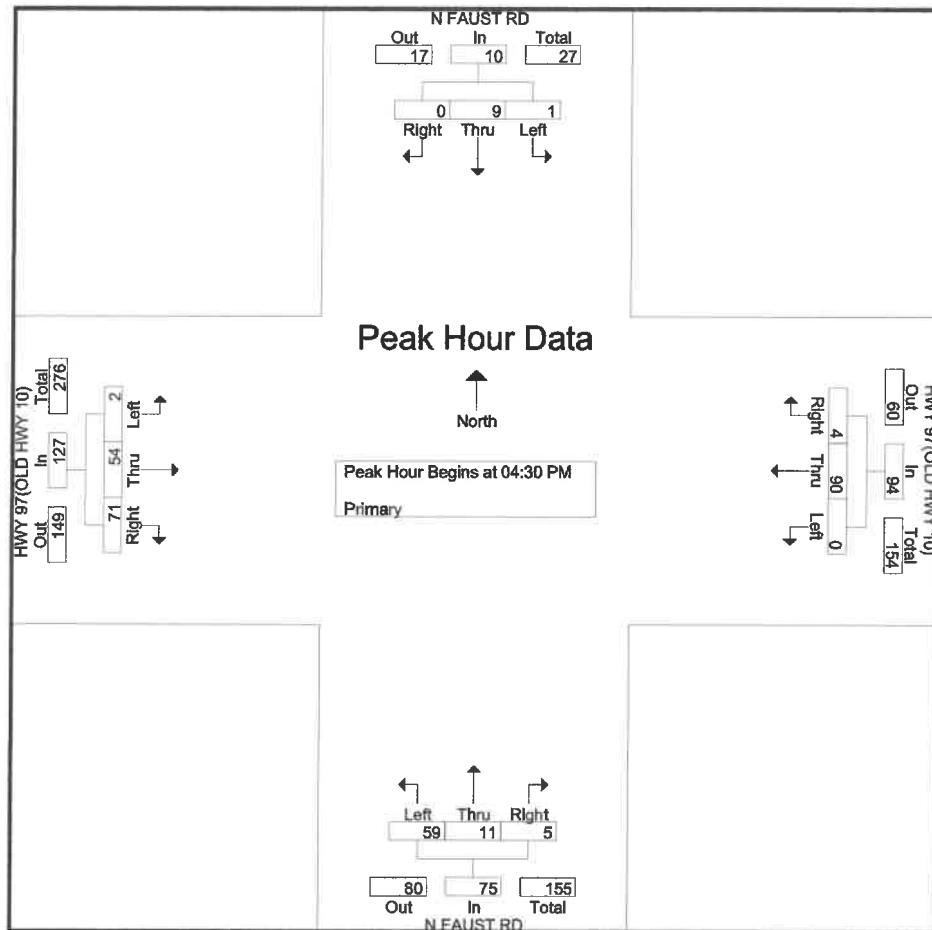
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ELLENSBURG, WASHINGTON
 N FAUST RD
 HWY 97 (OLD HWY 10)
 LOC #06P TSI07276M

File Name : TSI27606P
 Site Code : 00000006
 Start Date : 10/3/2007
 Page No : 2

Start Time	NFAUSTFD From North				HWY97(OLD HWY10) From East				NFAUSTFD From South				HWY97(OLD HWY10) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	3	1	4	1	28	0	29	0	1	14	15	18	15	0	33	81
04:45 PM	0	3	0	3	1	20	0	21	1	3	16	20	17	11	1	29	73
05:00 PM	0	1	0	1	2	20	0	22	2	3	13	18	23	12	0	35	76
05:15 PM	0	2	0	2	0	22	0	22	2	4	16	22	13	16	1	30	76
Total Volume	0	9	1	10	4	90	0	94	5	11	59	75	71	54	2	127	306
%App. Total	0	90	10		4.3	95.7	0		6.7	14.7	78.7		55.9	42.5	1.6		
PHF	.000	.750	.250	.625	.500	.804	.000	.810	.625	.688	.922	.852	.772	.844	.500	.907	.944



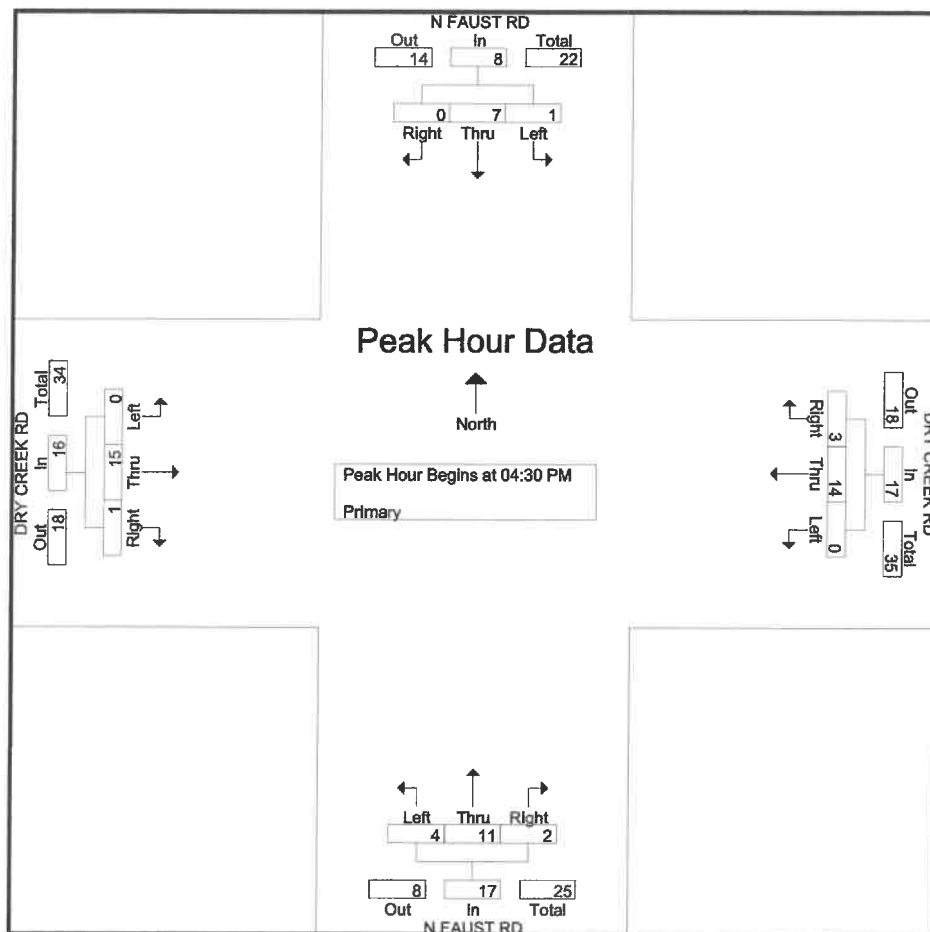
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ELLENSBURG, WASHINGTON
 N FAUST RD
 DRY CREEK RD
 LOC #07P TSI07276M

File Name : TSI27607P
 Site Code : 00000007
 Start Date : 10/3/2007
 Page No : 2

Start Time	NFAUSTRD From North				DRYCREEKRD From East				NFAUSTRD From South				DRYCREEKRD From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	4	0	4	1	6	0	7	0	2	0	2	0	6	0	6	19
04:45 PM	0	2	0	2	0	3	0	3	1	4	1	6	0	3	0	3	14
05:00 PM	0	0	0	0	1	1	0	2	1	2	1	4	1	3	0	4	10
05:15 PM	0	1	1	2	1	4	0	5	0	3	2	5	0	3	0	3	15
Total Volume	0	7	1	8	3	14	0	17	2	11	4	17	1	15	0	16	58
% App. Total	0	87.5	12.5		17.6	82.4	0		11.8	64.7	23.5		6.2	93.8	0		
PHF	.000	.438	.250	.500	.750	.583	.000	.607	.500	.688	.500	.708	.250	.625	.000	.667	.763





APPENDIX B INTERSECTION OPERATIONS ANALYSIS REPORTS



HCM Unsignalized Intersection Capacity Analysis
1: University Way & Reecer Creek Rd

Existing 2007 Conditions
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SEB	SEB
Lane Configurations						
Volume (veh/h)	79	158	141	74	195	79
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	172	153	80	212	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	234				524	193
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	234				524	193
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				56	90
cM capacity (veh/h)	1334				483	848
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	79	172	234	212	83	
Volume Left	79	0	0	212	0	
Volume Right	0	0	80	0	83	
cSH	1334	1700	1700	483	848	
Volume to Capacity	0.06	0.10	0.14	0.44	0.10	
Queue Length 95th (ft)	5	0	0	55	8	
Control Delay (s)	7.9	0.0	0.0	18.1	9.7	
Lane LOS	A			C	A	
Approach Delay (s)	2.5		0.0	15.8		
Approach LOS				C		
Intersection Summary						
Average Delay	6.8					
Intersection Capacity Utilization	36.6%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Old Highway 10 & Reecer Creek Rd

Existing 2007 Conditions
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SEB	SEB
Lane Configurations						
Volume (veh/h)	20	104	40	56	187	15
Sign Control		Stop		Free	Free	
Grade		0%		0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	113	43	104	203	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	403	211	220			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	403	211	220			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	95	88	97			
cM capacity (veh/h)	594	829	1350			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	135	43	104	220		
Volume Left	22	43	0	0		
Volume Right	113	0	0	16		
cSH	988	1350	1700	1700		
Volume to Capacity	0.14	0.03	0.06	0.13		
Queue Length 95th (ft)	12	2	0	0		
Control Delay (s)	10.3	7.8	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.3	2.3		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	3.4					
Intersection Capacity Utilization	27.4%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Dry Creek Rd & Reecer Creek Rd

Existing 2007 Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↓			↓			↑			↓	
Volume (veh/h)	1	12	20	23	4	7	5	60	36	5	156	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	13	22	25	4	8	5	65	39	5	170	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	286	298	170	304	276	85	170			104		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286	298	170	304	276	85	170			104		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	98	96	99	99	100			100		
cM capacity (veh/h)	674	611	674	618	627	974	1406			1487		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	36	37	5	104	5	170						
Volume Left	1	25	5	0	5	0						
Volume Right	22	8	0	98	0	0						
cSH	750	670	1408	1700	1487	1700						
Volume to Capacity	0.05	0.06	0.00	0.06	0.00	0.10						
Queue Length 95th (ft)	4	4	0	0	0	0						
Control Delay (s)	10.0	10.7	7.6	0.0	7.4	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	10.0	10.7	0.4		0.2							
Approach LOS	B	B										
Intersection Summary												
Average Delay	2.3											
Intersection Capacity Utilization	23.5%											
Analysis Period (min)	15											
ICU Level of Service	A											

HCM Unsignalized Intersection Capacity Analysis
4: Bender Rd & Reecer Creek Rd

Existing 2007 Conditions
AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↓
Volume (veh/h)	23	14	36	29	8	132
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	15	42	32	9	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	219	58			74	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	219	58			74	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	785	1008			1526	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	74	152			
Volume Left	25	0	9			
Volume Right	15	32	0			
cSH	842	1700	1526			
Volume to Capacity	0.05	0.04	0.01			
Queue Length 95th (ft)	4	0	0			
Control Delay (s)	9.5	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay	1.7					
Intersection Capacity Utilization	23.5%					
Analysis Period (min)	15					
ICU Level of Service	A					

HCM Unsignalized Intersection Capacity Analysis
5: Bowers Rd & Reecer Creek Rd

Existing 2007 Conditions
AM Peak Hour

Movement	WSL	WPR	NSL	NSR	SBL	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖
Volume (veh/h)	7	4	24	19	6	90
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	4	26	21	7	96
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Pavement Blockage						
Right turn flara (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	147	36			47	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC, unblocked vol	147	36			47	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	841	1036			1581	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	12	47	104			
Volume Left	6	0	7			
Volume Right	4	21	0			
cSH	903	1700	1561			
Volume to Capacity	0.01	0.03	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.0	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		19.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
6: Hwy 97 & Old Highway 10

Existing 2007 Conditions
AM Peak Hour

Movement	NBL	NGT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Sign Control	Stop			Stop			Stop			Stop		Stop
Volume (vph)	59	6	5	7	14	1	1	80	59	1	31	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	7	5	8	15	1	1	87	64	1	34	0
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	76	24	152	35								
Volume Left (vph)	64	8	1	1								
Volume Right (vph)	5	1	64	0								
Had (s)	0.16	0.07	-0.22	0.04								
Departure Headway (s)	4.5	4.4	4.0	4.3								
Degree Utilization, x	0.09	0.03	0.17	0.04								
Capacity (veh/h)	764	758	885	803								
Control Delay (s)	7.9	7.6	7.7	7.5								
Approach Delay (s)	7.9	7.6	7.7	7.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.8									
HCM Level of Service			A									
Intersection Capacity Utilization			23.8%		ICU Level of Service							A
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
7: Dry Creek Rd & Faust Rd

Existing 2007 Conditions
AM Peak Hour

	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SET	SBR	SEL	SER
Movement											
Lane Configurations	2	6	3	1	2	2	8	15	0	13	2
Volume (veh/h)	2	6	3	1	2	2	8	15	0	13	2
Sign Control	Free				Stop			Stop		Free	
Grade	0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow rate (vph)	2	7	3	1	2	2	9	16	0	14	2
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flars (veh)											
Median type	None										
Median storage (veh)											
Upstream signal (ft)											
pL, platoon unblocked											
vC, conflicting volume	16			36	29	15	31	29	8		
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	16			36	29	15	31	29	8		
IC, single (s)	4.1			7.1	6.5	6.2	7.1	6.5	6.2		
IC, 2 stage (s)											
IF (s)	2.2			3.5	4.0	3.3	3.5	4.0	3.3		
pD queue free %	100			100	100	100	99	98	100		
cM capacity (veh/h)	1601			956	862	1064	972	863	1074		
Direction Lane #	WBL	NBL	SBL	SEL							
Volume Total	12	5	25	16							
Volume Left	2	1	9	0							
Volume Right	3	2	0	2							
cSH	1601	953	898	1610							
Volume to Capacity	0.00	0.01	0.03	0.00							
Queue Length 95th (ft)	0	0	2	0							
Control Delay (s)	1.3	8.8	9.1	0.0							
Lane LOS	A	A	A								
Approach Delay (s)	1.3	8.8	9.1	0.0							
Approach LOS		A	A								
Intersection Summary											
Average Delay	5.0										
Intersection Capacity Utilization	20.0%			ICU Level of Service	A						
Analysis Period (min)	15										

HCM Signalized Intersection Capacity Analysis
1: University Way & Reecer Creek Rd

Background 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	WBT	WBt	SEB	SEt
Lane Configurations						
Volume (vph)	117	202	180	104	277	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Flt	1.00	1.00	0.95		1.00	0.95
Pt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1771		1770	1583
Flt Permitted	0.57	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1066	1863	1771		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	220	196	113	301	182
RTOR Reduction (vph)	0	0	42	0	0	107
Lane Group Flow (vph)	127	220	267	0	301	75
Turn Type	Perm				Perm	
Protected Phases		4	8		6	
Permitted Phases	4				6	
Actuated Green, G (s)	8.0	8.0	8.0		11.3	11.3
Effective Green, g (s)	8.0	8.0	8.0		11.3	11.3
Actuated g/C Ratio	0.29	0.29	0.29		0.41	0.41
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	312	546	519		733	655
v/s Ratio Prot	0.12	0.15	0.15		0.17	
v/s Ratio Perm	0.12				0.05	
v/c Ratio	0.41	0.40	0.52		0.41	0.12
Uniform Delay, d1	7.7	7.7	8.0		5.6	4.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	0.5	0.9		0.4	0.1
Delay (s)	8.6	8.2	8.9		6.0	5.0
Level of Service	A	A	A		A	A
Approach Delay (s)	8.4	8.9			5.6	
Approach LOS	A	A			A	
Intersection Summary						
HCM Average Control Delay	7.4		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.45					
Actuated Cycle Length (s)	27.3		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	47.6%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
2: Old Highway 10 & Reecer Creek Rd

Background 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	NBL	NBT	SEB	SEt
Lane Configurations						
Volume (veh/h)	30	133	51	155	337	33
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	145	55	168	366	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)					163	
pX, platoon unblocked						
vC, conflicting volume	684	384	402			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC0, unblocked vol	684	384	402			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	82	78	95			
cM capacity (veh/h)	405	663	1196			
Direction Lane #						
	EB 1	NB 1	SB 2	SB 1		
Volume Total	177	55	188	402		
Volume Left	33	55	0	0		
Volume Right	145	0	0	38		
cSH	813	1156	1700	1700		
Volume to Capacity	0.22	0.05	0.10	0.24		
Queue Length 95th (ft)	21	4	0	0		
Control Delay (s)	12.4	8.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.4	2.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	3.3					
Intersection Capacity Utilization	37.3%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Dry Creek Rd & Reecer Creek Rd

Background 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↓			↓			↓			↓		
Volume (veh/h)	1	15	26	29	5	9	6	114	46	6	311	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	1	16	28	32	5	10	7	124	50	7	338	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	501	538	338	549	513	149	338						174
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	501	538	338	549	513	149	338						174
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
IC, 2 stage (s)													
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	96	96	92	99	99	99						100
cM capacity (veh/h)	468	445	704	413	480	886	1221						1403
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	46	47	7	174	7	338							
Volume Left	1	32	7	0	7	0							
Volume Right	28	10	0	50	0	0							
cSH	577	472	1221	1700	1403	1700							
Volume to Capacity	0.08	0.10	0.01	0.10	0.00	0.20							
Queue Length 95th (ft)	6	8	0	0	0	0							
Control Delay (s)	11.8	13.5	8.0	0.0	7.8	0.0							
Lane LOS	B	B	A		A								
Approach Delay (s)	11.8	13.5	0.3	0.1									
Approach LOS	B	B		A									
Intersection Summary													
Average Delay	2.1												
Intersection Capacity Utilization	32.1%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
4: Bender Rd & Reecer Creek Rd

Background 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↓			↓			↓			↓		
Volume (veh/h)	0	14	38	61	5	18	16	60	48	10	211	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	15	42	66	5	20	17	65	52	11	229	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	369	403	229	427	377	91	229						117
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	369	403	229	427	377	91	229						117
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
IC, 2 stage (s)													
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	97	95	86	99	98	99						99
cM capacity (veh/h)	537	525	810	481	543	966	1339						1471
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	58	91	135	240									
Volume Left	0	65	17	11									
Volume Right	42	20	52	0									
cSH	708	552	1339	1471									
Volume to Capacity	0.08	0.17	0.01	0.01									
Queue Length 95th (ft)	7	15	1	1									
Control Delay (s)	10.5	12.8	1.1	0.4									
Lane LOS	B	B	A	A									
Approach Delay (s)	10.5	12.8	1.1	0.4									
Approach LOS	B	B											
Intersection Summary													
Average Delay	3.9												
Intersection Capacity Utilization	30.9%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
5: Bowers Rd & Reecer Creek Rd

Background 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	4	4	11	9	1	5	0	41	24	8	118	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	4	12	10	1	5	0	45	28	9	128	1
Postealians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume	210	217	129	218	204	58	129			71		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vC3, unblocked vol	210	217	129	218	204	58	129			71		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	100	99	100			99		
cM capacity (veh/h)	739	677	921	722	688	1009	1456			1530		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	18	71	139								
Volume Left	4	10	0	9								
Volume Right	12	5	26	1								
cSH	817	795	1458	1530								
Volume to Capacity	0.03	0.02	0.00	0.01								
Queue Length 95th (ft)	2	2	0	0								
Control Delay (s)	9.5	9.6	0.0	0.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.5	9.6	0.0	0.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			22.8%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
6: Hwy 97 & Old Highway 10

Background 2012 Conditions
AM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		+			+			+			+	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	75	8	6	9	18	1	1	108	75	1	50	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	9	7	10	20	1	1	115	82	1	54	0
Direction, Lane #	NS 1	SS 1	SE 1	NW 1								
Volume Total	97	30	198	55								
Volume Left	82	10	1	1								
Volume Right	7	1	82	0								
Hadq (s)	0.16	0.08	-0.21	0.04								
Departure Headway (s)	4.7	4.7	4.1	4.5								
Degree Utilization, x	0.13	0.04	0.22	0.07								
Capacity (veh/h)	730	718	858	766								
Control Delay (s)	8.3	7.8	8.2	7.8								
Approach Delay (s)	8.3	7.8	8.2	7.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.2									
HCM Level of Service			A									
Intersection Capacity Utilization			28.6%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
7: Dry Creek Rd & Faust Rd

Background 2012 Conditions
AM Peak Hour

Movement	WBL	WBR	WBR2	NRL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations	3	6	4	1	3	3	10	19	0	17	3
Volume (veh/h)	3	6	4	1	3	3	10	19	0	17	3
Sign Control	Free				Stop			Stop		Free	
Grade	0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	6	4	1	3	3	11	21	0	16	3
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None									None	
Median storage (veh)											
Upstream signal (s)											
pK, platoon unblocked											
vC, conflicting volume	22			48	40	20	42	39	11		
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	22			48	40	20	42	39	11		
IC, single (s)	4.1			7.1	6.5	6.2	7.1	6.5	6.2		
IC, 2 stage (s)											
IF (s)	2.2			3.5	4.0	3.3	3.5	4.0	3.3		
pQ queue free %	100			100	100	100	99	98	100		
oM capacity (veh/h)	1594			634	851	1068	953	851	1070		
Direction, Lane #	WBL	WBR	WBR2	NRL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Volume Total	16	8	32	22							
Volume Left	3	1	11	0							
Volume Right	4	3	0	3							
cSH	1594	942	884	1805							
Volume to Capacity	0.00	0.01	0.04	0.00							
Queue Length 95th (ft)	0	1	3	0							
Control Delay (s)	1.5	8.9	9.2	0.0							
Lane LOS	A	A	A								
Approach Delay (s)	1.5	8.9	9.2	0.0							
Approach LOS	A	A	A								
Intersection Summary											
Average Delay				4.9							
Intersection Capacity Utilization			21.0%		ICU Level of Service					A	
Analysis Period (min)			15								

HCM Signalized Intersection Capacity Analysis
1: University Way & Reecer Creek Rd

With Development 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	NBL	NBR
Lane Configurations						
Volume (vph)	118	202	190	105	281	173
Ideal Flow (vphpl)	1600	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
RT	1.00	1.00	0.95		1.00	0.85
RT Protected	0.95	1.00	1.00		0.95	1.00
Statd. Flow (prot)	1770	1963	1770		1770	1583
RT Permitted	0.57	1.00	1.00		0.95	1.00
Statd. Flow (perm)	1060	1963	1770		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	220	196	114	305	188
RTOR Reduction (vph)	0	0	42	0	0	110
Lane Group Flow (vph)	128	220	288	0	305	78
Turn Type	Perm				Perm	
Protected Phases		4	8		6	
Permitted Phases	4				6	
Actuated Green, G (s)	8.0	8.0	8.0		11.4	11.4
Effective Green, g (s)	8.0	8.0	8.0		11.4	11.4
Actuated g/C Ratio	0.29	0.29	0.29		0.42	0.42
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	309	544	517		738	659
v/c Ratio Prot		0.12	0.15		0.17	
v/c Ratio Perm	0.12				0.05	
v/c Ratio	0.41	0.40	0.52		0.41	0.12
Uniform Delay, d1	7.8	7.8	8.1		5.6	4.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	0.5	0.9		0.4	0.1
Delay (s)	8.7	8.3	9.0		6.0	5.0
Level of Service	A	A	A		A	A
Approach Delay (s)		8.4	9.0		5.8	
Approach LOS		A	A		A	
Intersection Summary						
HCM Average Control Delay	7.4		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.48		Sum of lost time (s)		8.0	
Actuated Cycle Length (s)	27.4		ICU Level of Service		A	
Intersection Capacity Utilization	45.0%		Analysis Period (min)		15	
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
2: Old Highway 10 & Reecer Creek Rd

With Development 2012 Conditions
AM Peak Hour

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	30	133	51	158	348	34
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak-Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	145	55	172	376	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)					163	
p/C, platoon unblocked						
v/C, conflicting volume	677	395	413			
v/C1, stage 1 conf vol						
v/C2, stage 2 conf vol						
v/Cu, unblocked vol	677	395	413			
IC, angle (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	92	78	95			
cM capacity (veh/h)	398	655	1146			
Direction Lane #						
	EB 1	EB 2	NB 2	SW 1		
Volume Total	177	55	172	413		
Volume Left	33	55	0	0		
Volume Right	145	0	0	37		
cSH	802	1146	1700	1700		
Volume to Capacity	0.22	0.05	0.10	0.24		
Queue Length 95th (ft)	21	4	0	0		
Control Delay (s)	12.8	8.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.6	2.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	3.3		ICU Level of Service		A	
Intersection Capacity Utilization	37.9%		Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
3: Dry Creek Rd & Reecer Creek Rd

With Development 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	15	26	29	5	9	6	117	48	6	321	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	15	28	32	5	10	7	127	50	7	349	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (t)												
pX, platoon unblocked												
vC, conflicting volume	515	552	349	564	527	152	349			177		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515	552	349	564	527	152	349			177		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	96	92	99	99	99			100		
cM capacity (veh/h)	458	437	694	404	452	694	1210			1399		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	46	47	7	177	7	349						
Volume Left	1	32	7	0	7	0						
Volume Right	28	10	0	50	0	0						
cSH	568	463	1210	1700	1399	1700						
Volume to Capacity	0.08	0.10	0.01	0.10	0.00	0.21						
Queue Length 95th (ft)	7	8	0	0	0	0						
Control Delay (s)	11.9	13.7	8.0	0.0	7.6	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.9	13.7	0.3		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay	2.0											
Intersection Capacity Utilization	32.6%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
4: Bender Rd & Reecer Creek Rd

With Development 2012 Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	14	36	61	5	19	16	64	48	13	221	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	42	66	5	21	17	70	52	14	240	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (t)												
pX, platoon unblocked												
vC, conflicting volume	422	425	240	449	399	96	240			122		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422	425	240	449	399	96	240			122		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	97	95	86	99	98	99			99		
cM capacity (veh/h)	517	509	798	473	527	861	1326			1466		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	58	92	139	254								
Volume Left	0	86	17	14								
Volume Right	42	21	32	0								
cSH	694	537	1326	1466								
Volume to Capacity	0.08	0.17	0.01	0.01								
Queue Length 95th (ft)	7	15	1	1								
Control Delay (s)	10.7	13.1	1.1	0.5								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.7	13.1	1.1	0.5								
Approach LOS	B	B										
Intersection Summary												
Average Delay	3.9											
Intersection Capacity Utilization	32.1%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
 5: Bowers Rd & Reecer Creek Rd AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+						+				+
Volume (veh/h)	4	4	23	9	1	5	4	41	24	8	118	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	4	25	10	1	5	4	45	26	9	128	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume	218	228	129	240	213	58	129			71		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCU, unblocked vol	218	228	129	240	213	58	129			71		
IC, single (s)	7.1	8.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	97	99	100	99	100			99		
cM capacity (veh/h)	728	668	921	887	679	1009	1458			1530		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	34	16	75	138								
Volume Left	4	10	4	9								
Volume Right	25	5	28	1								
cSH	650	768	1456	1530								
Volume to Capacity	0.04	0.02	0.00	0.01								
Queue Length 95th (ft)	3	2	0	0								
Control Delay (s)	9.4	9.8	0.5	0.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.4	9.8	0.5	0.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay		2.2										
Intersection Capacity Utilization		18.8%			ICU Level of Service		A					
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
 6: Hwy 97 & Old Highway 10 AM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBL	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop				Stop
Volume (vph)	75	8	6	9	18	1	1	106	75	1	50	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	9	7	10	20	1	1	115	82	1	54	0
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	97	30	198	55								
Volume Left (vph)	82	10	1	1								
Volume Right (vph)	7	1	82	0								
Had (s)	0.16	0.08	-0.21	0.04								
Departure Headway (s)	4.7	4.7	4.1	4.5								
Degree Utilization, x	0.13	0.04	0.22	0.07								
Capacity (veh/h)	730	718	858	766								
Control Delay (s)	8.3	7.8	8.2	7.8								
Approach Delay (s)	8.3	7.8	8.2	7.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.2									
HCM Level of Service			A									
Intersection Capacity Utilization			28.6%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
 7: Dry Creek Rd & Faust Rd AM Peak Hour

Movement	WBL	WBR	WBRZ	NAL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations	3	8	4	1	3	3	10	19	0	17	3
Volume (veh/h)											
Sign Control	Free				Stop			Stop		Free	
Grade	0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	8	4	1	3	3	11	21	0	18	3
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None									None	
Median storage (veh)											
Upstream signal (s)											
pX, platoon unblocked											
vC, conflicting volume	22			48	40	20	42	38	11		
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	22			48	40	20	42	39	11		
IC, single (s)	4.1			7.1	6.5	6.2	7.1	6.5	6.2		
IC, 2 stage (s)											
IF (s)	2.2			3.5	4.0	3.3	3.5	4.0	3.3		
p0 queue free %	100			100	100	100	99	98	100		
chl capacity (veh/h)	1584			934	851	1058	853	851	1070		
Direction Lane #	WBL	NBL	SBL	SEL							
Volume Total	16	6	32	22							
Volume Left	3	1	11	0							
Volume Right	4	3	0	3							
cSH	1584	842	884	1605							
Volume to Capacity	0.00	0.01	0.04	0.00							
Queue Length 95th (ft)	0	1	3	0							
Control Delay (s)	1.5	8.9	9.2	0.0							
Lane LOS	A	A	A								
Approach Delay (s)	1.5	8.9	9.2	0.0							
Approach LOS		A	A								
Intersection Summary											
Average Delay				4.9							
Intersection Capacity Utilization				20.0%							A
Analysis Period (min)				15							

HCM Unsignalized Intersection Capacity Analysis
1: University Way & Reecer Creek Rd

Existing 2007 Conditions
PM Peak Hour

Movement	EBL	EBT	WB1	WB2	SBL	SBR
Volume (veh/h)	117	190	217	172	119	90
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	127	207	236	187	129	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	423				790 329	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	423				790 329	
IC, single (s)	4.1				8.4 6.2	
IC, 2 stage (s)						
IF (s)	2.2				3.5 3.3	
p0 queue free %	89				59 68	
cM capacity (veh/h)	1136				319 712	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	127	207	423	179	129	87
Volume Left	127	0	0	129	0	0
Volume Right	0	0	187	0	87	0
cSH	1136	1700	1700	319	712	
Volume to Capacity	0.11	0.12	0.25	0.41	0.12	
Queue Length 95th (ft)	9	0	0	47	10	
Control Delay (s)	8.8	0.0	0.0	23.8	10.8	
Lane LOS	A			C	B	
Approach Delay (s)	3.3		0.0	18.6		
Approach LOS				C		
Intersection Summary						
Average Delay	5.2					
Intersection Capacity Utilization	45.0%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Old Highway 10 & Reecer Creek Rd

Existing 2007 Conditions
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Volume (veh/h)	15	65	82	184	124	9
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	71	89	200	135	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	518		140		145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518		140		145	
IC, single (s)	6.4		6.2		4.1	
IC, 2 stage (s)						
IF (s)	3.5		3.3		2.2	
p0 queue free %	97		92		94	
cM capacity (veh/h)	498		908		1438	
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	16	89	200	145		
Volume Left	16	89	0	0		
Volume Right	0	0	0	10		
cSH	1118	1438	1700	1700		
Volume to Capacity	0.08	0.06	0.12	0.09		
Queue Length 95th (ft)	6	5	0	0		
Control Delay (s)	9.9	7.7	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.9	2.4		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay	3.0					
Intersection Capacity Utilization	24.9%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Dry Creek Rd & Reecer Creek Rd

Existing 2007 Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	12	13	26	22	12	27	140	30	9	87	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	13	14	28	24	13	29	152	33	10	95	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	353	360	97	362	347	168	100			185		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	353	360	97	362	347	168	100			185		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	99	95	96	99	98			99		
cM capacity (veh/h)	562	552	539	563	561	676	1483			1390		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	35	65	29	185	10	100						
Volume Left	8	28	29	0	10	0						
Volume Right	14	13	0	33	0	5						
cSH	670	606	1483	1700	1390	1700						
Volume to Capacity	0.05	0.11	0.02	0.11	0.01	0.06						
Queue Length 95th (ft)	4	9	2	0	1	0						
Control Delay (s)	10.7	11.7	7.5	0.0	7.6	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	10.7	11.7	1.0		0.7							
Approach LOS	B	B										
Intersection Summary												
Average Delay	3.4											
Intersection Capacity Utilization	22.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
4: Bender Rd & Reecer Creek Rd

Existing 2007 Conditions
PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Volume (veh/h)	35	11	87	58	13	59	
Sign Control	Stop		Free		Free		
Grade	0%						
Peak Hour Factor	0.82	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	38	12	95	63	14	64	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
VC, conflicting volume	218	126			158		
VC1, stage 1 conf vol							
VC2, stage 2 conf vol							
VCu, unblocked vol	218	126			158		
IC, single (s)	6.4	6.2			4.1		
IC, 2 stage (s)							
IF (s)	3.5	3.3			2.2		
p0 queue free %	95	99			99		
cM capacity (veh/h)	762	924			1422		
Direction, Lane #	WB 1	NB 1	SB 1				
Volume Total	50	158	79				
Volume Left	38	0	14				
Volume Right	12	63	0				
cSH	785	1700	1422				
Volume to Capacity	0.08	0.09	0.01				
Queue Length 95th (ft)	5	0	1				
Control Delay (s)	9.8	0.0	1.4				
Lane LOS	A		A				
Approach Delay (s)	9.8	0.0	1.4				
Approach LOS	A						
Intersection Summary							
Average Delay	2.1						
Intersection Capacity Utilization	24.3%			ICU Level of Service			A
Analysis Period (min)	15						

HCM Unsignalized Intersection Capacity Analysis
5: Bowers Rd & Reecer Creek Rd

Existing 2007 Conditions
PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Volume (veh/h)	13	10	82	7	0	59
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	11	89	8	0	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Pedestrian Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	157	83			97	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	157	83			97	
IC, single (s)	6.4	8.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pQ queue free %	98	99			100	
CM capacity (veh/h)	834	984			1497	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	25	92	64			
Volume Left	14	0	0			
Volume Right	11	8	0			
cSH	888	1700	1497			
Volume to Capacity	0.03	0.06	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			14.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Hwy 97 & Old Highway 10

Existing 2007 Conditions
PM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗	
Sign Control	Stop		Stop		Stop		Stop		Stop		Stop		
Volume (vph)	59	11	5	1	9	0	2	64	71	0	90	4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	64	12	5	1	10	0	2	58	77	0	98	4	
Direction, Lane #	NB 1	SB 1	SE 1	NW 1									
Volume Total (vph)	62	11	138	102									
Volume Left (vph)	64	1	2	0									
Volume Right (vph)	5	0	77	4									
Head (s)	0.15	0.05	-0.30	0.01									
Departure Headway (s)	4.6	4.6	3.9	4.3									
Degree Utilization, x	0.10	0.01	0.15	0.12									
Capacity (veh/h)	743	732	887	809									
Control Delay (s)	8.1	7.8	7.6	7.9									
Approach Delay (s)	8.1	7.8	7.6	7.9									
Approach LOS	A	A	A	A									
Intersection Summary													
Delay	7.8												
HCM Level of Service	A												
Intersection Capacity Utilization	28.4%			ICU Level of Service				A					
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
7: Dry Creek Rd & Faust Rd

Existing 2007 Conditions
PM Peak Hour

Movement	WSL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1
Volume (veh/h)	0	14	3	4	11	2	1	7	0	15	1
Sign Control	Free				Stop			Stop		Free	
Grade	0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh)	0	15	3	4	12	2	1	8	0	16	1
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None									None	
Median storage (veh)											
Upstream signal (ft)											
pC, platoon unlocked	17			38	35	17	42	34	17		
vC, conflicting volume											
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	17			38	35	17	42	34	17		
iC, single (s)	4.1			7.1	6.5	6.2	7.1	6.5	6.2		
iC, 2 stage (s)											
IF (s)	2.2			3.5	4.0	3.3	3.5	4.0	3.3		
p0 queue free %	100			100	99	100	100	99	100		
cM capacity (veh/h)	1800			961	857	1062	949	858	1062		
Direction, Lane #	WB 1	NB 1	SB 1	SE 1							
Volume Total	18	18	9	17							
Volume Left	0	4	1	0							
Volume Right	3	2	0	1							
cSH	1800	900	669	1598							
Volume to Capacity	0.00	0.02	0.01	0.00							
Queue Length 95th (ft)	0	2	1	0							
Control Delay (s)	0.0	9.1	9.2	0.0							
Lane LOS	A	A	A								
Approach Delay (s)	0.0	9.1	9.2	0.0							
Approach LOS	A	A	A								
Interaction Summary											
Average Delay		3.9									
Intersection Capacity Utilization		20.0%			ICU Level of Service					A	
Analysis Period (min)		15									

HCM Signalized Intersection Capacity Analysis
1: University Way & Reecer Creek Rd

Background 2012 Conditions
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SEB	SEB
Lane Configurations						
Volume (veh/h)	229	242	277	251	171	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
FF	1.00	1.00	0.94		1.00	0.85
RT Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1743		1770	1583
RT Permitted	0.37	1.00	1.00		0.95	1.00
Satd. Flow (perm)	691	1863	1743		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	249	263	301	273	186	162
RTOR Reduction (vph)	0	0	39	0	0	125
Lane Group Flow (vph)	249	263	535	0	186	37
Turn Type	Perm				Perm	
Prohibited Phases		4	8		6	
Permitted Phases	4				6	6
Actuated Green, G (s)	25.1	25.1	25.1		9.8	9.8
Effective Green, g (s)	25.1	25.1	25.1		9.8	9.8
Actuated g/C Ratio	0.59	0.59	0.59		0.23	0.23
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	404	1090	1020		404	362
v/s Ratio Prot		0.14	0.31		0.11	
v/s Ratio Perm	0.36				0.02	
v/c Ratio	0.62	0.24	0.52		0.46	0.10
Uniform Delay, d1	5.8	4.3	5.3		14.3	13.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.8	0.1	0.5		0.8	0.1
Delay (s)	8.5	4.4	5.8		15.1	13.2
Level of Service	A	A	A		B	
Approach Delay (s)		6.4	5.8		14.2	
Approach LOS		A	A		B	
Intersection Summary						
HCM Average Control Delay	8.1		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.57		Sum of lost time (s)		8.0	
Actuated Cycle Length (s)	42.9		ICU Level of Service		B	
Intersection Capacity Utilization	62.1%		Analysis Period (min)		15	
C Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
2: Old Highway 10 & Reecer Creek Rd

Background 2012 Conditions
PM Peak Hour

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	35	83	105	346	224	21
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow ratio (vph)	36	90	114	376	243	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)				163		
pX, platoon unblocked						
vC, conflicting volume	869	255	268			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	869	255	268			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	67	68	91			
SM capacity (veh/h)	298	784	1298			
Direction, Lane #	EB 1	NB 1	NB 2	SW 1		
Volume Total	128	114	376	268		
Volume Left	38	114	0	0		
Volume Right	90	0	0	23		
cSH	1005	1298	1700	1700		
Volume to Capacity	0.13	0.09	0.22	0.16		
Queue Length 95th (ft)	11	7	0	0		
Control Delay (s)	12.8	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.8	1.9		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	2.9			ICU Level of Service		
Intersection Capacity Utilization	32.8%			A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Dry Creek Rd & Reecer Creek Rd

Background 2012 Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		◀	▶		◀	▶		◀	▶		◀	▶
Volume (veh/h)	0	15	17	33	28	15	34	306	38	11	186	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	16	16	36	30	16	37	333	41	12	202	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (h)												
pA, platoon unblocked												
vC, conflicting volume	667	677	205	680	660	353	209			374		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	667	677	205	680	660	353	209			374		
IC, angle (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	95	98	89	92	98	97			99		
cM capacity (veh/h)	331	381	835	335	366	660	1382			1185		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	45	83	37	374	12	209						
Volume Left	10	36	37	0	12	0						
Volume Right	18	16	0	41	0	7						
cSH	460	389	1362	1700	1185	1700						
Volume to Capacity	0.10	0.21	0.03	0.22	0.01	0.12						
Queue Length 95th (ft)	8	20	2	0	1	0						
Control Delay (s)	13.7	16.8	7.7	0.0	8.1	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	13.7	16.8	0.7		0.4							
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			38.5%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Bender Rd & Reecer Creek Rd

Background 2012 Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		◀	▶		◀	▶		◀	▶		◀	▶
Volume (veh/h)	0	9	28	66	16	14	56	147	110	17	103	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	28	72	17	15	61	160	120	16	112	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (h)												
pA, platoon unblocked												
vC, conflicting volume	514	550	112	523	490	220	112			279		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	514	550	112	523	490	220	112			279		
IC, angle (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	97	83	96	98	96			99		
cM capacity (veh/h)	430	418	941	424	452	820	1478			1283		
Direction, Lane #	EB 1	WB 1	NB 1	NB 1	SB 1							
Volume Total	38	104	340	130								
Volume Left	0	72	61	18								
Volume Right	28	15	120	0								
cSH	712	461	1478	1283								
Volume to Capacity	0.05	0.23	0.04	0.01								
Queue Length 95th (ft)	4	22	3	1								
Control Delay (s)	10.3	15.1	1.7	1.2								
Lane LOS	B	C	A	A								
Approach Delay (s)	10.3	15.1	1.7	1.2								
Approach LOS	B	C										
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			42.8%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Bowers Rd & Reecer Creek Rd

Background 2012 Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	2	7	17	4	19	0	112	9	0	87	4
Sign Control	Stop											
Grade	0%											
Peak Hour Factor	0.92											
Hourly flow rate (vph)	2	2	6	18	4	14	0	122	10	0	95	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume	240	228	97	232	226	127	99					132
vC1, stage 1 cont vol												
vC2, stage 2 cont vol												
vCu, unblocked vol	240	228	97	232	226	127	99					132
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	100	99	97	99	98	100					100
dM capacity (veh/h)	700	671	980	715	674	824	1494					1454
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	37	132	99								
Volume Left	2	18	0	0								
Volume Right	6	14	10	4								
cSH	838	777	1494	1454								
Volume to Capacity	0.01	0.05	0.00	0.00								
Queue Length 95th (ft)	1	4	0	0								
Control Delay (s)	9.4	9.9	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	9.4	9.9	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay	1.7											
Intersection Capacity Utilization	17.5%											
Analysis Period (min)	15											
ICU Level of Service	A											

HCM Unsignalized Intersection Capacity Analysis
6: Hwy 97 & Old Highway 10

Background 2012 Conditions
PM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control	Stop											
Volume (vph)	75	14	6	1	11	0	3	85	91	0	124	5
Peak Hour Factor	0.92											
Hourly flow rate (vph)	82	15	7	1	12	0	3	92	99	0	135	5
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	103	13	195	140								
Volume Left (vph)	82	1	3	0								
Volume Right (vph)	7	0	99	5								
Head (s)	0.15	0.05	-0.27	0.01								
Departure Headway (s)	4.6	4.9	4.1	4.4								
Degree Utilization, %	0.14	0.02	0.22	0.17								
Capacity (veh/h)	700	690	852	780								
Control Delay (s)	8.6	7.9	8.2	8.3								
Approach Delay (s)	8.6	7.9	8.2	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay	8.3											
ICU Level of Service	A											
Intersection Capacity Utilization	31.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
7: Dry Creek Rd & Faust Rd

Background 2012 Conditions
PM Peak Hour

Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1
Volume (veh/h)	0	18	4	5	14	3	1	9	0	19	1
Sign Control	Free			Stop	Stop	Stop	Stop	Stop	Free	Free	
Grade	0%			0%	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow rate (vph)	0	20	4	5	15	3	1	10	0	21	1
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None								None		
Median storage (veh)											
Upstream signal (s)											
PK platform unblocked											
IC, conflicting volume	22			48	45	21	54	43	22		
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	22			48	45	21	54	43	22		
IC, single (s)	4.1			7.1	6.5	6.2	7.1	6.5	6.2		
IC, 2 stage (s)											
IF (s)	2.2			3.5	4.0	3.3	3.5	4.0	3.3		
p0 queue free %	100			99	98	100	100	99	100		
SM capacity (veh/h)	1594			944	847	1056	928	848	1055		
Direction, Lane #	WB 1	NB 1	SB 1	SE 1							
Volume Total	24	24	11	22							
Volume Left	0	5	1	0							
Volume Right	4	3	0	1							
cSH	1594	892	856	1591							
Volume to Capacity	0.00	0.03	0.01	0.00							
Queue Length 95th (ft)	0	2	1	0							
Control Delay (s)	0.0	9.1	9.3	0.0							
Lane LOS		A	A								
Approach Delay (s)	0.0	9.1	9.3	0.0							
Approach LOS		A	A								
Intersection Summary											
Average Delay		4.0									
Intersection Capacity Utilization		20.0%			ICU Level of Service					A	
Analysis Period (min)		15									

HCM Signalized Intersection Capacity Analysis
 1: University Way & Reecer Creek Rd

With Development 2012 Conditions
 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	233	242	277	254	172	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.94	1.00	0.85	1.00
Satd. Flow (prot)	1770	1863	1742	1770	1583	1583
Flt Permitted	0.37	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	685	1863	1742	1770	1583	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	263	301	276	187	165
RTOR Reduction (vph)	0	0	39	0	0	127
Lane Group Flow (vph)	253	263	538	0	187	38
Turn Type	Perm				Perm	
Protected Phases		4	8		6	
Permitted Phases	4				6	
Adjusted Green, G (s)	25.1	25.1	25.1	9.9	9.9	
Effective Green, g (s)	25.1	25.1	25.1	9.9	9.9	
Adjusted g/C Ratio	0.58	0.58	0.58	0.23	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Equivalent (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	400	1087	1017	408	364	
v/s Ratio Prot		0.14	0.31		0.11	
v/s Ratio Perm	0.37				0.02	
v/c Ratio	0.83	0.24	0.53	0.48	0.10	
Uniform Delay, d1	5.9	4.3	5.4	14.2	13.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	0.1	0.5	0.8	0.1	
Delay (s)	9.2	4.5	5.9	15.1	13.2	
Level of Service	A	A	A	B	B	
Approach Delay (s)	6.8	5.9		14.2		
Approach LOS	A	A		B		
Intersection Summary						
HCM Average Control Delay	8.2		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.58		Sum of lost time (s)		11.0	
Adjusted Cycle Length (s)	43.0		ICU Level of Service		B	
Intersection Capacity Utilization	62.3%		Analysis Period (min)		15	
Analysis Period (min)	15					
C Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2: Old Highway 10 & Reecer Creek Rd

With Development 2012 Conditions
 PM Peak Hour

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	26	83	105	354	228	21
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flowrate (vph)	28	90	114	385	248	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type		None		None		
Median storage (ft)						
Upstream signal (ft)				163		
p/C, platoon unblocked						
v/C, conflicting volume	872	259	271			
v/C1, stage 1 cont vol						
v/C2, stage 2 cont vol						
v/Cu, unblocked vol	872	259	271			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p/O queue free %	90	88	91			
CM capacity (veh/h)	283	779	1283			
Direction Lane #						
	EB 1	NB 1	NB 2	SW 1		
Volume Total	118	114	385	271		
Volume Left	28	114	0	0		
Volume Right	90	0	0	23		
cSIH	1024	1293	1700	1700		
Volume to Capacity	0.12	0.09	0.23	0.16		
Queue Length 95th (ft)	10	7	0	0		
Control Delay (s)	12.2	8.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.2	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	2.7		ICU Level of Service		A	
Intersection Capacity Utilization	33.1%		Analysis Period (min)		15	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
 3: Dry Creek Rd & Reecer Creek Rd PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	↔	
Volume (veh/h)	9	15	17	33	28	15	34	314	38	11	190	8	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	10	16	18	36	30	16	37	341	41	12	207	7	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX platoon unblocked													
vC, conflicting volume	680	690	210	693	673	362	213						383
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	680	690	210	693	673	362	213						383
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
IC, 2 stage (s)													
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	97	95	98	89	92	98	97						99
cm capacity (veh/h)	324	354	830	328	383	683	1357						1176
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	45	83	37	383	12	213							
Volume Left	10	36	37	0	12	0							
Volume Right	18	16	0	41	0	7							
cSH	453	380	1357	1700	1176	1700							
Volume to Capacity	0.10	0.22	0.03	0.23	0.01	0.13							
Queue Length 95th (ft)	8	20	2	0	1	0							
Control Delay (s)	13.8	17.1	7.7	0.0	8.1	0.0							
Lane LOS	B	C	A	A	A	A							
Approach Delay (s)	13.8	17.1	0.7			0.4							
Approach LOS	B	C											
Intersection Summary													
Average Delay	3.1												
Intersection Capacity Utilization	40.0%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
 4: Bender Rd & Reecer Creek Rd PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	↔	
Volume (veh/h)	0	9	26	66	16	16	56	155	110	18	106	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	10	28	72	17	17	61	168	120	20	117	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX platoon unblocked													
vC, conflicting volume	533	566	117	540	507	228	117						288
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	533	566	117	540	507	228	117						288
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
IC, 2 stage (s)													
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	98	97	83	96	98	96						98
cm capacity (veh/h)	416	409	935	413	442	611	1471						1274
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	38	107	349	137									
Volume Left	0	72	81	20									
Volume Right	26	17	120	0									
cSH	703	454	1471	1274									
Volume to Capacity	0.05	0.23	0.04	0.02									
Queue Length 95th (ft)	4	23	3	1									
Control Delay (s)	10.4	15.3	1.6	1.2									
Lane LOS	B	C	A	A									
Approach Delay (s)	10.4	15.3	1.6	1.2									
Approach LOS	B	C											
Intersection Summary													
Average Delay	4.4												
Intersection Capacity Utilization	43.4%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
5: Bowers Rd & Reocer Creek Rd PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		◀	▶		◀	▶		◀	▶		◀	▶
Volume (veh/h)	3	3	13	17	5	13	10	112	9	0	67	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	3	14	18	5	14	11	122	10	0	65	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (s)												
uL, platoon unblocked												
uC, conflicting volume	262	251	97	291	248	127	100			132		
uC1, stage 1 conf vol												
uC2, stage 2 conf vol												
uC, unblocked vol	262	251	97	261	248	127	100			132		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
pQ queue free %	100	99	99	97	99	96	99			100		
BM capacity (veh/h)	672	648	859	675	648	824	1483			1454		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	38	142	100								
Volume Left	3	18	11	0								
Volume Right	14	14	10	5								
cSI	839	745	1483	1454								
Volume to Capacity	0.02	0.05	0.01	0.00								
Queue Length 95th (ft)	2	4	1	0								
Control Delay (s)	9.4	10.1	0.6	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	9.4	10.1	0.6	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay	2.2											
Intersection Capacity Utilization	25.2%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
6: Hwy 97 & Old Highway 10 PM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		◀	▶		◀	▶		◀	▶		◀	▶
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	75	14	6	1	11	0	3	85	91	0	125	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	15	7	1	12	0	3	92	99	0	138	5
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	103	13	195	141								
Volume Left (vph)	82	1	3	0								
Volume Right (vph)	7	0	99	5								
Head (s)	0.15	0.05	-0.27	0.01								
Departure Headway (s)	4.8	4.8	4.1	4.4								
Degree Utilization, %	0.14	0.02	0.22	0.17								
Capacity (veh/h)	699	660	851	780								
Control Delay (s)	8.6	7.9	8.2	8.3								
Approach Delay (s)	8.6	7.9	8.2	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay	8.3											
HCM Level of Service	A											
Intersection Capacity Utilization	31.2%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis With Development 2012 Conditions
 7: Dry Creek Rd & Faust Rd PM Peak Hour

Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations	W	W		W	T		W	T		W	T
Volume (veh/h)	0	18	4	5	14	3	1	9	0	10	1
Sign Control	Free			Stop			Stop		Free		
Grade	0%			0%			0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh)	0	20	4	5	15	3	1	10	0	11	1
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None								None		
Median storage (veh)											
Upstream signal (s)											
pL, platoon unblocked											
vC, conflicting volume	22			48	45	21	54	43	22		
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	22			48	45	21	54	43	22		
IC, single (s)	4.1			7.1	6.5	6.2	7.1	6.5	6.2		
IC, 2 stage (s)											
IF (s)	2.2			3.5	4.0	3.3	3.5	4.0	3.3		
p0 queue free %	100			99	98	100	100	99	100		
cM capacity (veh/h)	1584			944	847	1056	829	848	1055		
Direction, Lane #	WB 1	NB 1	SB 1	SE 1							
Volume Total	24	24	11	22							
Volume Left	0	5	1	0							
Volume Right	4	3	0	1							
cSI	1584	892	856	1591							
Volume to Capacity	0.00	0.03	0.01	0.00							
Queue Length 95th (ft)	0	2	1	0							
Control Delay (s)	0.0	9.1	9.3	0.0							
Lane LOS		A	A								
Approach Delay (s)	0.0	9.1	9.3	0.0							
Approach LOS		A	A								
Intersection Summary											
Average Delay				4.0							
Intersection Capacity Utilization				20.0%	ICU Level of Service	A					
Analysis Period (min)				15							



APPENDIX C QUEUING AND BLOCKING REPORTS



Intersection: 4: Bender Rd & Reecer Creek Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	48	71	32	29
Average Queue (ft)	25	35	2	2
95th Queue (ft)	47	55	16	15
Link Distance (ft)	377	1388	391	808
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Bowers Rd & Reecer Creek Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	36	31	12	18
Average Queue (ft)	20	11	1	1
95th Queue (ft)	43	34	8	9
Link Distance (ft)	376	1383	808	951
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: Bender Rd & Reecer Creek Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	56	74	48	31
Average Queue (ft)	22	36	5	3
95th Queue (ft)	48	62	26	17
Link Distance (ft)	412	1388	389	810
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Bowers Rd & Reecer Creek Rd

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	31	52
Average Queue (ft)	11	20
95th Queue (ft)	34	44
Link Distance (ft)	376	1383
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0