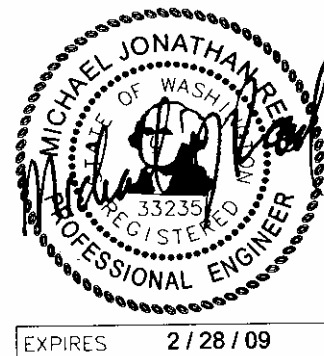


*Red Bridge Road Subdivisions  
Kittitas County, WA*

Traffic Impact Analysis

October 17, 2007



Prepared for:

*Gleason Properties  
PO Box 1321  
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Prepared by:



**Transportation Engineering NorthWest, LLC**

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## FINDINGS AND CONCLUSIONS

**Project Proposal.** Full build-out of the *Red Bridge Road Subdivisions* would consist of four separate residential plats with up to 14 single-family homes sites (56 single-family homes in total), located on the south side of Red Bridge Road in Kittitas County, WA. The individual plats, including Gleason, Cameron, Fremmerlid and Taylor, are adjoining parcels that would be developed in coordination such that roadway and other infrastructure would connect to one another and provide a total of two access connection points onto Red Bridge Road.

**Trip Generation.** The *Red Bridge Road Subdivisions* are estimated to generate approximately 610 daily and 64 p.m. peak hour vehicular trips at full build-out and occupancy of all 56 single-family homes.

**Study Roadway Operations.** Daily traffic demand due to the proposed developments on SR 970 would increase by approximately 100 vehicles west of SR 10 and less than 50 vehicles east of Teanaway Road in 2027. SR 10 daily traffic volumes would increase by less than 50 vehicles in 2027 with the project. These State highway arterials are designed to carry this additional traffic demand. Red Bridge Road west of the site is forecasted to experience an increase of approximately 500 daily vehicles, while Red Bridge Road east of the properties and Teanaway Road south of Red Bridge Road would experience an increase of approximately 100 daily vehicles. While these County roadways would experience a high proportional increase in traffic demands based on historical levels, total average daily traffic (ADT) would not exceed 700 ADT on either Red Bridge Road or Teanaway Road, well within acceptable traffic loads of these rural roadways.

**Off-Site Study Intersection Operations.** All off-site study intersections are anticipated to operate at LOS C or better with the proposed development in 2027.

**Nonmotorized Transportation Impacts.** The applicants would be required to fully fund and construct the necessary frontage improvements onto Red Bridge Road.

**Site Access Impacts.** Vegetation should be removed along the property frontage of Red Bridge Road to maximize sight distance to the west of the proposed site access roadway.

**Mitigation Measures.** The applicants would be required to fully fund and construct the necessary frontage improvements, site access connections onto Red Bridge Road, and internal roadways connecting for future extension to three adjacent residential pipeline developments. The applicants may also have to contribute approximately 8.4 percent of a proportional fair share (total share of all four plats) toward future turn lane improvements warranted on SR 907 at Red Bridge Road.



## INTRODUCTION

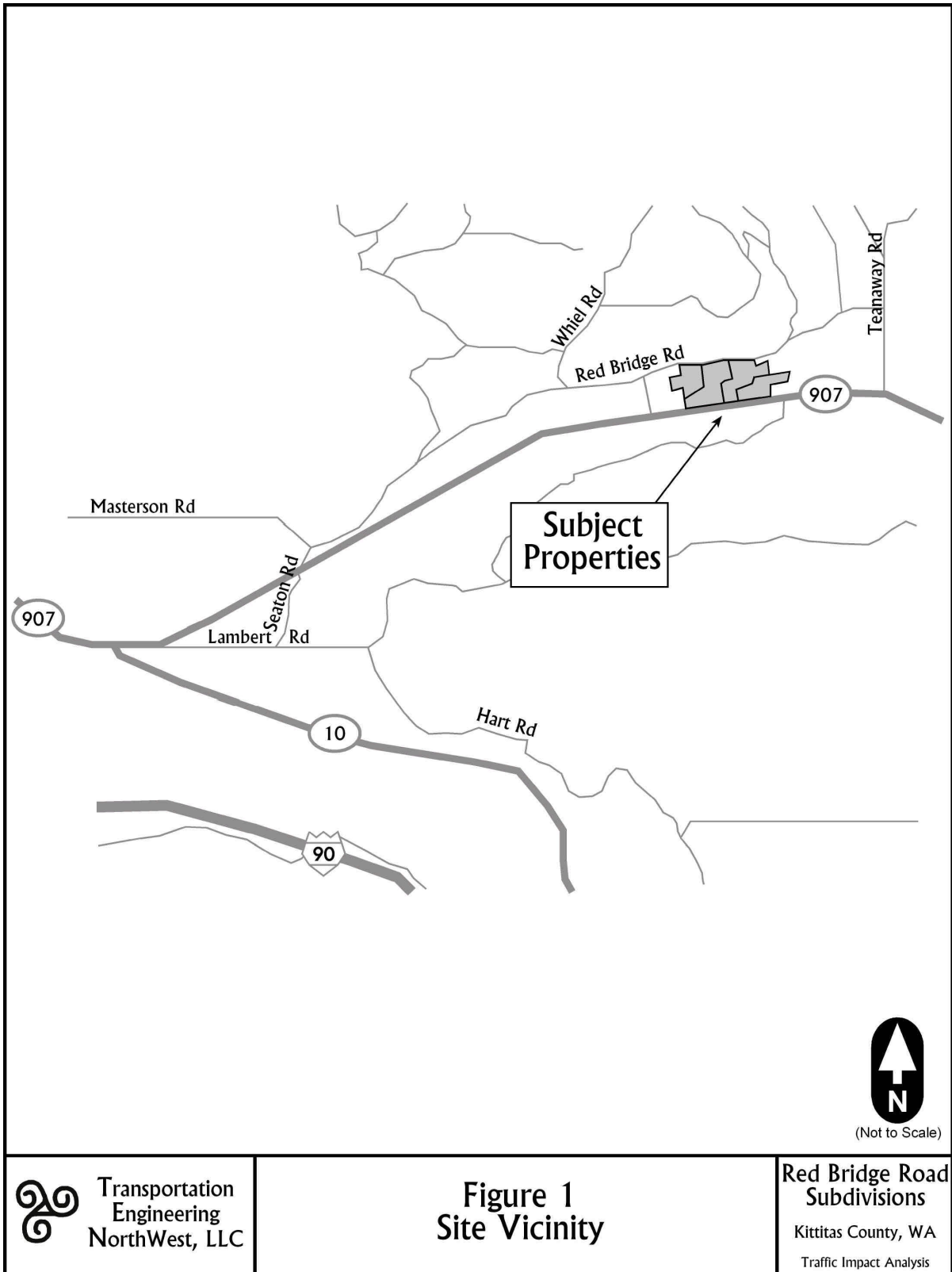
This study summarizes traffic impacts associated with the *Red Bridge Road subdivisions*, a combined buildout of 56 single-family homes on four separate, but adjacent residential plats located on the south side of Red Bridge Road in Kittitas County, WA. Based on our discussions with Kittitas County and the County's *Traffic Impact Analysis Requirements*, the following tasks were undertaken to analyze traffic impacts associated with the proposed action:

- Assessment of existing conditions through field reconnaissance and review of existing planning documents.
- Estimation of weekday vehicular daily and p.m. peak hour trips generated by the proposed action.
- Assignment of weekday daily and p.m. peak hour project trips onto the existing roadway network in the immediate vicinity.
- Evaluation of p.m. peak level of service (LOS) impacts at the following study intersections:
  1. *SR 970 / SR 10*
  2. *SR 970 / Red Bridge Road*
  3. *SR 970 / Teanaway Road*
  4. *Red Bridge Road / Teanaway Road*
  5. *Red Bridge Road / Masterson Road*
- Evaluation of nonmotorized facilities and site access, safety, and circulation issues.
- Identification of mitigation measures to maintain acceptable levels of mobility and safety based upon Kittitas County and the Washington State Department of Transportation (WSDOT) standards and guidelines.

## Project Description

This study summarizes traffic impacts associated with the *Red Bridge Road subdivisions*, a combined buildout of 56 single-family homes on four separate, but adjacent residential plats located on the south side of Red Bridge Road in Kittitas County, WA. The individual plats, including Gleason, Cameron, Fremmerlid and Taylor, are adjoining parcels that would be developed in coordination such that roadway and other infrastructure would connect to one another and provide a total of two access connection points onto Red Bridge Road. The Gleason plat is expected to be developed first (within the next several years). Subsequent buildout of remaining plats is currently not known. Therefore, for the purpose of this analysis, the year 2027 was selected as the build-out year for full completion of the project per Kittitas County 20-year protected traffic forecast requirements.

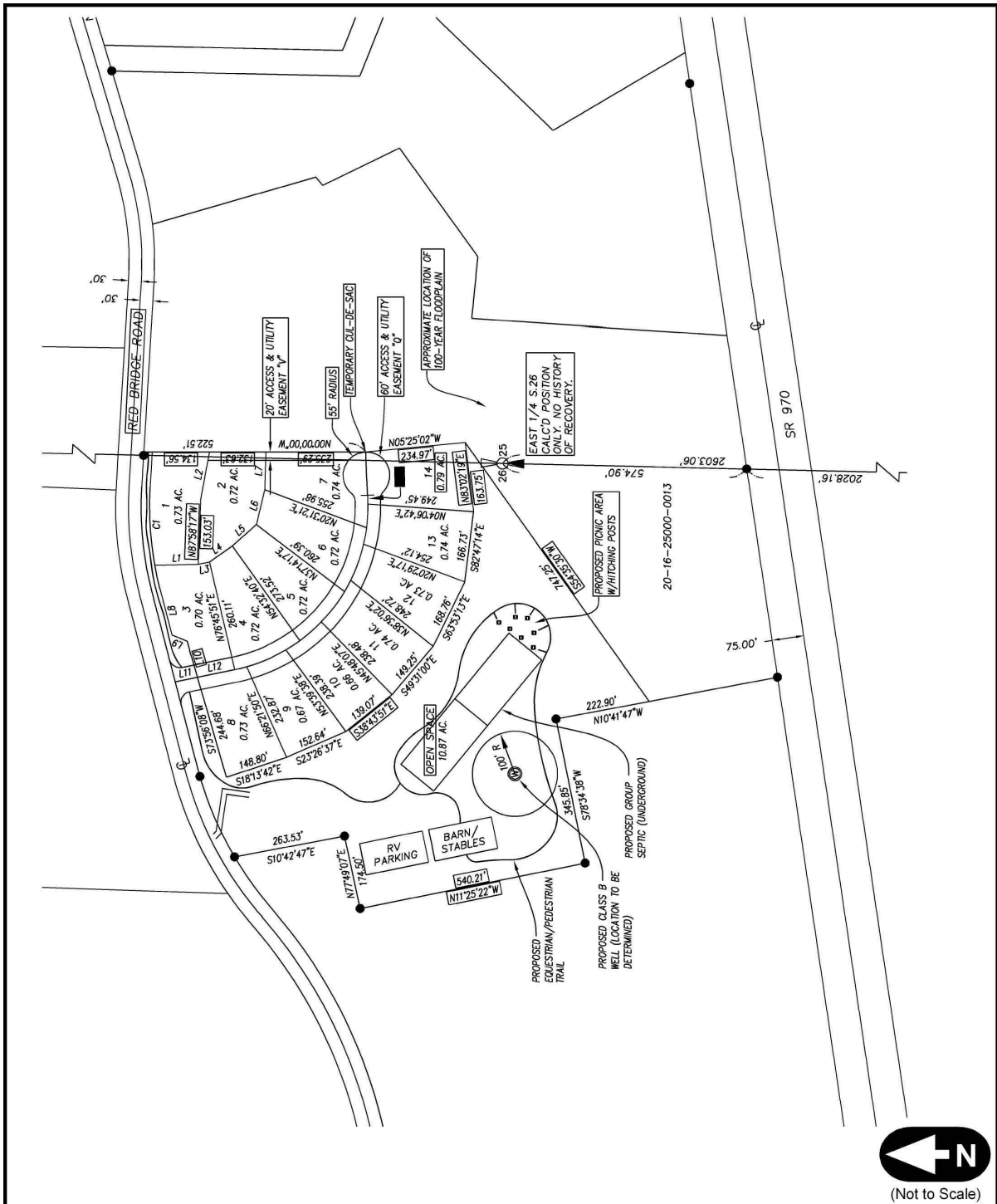
A project site vicinity map is shown in **Figure 1**, and a site plan for the Gleason Plat is illustrated in **Figure 2**.



 Transportation Engineering NorthWest, LLC

**Figure 1**  
**Site Vicinity**

**Red Bridge Road Subdivisions**  
Kittitas County, WA  
Traffic Impact Analysis



 Transportation Engineering NorthWest, LLC

**Figure 2**  
**Project Site Plan**  
**Gleason Plat**

**Red Bridge Road Subdivisions**  
 Kittitas County, WA  
 Traffic Impact Analysis

## EXISTING CONDITIONS

This section describes existing transportation system conditions in the study area. It includes an inventory of existing roadway conditions, collision history, traffic volumes, intersection levels of service, nonmotorized transportation facilities, and planned roadway improvements.

### Roadway Conditions

The following paragraphs describe existing arterial roadways that would be used as major routes for site access. Roadway characteristics are described in terms of facility type, number of lanes, posted speed limits and shoulder types and widths.

**SR 970** is classified by WSDOT as a two-lane, rural principal arterial. Travel lanes are approximately 12 feet with 4-to 8-foot paved shoulders. The speed limit is posted at 55 mph west of and 60 mph east of Masterson Road / Seaton Road.

**Red Bridge Road** is a two-lane unchannelized roadway. The roadway is paved and approximately 27 feet in width, with 0- to 4-foot gravel shoulders. The posted speed limit is 25 mph.

**SR 10** is classified by WSDOT as a two-lane, rural collector arterial. Travel lanes are approximately 10 to 12 feet with 2-to 10-foot bituminous concrete shoulders. The speed limit is posted at 55 mph.

**Teanaway Road** is a two-lane unchannelized roadway with 11- to 12-foot travel lanes and 2- to 6-foot gravel shoulders. The speed limit is posted at 50 mph.

### Collision History

The frequency and severity of collisions are commonly weighted against the speed, volume, and functional classification of a roadway segment or intersection. These variables are considered in determining if a certain location has an unusually high collision rate or unsafe condition.

The average annual collision rate is calculated by summing the total number of collisions that occurred at a specified intersection or roadway segment during the past three years, and dividing the total by three. Collision data for an intersection is also measured by collision rates per million entering vehicles (MEV). Collisions per MEV reflect the number of vehicles traveling through an intersection, providing a different indication of design-related versus volume-related incidences.

**Table 1** summarizes historical collision data as provided by the WSDOT for the most recent 3-year period between January 1, 2004 and December 31, 2006 at all study intersections. There were no reported collisions at the intersection of SR 970 at Masterson Road /Seaton Road or SR 970 at Teanaway Road. There was only 1 reported collision at the SR 970 at SR 10 intersection, which has a 0.19 per MEV. There have been no fatal accidents during the most recent three-year period of collision record data.





On Kittitas County roads, there have only been 3 reported collisions since 2004 on Teanaway Road (1 reported collision in 2007) and Red Bridge Road (two reported collisions; 1 in 2004 and 1 in 2007), none of them occurring at intersections. Thus, there are no safety issues in the immediate site vicinity.

**Table 1: January 1, 2004 – December 31, 2006 Historical Collision Rates**

ID #	Intersections	Fatal Collisions	Injury Collisions	PDO Collisions	Total Collisions	Average Annual Collision Rate	Collision Rate per MEV
1	SR 970 at SR 10	0	1	0	1	0.3	0.19

Source: WSDOT standard Accident History Detail Report, Data Collected August 2007. No reported collisions at the intersections of SR 970 and Master Road/Seaton Road and SR 970 at Teanaway Road.  
MEV – Million entering vehicles.

## Existing Traffic Volumes

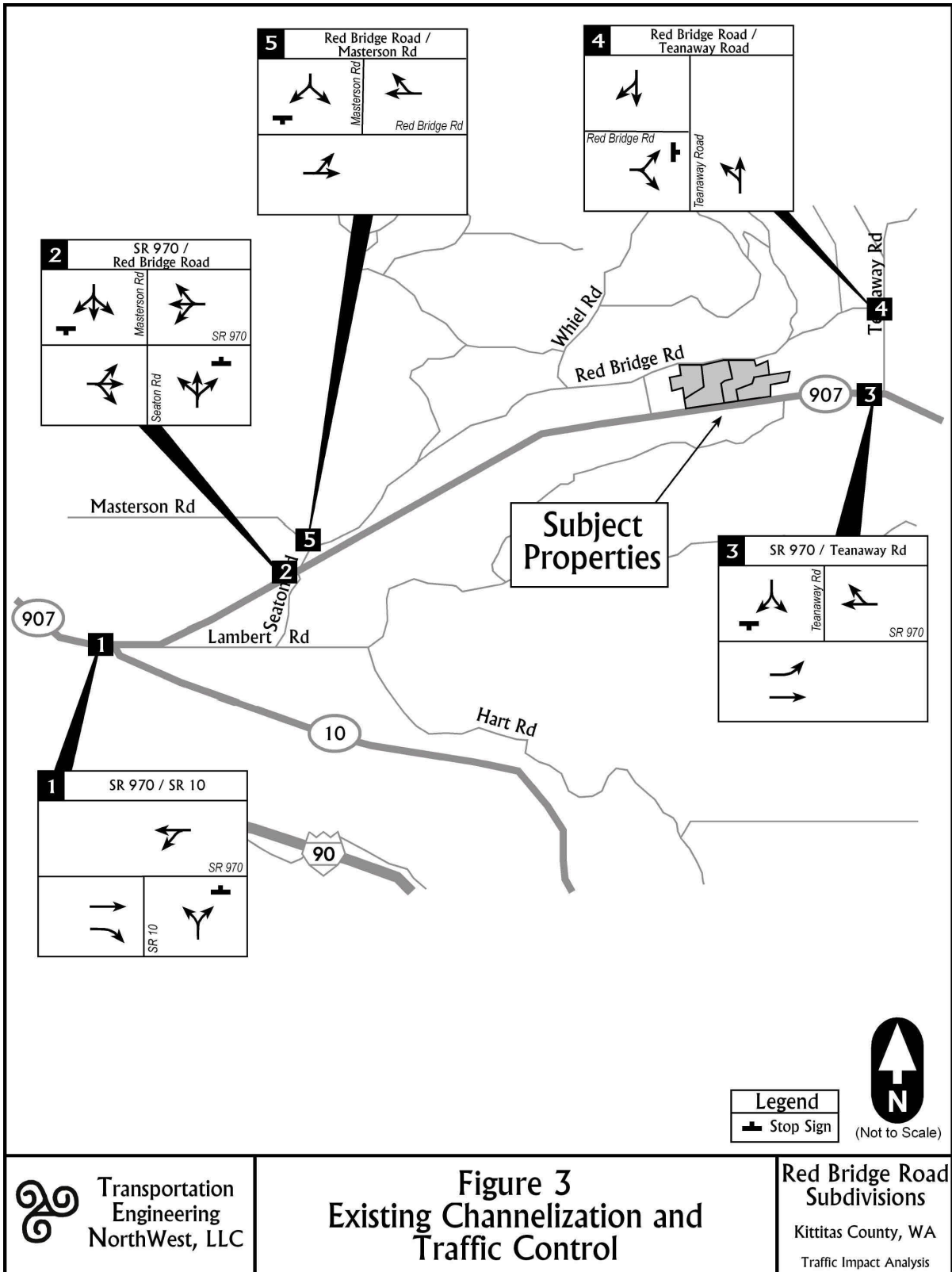
Average weekday daily traffic volumes (AWDT) represent the number of vehicles traveling a roadway segment over a 24-hour period on an average weekday. Peak hour traffic volumes represent the highest hourly volume of vehicles passing through an intersection during a typical 4-6 p.m. weekday peak period. **Figure 3** illustrates existing channelization and traffic control at the study intersections. **Figure 4** summarizes existing daily and p.m. peak hour traffic volumes.

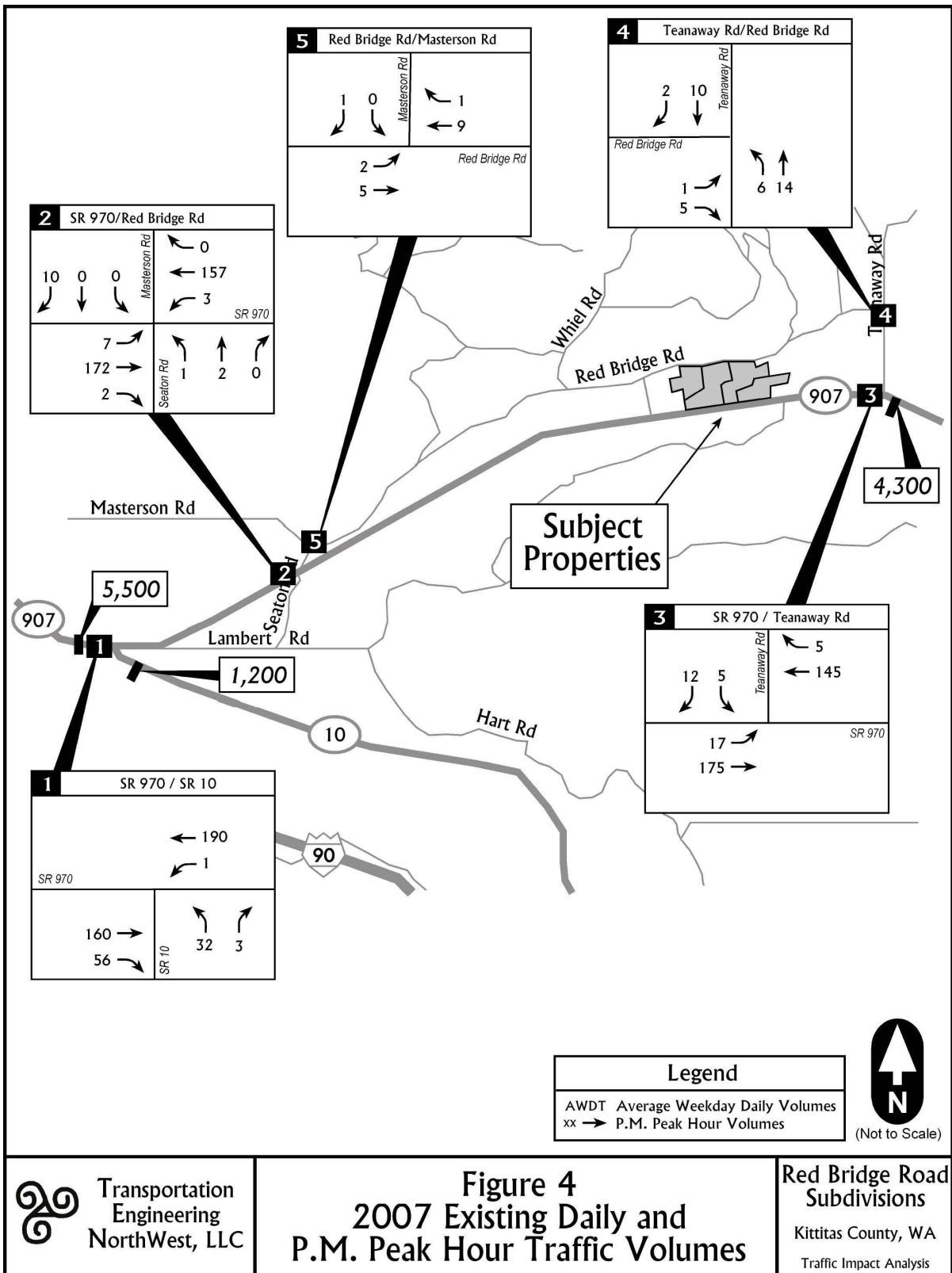
Daily traffic volumes were obtained from WSDOT. All Traffic Data Services, Inc. conducted p.m. peak period turning movement counts at all study intersections in July 2007 (traffic counts provided in **Appendix A**). Historical traffic volumes on SR 970 indicate a 2 percent per year background growth rate. Thus, all traffic counts not counted in the year 2007 were factored by 2 percent per year to estimate year 2007 existing conditions.

## Intersection Level of Service

Level of service (LOS) serves as an indicator of the quality of traffic flow at an intersection or road segment. The LOS grading ranges from A to F, such that LOS A is assigned when minimal delays are present and low volumes are experienced. LOS F indicates long delays and/or forced flow. **Table 2** summarizes the delay range for each level of service at unsignalized intersections. The methods used to calculate the levels of service are described in the updated *2000 Highway Capacity Manual* (Special Report 209, Transportation Research Board).

For unsignalized intersections, a level of service and estimate of average control delay is determined for each minor or controlled movement based upon a sequential analysis of gaps in the major traffic streams and conflicting traffic movements. In addition, given that unsignalized intersections create different driver expectations and congestion levels than signalized intersections, their delay criteria are lower. Control delay at unsignalized intersections include deceleration delay, queue move-up time, stopped delay in waiting for an adequate gap in flows through the intersection, and final acceleration delay. The *Highway Capacity Software* (version 4.1f) was used to evaluate levels of service at unsignalized intersections.





**Figure 4**  
2007 Existing Daily and P.M. Peak Hour Traffic Volumes

**Table 2: Unsignalized Intersection Level of Service Measures**

Level of Service	Unsignalized Intersection Delay Range (sec)
A	≤ 10
B	> 10 to ≤ 15
C	> 15 to ≤ 25
D	> 25 to ≤ 35
E	> 35 to ≤ 50
F	≥ 50

Source: "Highway Capacity Manual", Special Report 209, Transportation Research Board, 2000, Update.

**Table 3** highlights existing 2007 p.m. peak hour levels of service at study intersections. As shown, critical stop controlled movements at all study intersections currently operate at LOS B or better. Detailed level of service summary sheets are provided in **Appendix B**.

**Table 3: Existing 2007 P.M. Peak Intersection Level of Service**

Unsignalized Intersections	Traffic Control Movement	LOS	Average Delay (seconds)
#1 - SR 970 at SR 10	Westbound Left	A	8
	Northbound	B	11
#2 - SR 970 at Red Bridge Road	Eastbound Left	A	8
	Westbound Left	A	8
	Northbound	B	12
	Southbound	A	9
#3 - SR 970 at Teanaway Road	Eastbound Left	A	8
	Southbound	B	10
#4 – Red Bridge Road at Teanaway Road	Eastbound	A	8
	Northbound Left	A	8
#5 – Red Bridge Road at Masterson Road	Eastbound Left	A	8
	Southbound	A	8

1 - Analysis based on HCS 2000 results using HCM 2000 control delays and LOS.

## Nonmotorized Transportation Facilities

Gravel shoulders are provided on Red Bridge Road and Teanaway Road/ Seaton Road. Paved shoulders are provided on SR 970. SR 10 consists of bituminous concrete shoulders.

## Planned Roadway Improvements

A review of Kittitas County's *2007-2027 Six-Year Transportation Improvement Plan* identified no transportation capacity related improvements in the project site vicinity that would be impacted by project trips.



## TRAFFIC IMPACTS

The following section describes transportation impacts the proposed project would have on the surrounding arterial network. The discussion includes non-project related traffic forecasts, new trips generated by the proposed development, distribution and assignment of new project trips, impacts on roadways, levels of service, nonmotorized facilities, and site access, safety, and circulation issues.

### Non-Project Traffic Forecasts

For the purpose of this traffic analysis, year 2027 was selected as the build-out year based upon Kittitas County 20-year protected traffic forecast requirements. As mentioned previously, to estimate future traffic volumes, existing traffic counts were factored by 2 percent per year to estimate 2027 “baseline” without project conditions.

In addition, traffic volumes from vicinity pipeline projects include the following: approximately 204 single-family residential homes feeding onto Columbia Avenue at SR 903 within Cle Elum, were used in addition to the background traffic growth rate to estimate 2027 traffic volumes along SR 970 without the *Red Bridge Road Subdivision* (future year traffic volume forecast estimates are provided in **Appendix C**).

### Project Trip Generation

Trip generation rates compiled by the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 7<sup>th</sup> Edition*, 2003, were used to estimate daily and p.m. peak hour vehicular trip generation by the proposed development using fitted curve equations for Single-Family Detached Housing (ITE land use code 210).

**Table 4** summarizes estimated trip generation by the proposed subdivisions (56 lots in total). An estimated total of 610 daily and 64 p.m. peak hour vehicular trips (40 entering and 24 exiting) would be generated at full build-out.

**Table 4: Project Trip Generation**

Land Use	Size	P.M. Peak Trip Generation			Daily Trip Generation
		Enter	Exit	Total	
Single-Family Detached Housing <sup>1</sup>	56 DU	40	24	64	610

Source: ITE *Trip Generation Manual*, 7<sup>th</sup> Edition, 2003, for ITE Land Use Code 210.

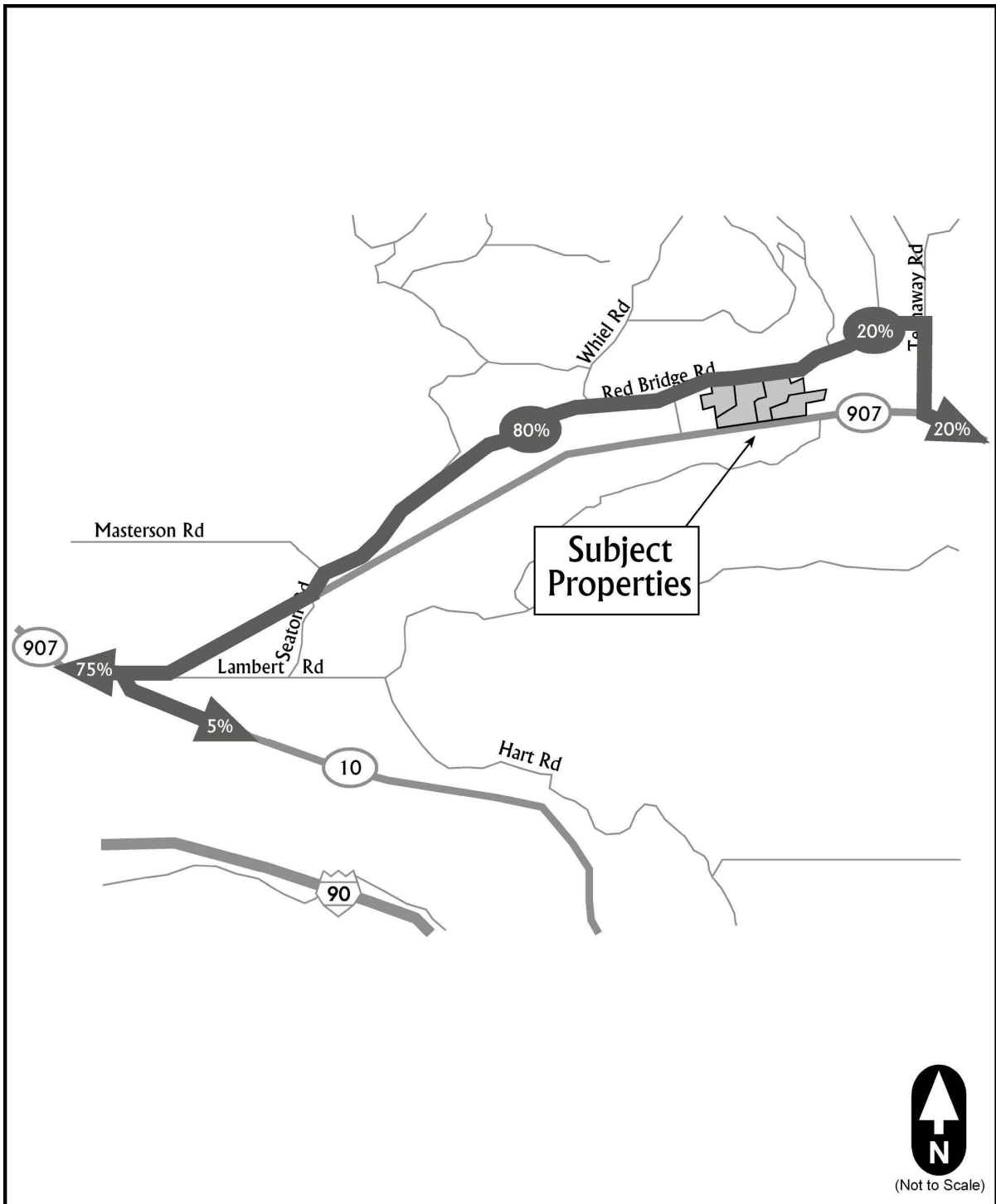
1 - DU is Dwelling Unit.

### Trip Distribution and Assignment

Based upon existing traffic volumes and the regional employment distribution within the area, traffic volumes generated by the proposed action would be distributed as follows (also shown in **Figure 5**):

- 75 percent westerly and 20 percent easterly via SR 970; and
- 5 percent southerly via SR 10.





 Transportation Engineering NorthWest, LLC	<b>Figure 5</b> <b>Project Trip Distribution</b>	<b>Red Bridge Road Subdivisions</b> Kittitas County, WA Traffic Impact Analysis
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## Traffic Volume Impacts

**Figure 6** summarizes future year 2027 daily and p.m. peak hour traffic volumes with and without the proposed development. Traffic volume calculations are provided in **Appendix C**. Daily traffic demand due to the proposed developments on SR 970 would increase by approximately 500 vehicles west of SR 10 and 100 vehicles east of Teanaway Road in 2027. SR 10 daily traffic volumes would increase by less than 50 vehicles in 2027 with the project. These State highway arterials are designed to carry this additional traffic demand. Red Bridge Road west of the site is forecasted to experience an increase of approximately 500 daily vehicles, while Red Bridge Road east of the properties and Teanaway Road south of Red Bridge Road would experience an increase of approximately 100 daily vehicles. While these County roadways would experience a high proportional increase in traffic demands based on historical levels, total average daily traffic (ADT) would not exceed 700 ADT on either Red Bridge Road or Teanaway Road, well within acceptable traffic loads of these rural roadways.

## Intersection Level of Service Impacts

**Table 5** summarizes level of service impacts due to the proposed development at all study intersections in 2027. As shown, little or no increase in vehicle delay would result due to the proposed action and all study intersections are anticipated to operate at LOS C or better with and without the project in 2027. Detailed level of service summary worksheets are provided in **Appendix B**.

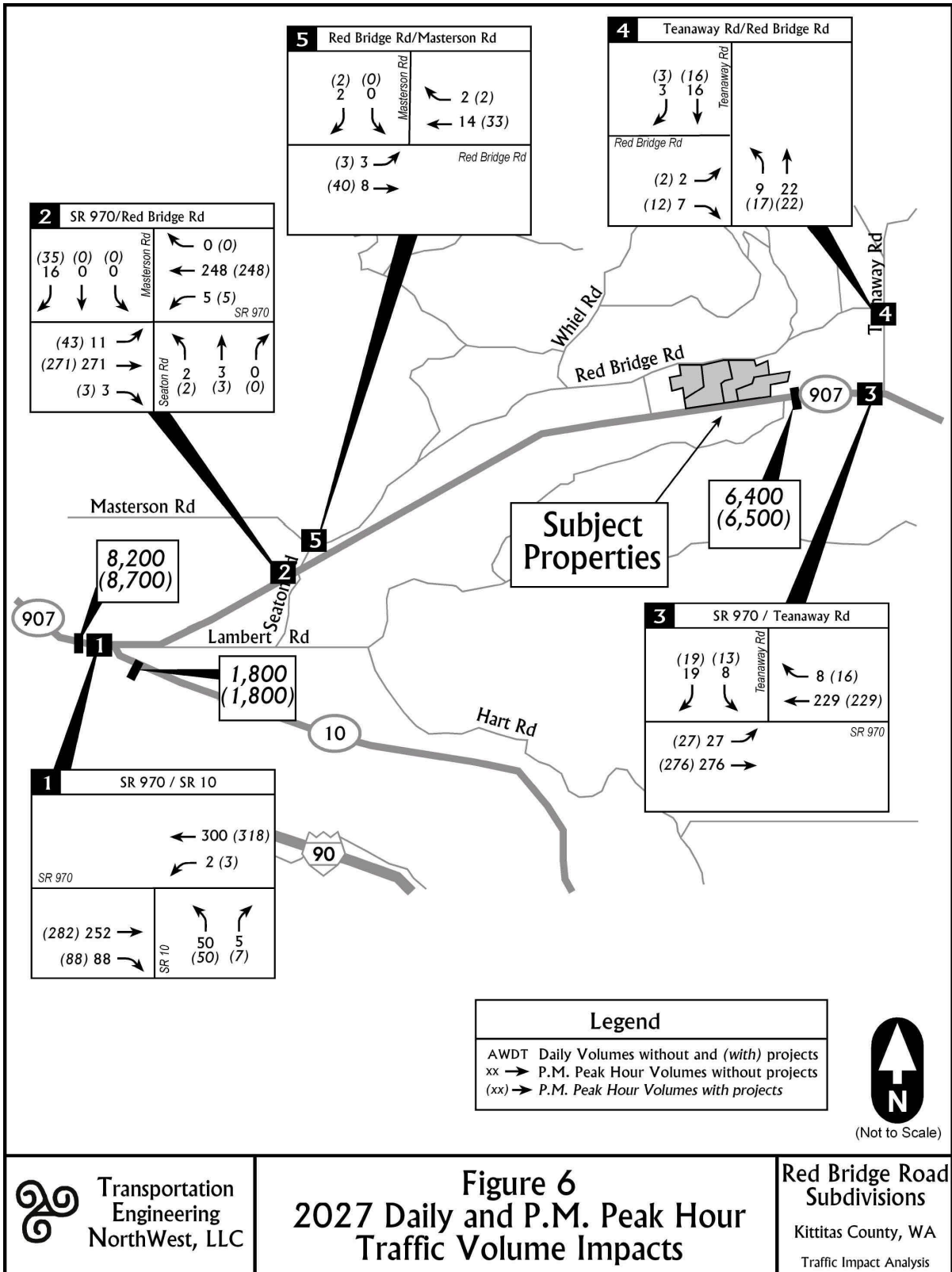
**Table 5: 2027 P.M. Peak Intersection Level of Service Impacts**

Unsignalized Intersections	Traffic Control Movement	Without Project LOS	Without Project Delay (seconds)	With Project LOS	With Project Delay (seconds)
#1 - SR 970 at SR 10	Westbound Left	A	8	A	8
	Northbound	B	13	B	14
#2 - SR 970 at Red Bridge Road Road	Eastbound Left	A	8	A	8
	Westbound Left	A	8	A	8
	Northbound	B	14	C	15
	Southbound	A	9	A	10
#3 - SR 970 at Teanaway Road	Eastbound Left	A	8	A	8
	Southbound	B	11	B	12
#4 – Red Bridge Road at Teanaway Road	Eastbound	A	8	A	8
	Northbound Left	A	8	A	8
#5 – Red Bridge Road at Masterson Road	Eastbound Left	A	8	A	8
	Southbound	A	8	A	8

1 - Analysis based on HCS 2000 results using HCM 2000 control delays and LOS.

## Nonmotorized Transportation Facilities

The applicants would be required to fully fund and construct the necessary frontage improvements onto Red Bridge Road.





## Site Access, Safety, and Circulation Issues

Vehicular site access is proposed via two new roadway connections onto Red Bridge Road, which would provide access for the Gleason Properties and 3 adjacent subdivision. The applicants would be required to fully fund and construct the necessary frontage improvements, site access connections onto Red Bridge Road, and internal roadways connecting all four residential developments.

The Gleason Properties property abuts SR 907. However, under *WAC 468-52-040-2 – Highway Access Management – Access Control Classification System and Standards*, the project is not allowed to take direct access to the State Highway system as it does have alternative access via Red Bridge Road. As such, all vehicular access is proposed via Red Bridge/Teaway Road at established intersections with SR 907.

## Sight Distance

The American Association of State and Highway Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 2001, was used to determine sight distance requirements. AASHTO requires 335 feet of stopping sight distance and 200 feet of entering sight distance for a 30 mph design speed (5 mph over 25 mph posted speed limit) onto Red Bridge Road. Field-measured sight distances at the western site access roadway onto Red Bridge Road is approximately 350 feet to the west with the removal of property frontage vegetation and greater than 500 feet to the east. The eastern site driveway onto Red Bridge Road has field-measured sight distances greater than 500 feet to the west and east. Therefore, the proposed site driveways onto Red Bridge Road would meet AASHTO sight distance requirements.

## Turn-Lane Warrants

Left- and right-turn movements represent critical turning movements at unsignalized intersections, increasing the potential for intersection delay and safety issues. An evaluation of the potential need for a eastbound left-turns and westbound right-turn lanes along SR 907 was reviewed at Red Bridge Road during the weekday p.m. peak hour under 2027 with project conditions, with results summarized in **Table 6**. Turn lane warrants are based upon procedures and guidelines found in WSDOT's *Design Manual*, January 2005.

**Table 6: 2027 Left-Turn Lane Warrants at SR 907 / Red Bridge Road Intersection**

Left-Turn Lane Warrant	Without Project	With Project
Eastbound Left-Turns	36	45
Total DHV (WB & EB Approach Volumes)	584	593
% Total DHV Turning Left	6%	8%
Volume Warrant Met? <sup>1</sup>	Yes	Yes
Posted Speed Limit	60	60
Left-Turn Lane Length <sup>2</sup>	100	100

1 - Based on WSDOT's *Design Manual*, January 2005, Figure 910-8a Left-Turn Storage Guidelines Two Lane-Unsignalized.

2 - Based on WSDOT's *Design Manual*, January 2005, Left-Turn Storage Length (Two-Lane Unsignalized).

As shown, an eastbound left-turn lane at Red Bridge Road and SR 907 would be warranted in 2027 regardless of the project. The *Red Bridge Road Subdivision's* proportion share toward these improvements would be approximately 8.4 percent.

Forecasted westbound right turning movements at either the intersection of SR 970 and Red Bridge Road or Teanaway would be less than 20 vehicles per hour, and therefore, no right turn lane warrants would be triggered.

## MITIGATION MEASURES

An analysis was conducted of vehicular trip generation, impacts on roadways and significant intersections, nonmotorized facilities, and site access, safety, and circulation issues. Based upon this traffic impact analysis, the following mitigation measures may be required:

- The applicants would be required to fully fund and construct the necessary frontage improvements, site access connections onto Red Bridge Road, and internal roadways connecting all four residential developments.
- Remove vegetation along the property frontage of Red Bridge Road to maximize sight distance to the west of the western site access roadway.
- The applicants may have to contribute approximately 8.4 percent (in total) of a proportional fair share toward future turn lane improvements warranted on SR 907 at its Red Bridge Road intersection.



# Appendix A

## Traffic Counts



# Peak Hour Summary

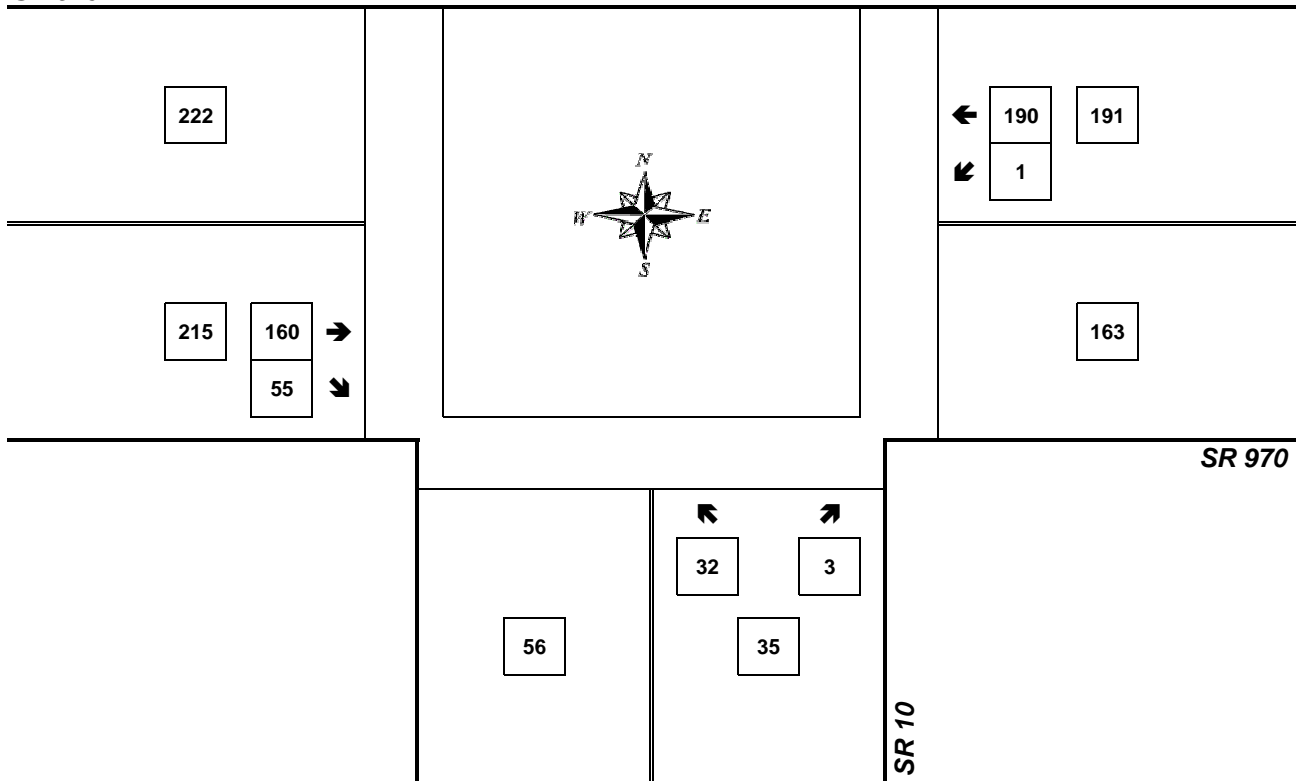


Mark Skaggs  
(206) 251-0300

## SR 10 & SR 970

4:00 PM to 5:00 PM  
Tuesday, July 31, 2007

### SR 970



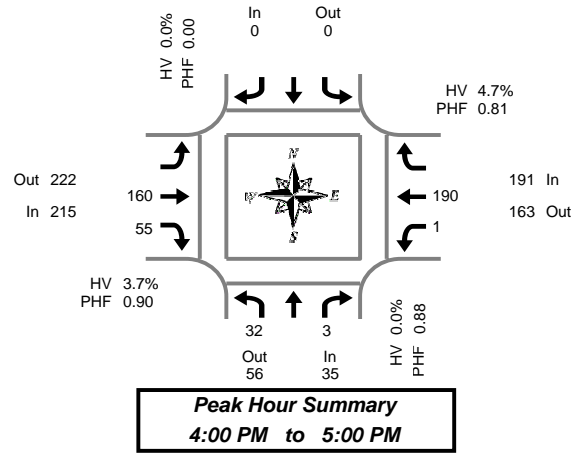
Approach	PHF	HV%	Volume
EB	0.90	3.7%	215
WB	0.81	4.7%	191
NB	0.88	0.0%	35
SB	0.00	0.0%	0
<b>Intersection</b>	<b>0.93</b>	<b>3.9%</b>	<b>441</b>

Count Period: 4:00 PM to 6:00 PM

# Total Vehicle Summary



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## SR 10 & SR 970

Tuesday, July 31, 2007  
4:00 PM to 6:00 PM

### 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SR 10				Southbound SR 10				Eastbound SR 970				Westbound SR 970				Interval Total
	L		R	HV					T	R	HV	L	T		HV		
4:00 PM	8		1	0					34	17	1	0	54		2	114	
4:15 PM	7		2	0					45	15	2	0	42		4	111	
4:30 PM	7		0	0					41	11	2	1	58		3	118	
4:45 PM	10		0	0					40	12	3	0	36		0	98	
5:00 PM	12		1	0					59	6	5	2	31		5	111	
5:15 PM	11		2	0					43	13	4	0	44		2	113	
5:30 PM	7		1	0					36	7	1	0	40		1	91	
5:45 PM	10		0	0					33	7	1	0	25		1	75	
Total Survey	72		7	0					331	88	19	3	330		18	831	

### Peak Hour Summary

4:00 PM to 5:00 PM

By Approach	Northbound SR 10				Southbound SR 10				Eastbound SR 970				Westbound SR 970				Total	
	In	Out	Total	HV	In	Out	Total		In	Out	Total	HV	In	Out	Total	HV		
Volume	35	56	91	0	0	0	0		215	222	437	8	191	163	354	9	441	
%HV	0.0%				0.0%					3.7%				4.7%				3.9%
PHF	0.88				0.00					0.90				0.81				0.93

By Movement	Northbound SR 10				Southbound SR 10				Eastbound SR 970				Westbound SR 970				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	32		3	35				0		160	55	215	1	190		191	441
PHF	0.80		0.38	0.88				0.00		0.89	0.81	0.90	0.25	0.82		0.81	0.93

### Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SR 10				Southbound SR 10				Eastbound SR 970				Westbound SR 970				Interval Total
	L		R	HV					T	R	HV	L	T		HV		
4:00 PM	32		3	0					160	55	8	1	190		9	441	
4:15 PM	36		3	0					185	44	12	3	167		12	438	
4:30 PM	40		3	0					183	42	14	3	169		10	440	
4:45 PM	40		4	0					178	38	13	2	151		8	413	
5:00 PM	40		4	0					171	33	11	2	140		9	390	

# Peak Hour Summary

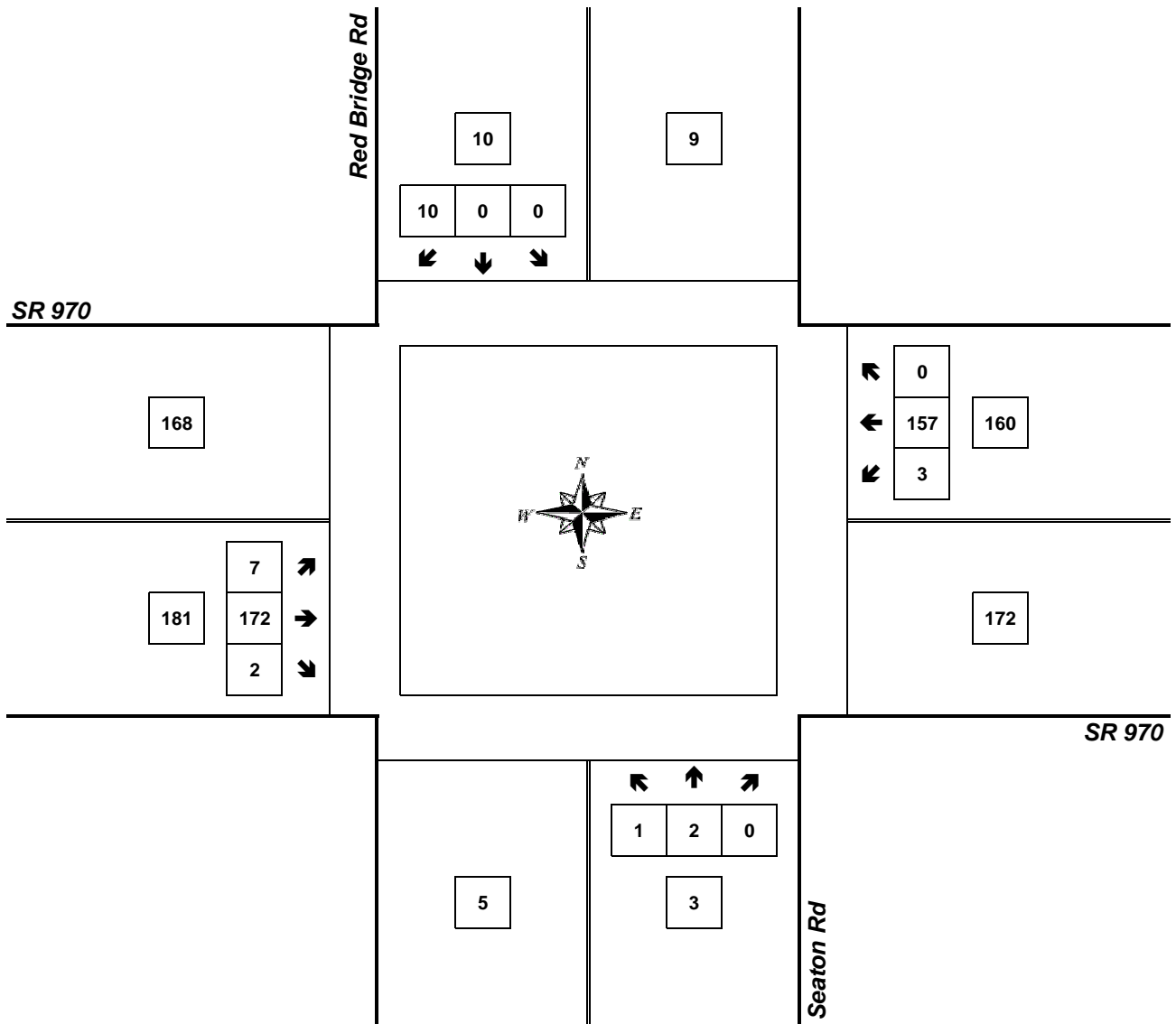


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## Red Bridge Rd & SR 970

4:15 PM to 5:15 PM

Tuesday, July 31, 2007



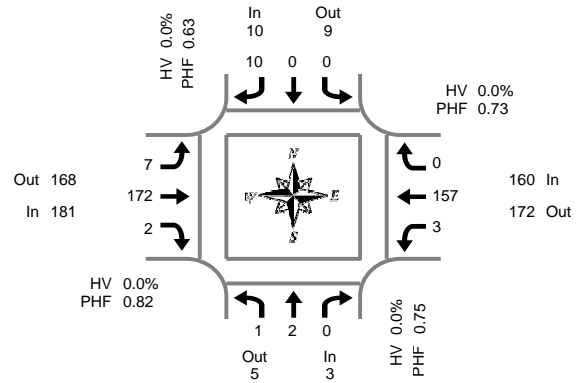
Approach	PHF	HV%	Volume
EB	0.82	0.0%	181
WB	0.73	0.0%	160
NB	0.75	0.0%	3
SB	0.63	0.0%	10
<b>Intersection</b>	<b>0.89</b>	<b>0.0%</b>	<b>354</b>

Count Period: 4:00 PM to 6:00 PM

# Total Vehicle Summary



Mark Skaggs  
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**Peak Hour Summary**  
4:15 PM to 5:15 PM

## Red Bridge Rd & SR 970

Tuesday, July 31, 2007  
4:00 PM to 6:00 PM

### 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Red Bridge Rd				Southbound Red Bridge Rd				Eastbound SR 970				Westbound SR 970				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	1	0	1	1	0	0	1	31	0	0	0	44	0	0	79
4:15 PM	0	1	0	0	0	0	1	0	3	39	0	0	2	53	0	0	99
4:30 PM	1	0	0	0	0	0	2	0	1	39	2	0	0	45	0	0	90
4:45 PM	0	1	0	0	0	0	4	0	1	41	0	0	0	27	0	0	74
5:00 PM	0	0	0	0	0	0	3	0	2	53	0	0	1	32	0	0	91
5:15 PM	0	0	1	0	0	2	1	0	5	41	0	0	0	36	1	0	87
5:30 PM	0	2	1	0	0	1	1	0	0	29	1	0	0	35	0	0	70
5:45 PM	1	0	0	0	0	0	1	0	3	32	0	0	1	23	0	0	61
Total Survey	2	4	3	0	1	4	13	0	16	305	3	0	4	295	1	0	651

### Peak Hour Summary

4:15 PM to 5:15 PM

By Approach	Northbound Red Bridge Rd				Southbound Red Bridge Rd				Eastbound SR 970				Westbound SR 970				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	3	5	8	0	10	9	19	0	181	168	349	0	160	172	332	0	354
%HV	0.0%				0.0%				0.0%				0.0%				0.0%
PHF	0.75				0.63				0.82				0.73				0.89

By Movement	Northbound Red Bridge Rd				Southbound Red Bridge Rd				Eastbound SR 970				Westbound SR 970				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	2	0	3	0	0	10	10	7	172	2	181	3	157	0	160	354
PHF	0.25	0.50	0.00	0.75	0.00	0.00	0.63	0.63	0.58	0.81	0.25	0.82	0.38	0.74	0.00	0.73	0.89

### Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Red Bridge Rd				Southbound Red Bridge Rd				Eastbound SR 970				Westbound SR 970				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	1	2	1	0	1	1	7	0	6	150	2	0	2	169	0	0	342
4:15 PM	1	2	0	0	0	0	10	0	7	172	2	0	3	157	0	0	354
4:30 PM	1	1	1	0	0	2	10	0	9	174	2	0	1	140	1	0	342
4:45 PM	0	3	2	0	0	3	9	0	8	164	1	0	1	130	1	0	322
5:00 PM	1	2	2	0	0	3	6	0	10	155	1	0	2	126	1	0	309

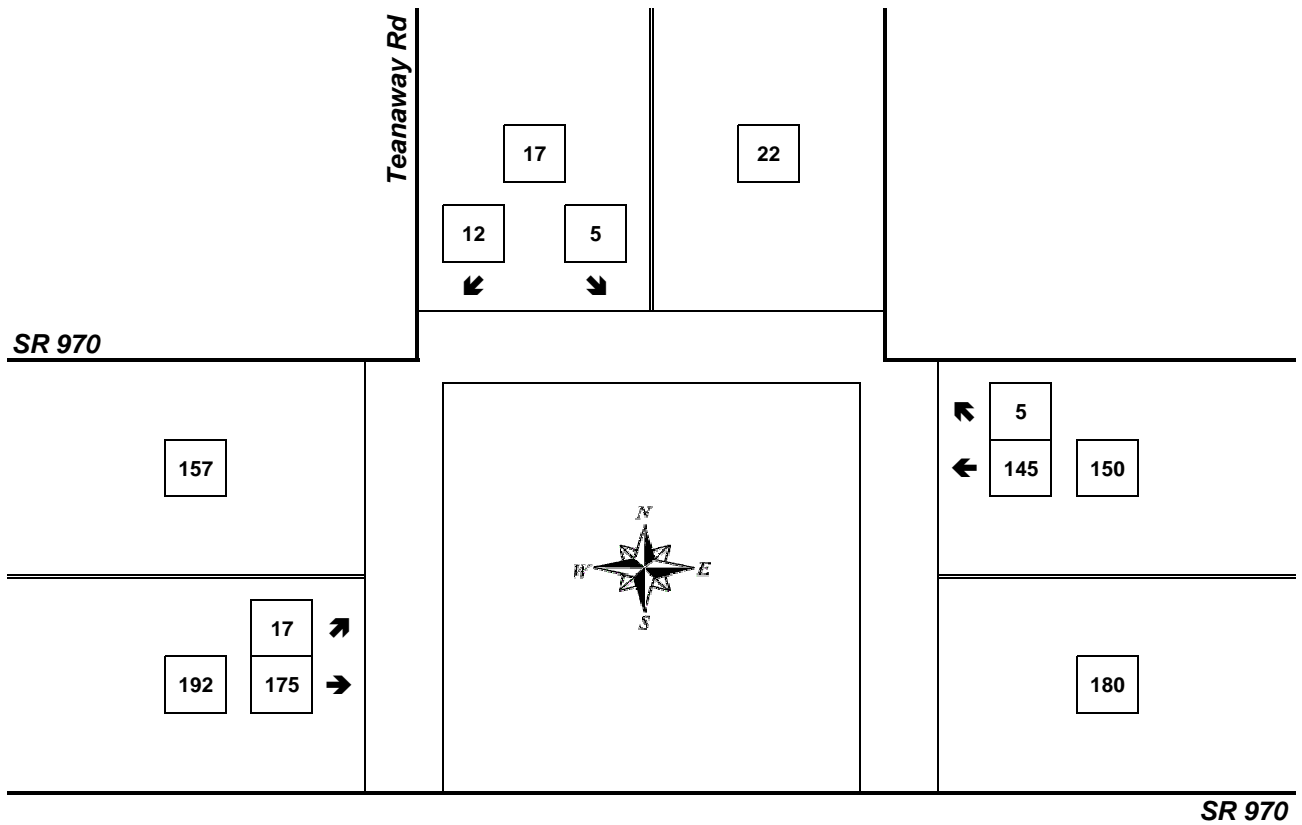
# Peak Hour Summary



Mark Skaggs  
(206) 251-0300

## Teanaway Rd & SR 970

4:15 PM to 5:15 PM  
Thursday, August 02, 2007



Approach	PHF	HV%	Volume
EB	0.81	15.1%	192
WB	0.74	16.0%	150
NB	0.00	0.0%	0
SB	0.47	0.0%	17
<b>Intersection</b>	<b>0.93</b>	<b>14.8%</b>	<b>359</b>

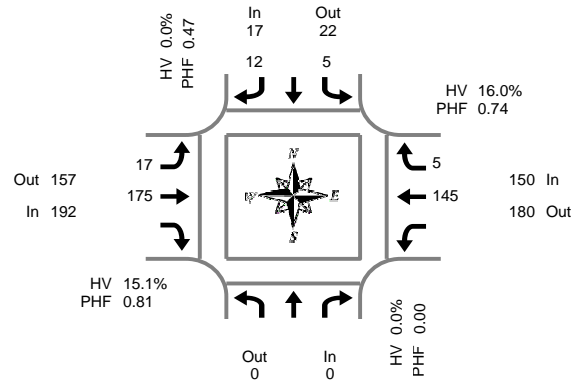
Count Period: 4:00 PM to 6:00 PM



# Total Vehicle Summary



Mark Skaggs  
(206) 251-0300



## Teanaway Rd & SR 970

Thursday, August 02, 2007  
4:00 PM to 6:00 PM

### 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Teanaway Rd			Southbound Teanaway Rd			Eastbound SR 970			Westbound SR 970			Interval Total
	L	R	HV	L	T	HV	T	R	HV				
4:00 PM	1	4	0	8	37	1	31	2	8	83			
4:15 PM	3	6	0	5	51	12	27	2	2	94			
4:30 PM	1	3	0	6	53	3	33	1	4	97			
4:45 PM	0	2	0	4	38	9	34	2	6	80			
5:00 PM	1	1	0	2	33	5	51	0	12	88			
5:15 PM	1	4	0	5	31	4	42	2	8	85			
5:30 PM	3	4	0	3	37	4	40	0	10	87			
5:45 PM	3	3	1	5	46	3	30	0	5	87			
Total Survey	13	27	1	38	326	41	288	9	55	701			

### Peak Hour Summary 4:15 PM to 5:15 PM

By Approach	Northbound Teanaway Rd			Southbound Teanaway Rd				Eastbound SR 970				Westbound SR 970				Total	
	In	Out	Total	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		
Volume	0	0	0	17	22	39	0	192	157	349	29	150	180	330	24	359	
%HV	0.0%			0.0%					15.1%				16.0%				14.8%
PHF	0.00			0.47					0.81				0.74				0.93

By Movement	Northbound Teanaway Rd			Southbound Teanaway Rd			Eastbound SR 970			Westbound SR 970			Total
	Total	L	R	Total	L	T	Total	L	T	Total	T	R	
Volume	0	5	12	17	17	175	192	145	5	150	359		
PHF	0.00	0.42	0.50	0.47	0.71	0.83	0.81	0.71	0.63	0.74	0.93		

### Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Teanaway Rd			Southbound Teanaway Rd			Eastbound SR 970			Westbound SR 970			Interval Total
	L	R	HV	L	T	HV	T	R	HV				
4:00 PM	5	15	0	23	179	25	125	7	20	354			
4:15 PM	5	12	0	17	175	29	145	5	24	359			
4:30 PM	3	10	0	17	155	21	160	5	30	350			
4:45 PM	5	11	0	14	139	22	167	4	36	340			
5:00 PM	8	12	1	15	147	16	163	2	35	347			

## Appendix B

### Detailed Intersection Level of Service Summary Sheets



HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: JGT  
 Agency/Co.: TENW  
 Date Performed: 8/3/2007  
 Analysis Time Period: PM Peak  
 Intersection: #1 - SR 970 / SR 10  
 Jurisdiction: WSDOT/Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2007 Existing  
 Project ID: Gleason Properties  
 East/West Street: SR 970  
 North/South Street: SR 10  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R

Volume		160	56		1	190	
Peak-Hour Factor, PHF		0.93	0.93		0.93	0.93	
Hourly Flow Rate, HFR		172	60		1	204	
Percent Heavy Vehicles		--	--		5	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		0	1	
Configuration		T	R		LT		
Upstream Signal?		No				No	

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R

Volume		32	3				
Peak Hour Factor, PHF		0.93	0.93				
Hourly Flow Rate, HFR		34	3				
Percent Heavy Vehicles		0	0				
Percent Grade (%)		0				0	
Flared Approach: Exists?/Storage		No			/		/
Lanes		0	0				
Configuration		LR					

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			1	4	7		8	9	10

Lane Config		LT		LR				
v (vph)		1		37				
C(m) (vph)		1318		643				
v/c		0.00		0.06				
95% queue length		0.00		0.18				
Control Delay		7.7		10.9				
LOS		A		B				
Approach Delay				10.9				
Approach LOS				B				

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: JGT  
 Agency/Co.: TENW  
 Date Performed: 10/16/2007  
 Analysis Time Period: PM Peak  
 Intersection: #1 - SR 970 / SR 10  
 Jurisdiction: WSDOT/Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2027 Without Project  
 Project ID: Gleason Properties  
 East/West Street: SR 970  
 North/South Street: SR 10  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound			Westbound		
		1	2	3	4	5	6
		L	T	R	L	T	R

Volume		252	88		2	300	
Peak-Hour Factor, PHF		0.93	0.93		0.93	0.93	
Hourly Flow Rate, HFR		270	94		2	322	
Percent Heavy Vehicles		--	--		5	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		0	1	
Configuration		T	R		LT		
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Northbound			Southbound		
		7	8	9	10	11	12
		L	T	R	L	T	R

Volume		50		6			
Peak Hour Factor, PHF		0.93		0.93			
Hourly Flow Rate, HFR		53		6			
Percent Heavy Vehicles		0		0			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage				No	/		/
Lanes		0		0			
Configuration			LR				

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound			Southbound		
			7	8	9	10	11	12
Lane Config		LT		LR				

v (vph)		2		59			
C(m) (vph)		1178		489			
v/c		0.00		0.12			
95% queue length		0.01		0.41			
Control Delay		8.1		13.4			
LOS		A		B			
Approach Delay				13.4			
Approach LOS				B			

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: JGT  
 Agency/Co.: TENW  
 Date Performed: 10/16/2007  
 Analysis Time Period: PM Peak  
 Intersection: #1 - SR 970 / SR 10  
 Jurisdiction: WSDOT/Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2027 With Project  
 Project ID: Gleason Properties  
 East/West Street: SR 970  
 North/South Street: SR 10  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound			Westbound		
		1	2	3	4	5	6
		L	T	R	L	T	R

Volume		282	88		3	318	
Peak-Hour Factor, PHF		0.93	0.93		0.93	0.93	
Hourly Flow Rate, HFR		303	94		3	341	
Percent Heavy Vehicles		--	--		5	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		0	1	
Configuration		T	R		LT		
Upstream Signal?		No				No	

Minor Street:	Approach Movement	Northbound			Southbound		
		7	8	9	10	11	12
		L	T	R	L	T	R

Volume		50		7			
Peak Hour Factor, PHF		0.93		0.93			
Hourly Flow Rate, HFR		53		7			
Percent Heavy Vehicles		0		0			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage				No	/		/
Lanes		0		0			
Configuration			LR				

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound			Southbound		
			7	8	9	10	11	12
Lane Config	1	4	LT	LR				

v (vph)		3		60			
C(m) (vph)		1145		458			
v/c		0.00		0.13			
95% queue length		0.01		0.45			
Control Delay		8.2		14.0			
LOS		A		B			
Approach Delay				14.0			
Approach LOS				B			

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst:

Agency/Co.: TENW  
 Date Performed: 8/3/2007  
 Analysis Time Period: PM Peak  
 Intersection: #2 - SR 970/Red Bridge Road  
 Jurisdiction: WSDOT/City of Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2007 Existing  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Rd  
 North/South Street: SR 970  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		7	172	2		3	157	0
Peak-Hour Factor, PHF		0.89	0.89	0.89		0.89	0.89	0.89
Hourly Flow Rate, HFR		7	193	2		3	176	0
Percent Heavy Vehicles		0	--	--		0	--	--
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	1	0		0	1	0
Configuration		LTR				LTR		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		1	2	0		0	0	10
Peak Hour Factor, PHF		0.89	0.89	0.89		0.89	0.89	0.89
Hourly Flow Rate, HFR		1	2	0		0	0	11
Percent Heavy Vehicles		0	0	0		0	0	0
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage		No			/	No		
Lanes		0	1	0		0	1	0
Configuration		LTR				LTR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			7	8	9		10	11	12
Lane Config	LTR	LTR		LTR			LTR		
v (vph)	7	3		3			11		
C(m) (vph)	1412	1390		548			872		
v/c	0.00	0.00		0.01			0.01		
95% queue length	0.01	0.01		0.02			0.04		
Control Delay	7.6	7.6		11.6			9.2		
LOS	A	A		B			A		
Approach Delay				11.6			9.2		
Approach LOS				B			A		

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: JGT  
 Agency/Co.: TENW  
 Date Performed: 8/3/2007  
 Analysis Time Period: PM Peak  
 Intersection: #2 - SR 970/Red Bridge  
 Jurisdiction: WSDOT/City of Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2027 Without Project  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge  
 North/South Street: SR 970  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		11	271	3		5	248	0
Peak-Hour Factor, PHF		0.89	0.89	0.89		0.89	0.89	0.89
Hourly Flow Rate, HFR		12	304	3		5	278	0
Percent Heavy Vehicles		0	--	--		0	--	--
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	1	0		0	1	0
Configuration		LTR				LTR		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		2	3	0		0	0	16
Peak Hour Factor, PHF		0.89	0.89	0.89		0.89	0.89	0.89
Hourly Flow Rate, HFR		2	3	0		0	0	17
Percent Heavy Vehicles		0	0	0		0	0	0
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage		No			/	No		
Lanes		0	1	0		0	1	0
Configuration		LTR				LTR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			1	4	7		8	9	10
Lane Config	LTR	LTR		LTR			LTR		
v (vph)	12	5		5			17		
C(m) (vph)	1296	1265		395			766		
v/c	0.01	0.00		0.01			0.02		
95% queue length	0.03	0.01		0.04			0.07		
Control Delay	7.8	7.9		14.2			9.8		
LOS	A	A		B			A		
Approach Delay				14.2			9.8		
Approach LOS				B			A		

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: JGT  
 Agency/Co.: TENW  
 Date Performed: 8/3/2007  
 Analysis Time Period: PM Peak  
 Intersection: #2 - SR 970/Red Bridge  
 Jurisdiction: WSDOT/City of Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2027 With Project  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Rd  
 North/South Street: SR 970  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		43	271	3		5	248	0
Peak-Hour Factor, PHF		0.89	0.89	0.89		0.89	0.89	0.89
Hourly Flow Rate, HFR		48	304	3		5	278	0
Percent Heavy Vehicles		0	--	--		0	--	--
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	1	0		0	1	0
Configuration		LTR				LTR		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		2	3	0		0	0	35
Peak Hour Factor, PHF		0.89	0.89	0.89		0.89	0.89	0.89
Hourly Flow Rate, HFR		2	3	0		0	0	39
Percent Heavy Vehicles		0	0	0		0	0	0
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage		No			/	No		
Lanes		0	1	0		0	1	0
Configuration		LTR				LTR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			1	4	7		8	9	10
Lane Config	LTR	LTR		LTR			LTR		
v (vph)	48	5		5			39		
C(m) (vph)	1296	1265		339			766		
v/c	0.04	0.00		0.01			0.05		
95% queue length	0.12	0.01		0.04			0.16		
Control Delay	7.9	7.9		14.8			10.0-		
LOS	A	A		C			A		
Approach Delay				14.8			10.0-		
Approach LOS				C			A		









HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: MJR  
 Agency/Co.: TENW  
 Date Performed: 10/17/2007  
 Analysis Time Period: PM Peak  
 Intersection: Teanaway/Red Bridge Road  
 Jurisdiction: Kittitas  
 Units: U. S. Customary  
 Analysis Year: 2007 Existing  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge  
 North/South Street: Teanaway Road  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		1	0	5				
Peak-Hour Factor, PHF		0.90	0.90	0.90				
Hourly Flow Rate, HFR		1	0	5				
Percent Heavy Vehicles		0	--	--		--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	0	0				
Configuration		LTRLR						
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		6	14			10	2	
Peak Hour Factor, PHF		0.90	0.90			0.90	0.90	
Hourly Flow Rate, HFR		6	15			11	2	
Percent Heavy Vehicles		0	0			0	0	
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage					/	No /		
Lanes		0	1			1	0	
Configuration		LT				TR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			1	4	7		8	9	10
Lane Config	LTR			LT					TR
v (vph)	1			21					13
C(m) (vph)	1636			923					917
v/c	0.00			0.02					0.01
95% queue length	0.00			0.07					0.04
Control Delay	7.2			9.0					9.0
LOS	A			A					A
Approach Delay					9.0			9.0	
Approach LOS					A			A	

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: MJR  
 Agency/Co.: TENW  
 Date Performed: 10/17/2007  
 Analysis Time Period: PM Peak  
 Intersection: Teanaway/Red Bridge Road  
 Jurisdiction: Kittitas  
 Units: U. S. Customary  
 Analysis Year: 2027 Baseline  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge  
 North/South Street: Teanaway Road  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		2	0	7				
Peak-Hour Factor, PHF		0.90	0.90	0.90				
Hourly Flow Rate, HFR		2	0	7				
Percent Heavy Vehicles		0	--	--		--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	0	0				
Configuration		LTRLR						
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		9	22			16	3	
Peak Hour Factor, PHF		0.90	0.90			0.90	0.90	
Hourly Flow Rate, HFR		10	24			17	3	
Percent Heavy Vehicles		0	0			0	0	
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage					/	No /		
Lanes		0	1			1	0	
Configuration		LT				TR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			1	4	7		8	9	10
Lane Config	LTR			LT					TR
v (vph)	2			34					20
C(m) (vph)	1636			915					913
v/c	0.00			0.04					0.02
95% queue length	0.00			0.12					0.07
Control Delay	7.2			9.1					9.0
LOS	A			A					A
Approach Delay					9.1			9.0	
Approach LOS					A			A	

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: MJR  
 Agency/Co.: TENW  
 Date Performed: 10/17/2007  
 Analysis Time Period: PM Peak  
 Intersection: Teanaway/Red Bridge Road  
 Jurisdiction: Kittitas  
 Units: U. S. Customary  
 Analysis Year: 2027 with Projects  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge  
 North/South Street: Teanaway Road  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		2	0	12				
Peak-Hour Factor, PHF		0.90	0.90	0.90				
Hourly Flow Rate, HFR		2	0	13				
Percent Heavy Vehicles		0	--	--		--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	0	0				
Configuration		LTRLR						
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		17	22			16	3	
Peak Hour Factor, PHF		0.90	0.90			0.90	0.90	
Hourly Flow Rate, HFR		18	24			17	3	
Percent Heavy Vehicles		0	0			0	0	
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage					/	No /		
Lanes		0	1			1	0	
Configuration		LT				TR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			1	4	7		8	9	10
Lane Config	LTR			LT					TR
v (vph)	2			42					20
C(m) (vph)	1636			925					906
v/c	0.00			0.05					0.02
95% queue length	0.00			0.14					0.07
Control Delay	7.2			9.1					9.1
LOS	A			A					A
Approach Delay					9.1			9.1	
Approach LOS					A			A	

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: MJR  
 Agency/Co.: TENW  
 Date Performed: 10/17/2007  
 Analysis Time Period: PM Peak  
 Intersection: Red Bridge Rd/Masterson Road  
 Jurisdiction: Kittitas  
 Units: U. S. Customary  
 Analysis Year: 2007 Existing  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Road  
 North/South Street: Masterson  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		2	5			9	1	
Peak-Hour Factor, PHF		0.90	0.90			0.90	0.90	
Hourly Flow Rate, HFR		2	5			10	1	
Percent Heavy Vehicles		0	--	--		--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	1			1	0	
Configuration		LT				TR		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume						0	2	
Peak Hour Factor, PHF						0.90	0.90	
Hourly Flow Rate, HFR						0	2	
Percent Heavy Vehicles						0	0	
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage					/		No /	
Lanes						0	0	
Configuration						LR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound			
			4	7	8		9	10	11	12
Lane Config	1	4		7	8	9		10	11	12
	LT								LR	
v (vph)	2							2		
C(m) (vph)	1621							1077		
v/c	0.00							0.00		
95% queue length	0.00							0.01		
Control Delay	7.2							8.3		
LOS	A							A		
Approach Delay								8.3		
Approach LOS								A		

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: MJR  
 Agency/Co.: TENW  
 Date Performed: 10/17/2007  
 Analysis Time Period: PM Peak  
 Intersection: Red Bridge Rd/Masterson Road  
 Jurisdiction: Kittitas  
 Units: U. S. Customary  
 Analysis Year: 2027 Baseline  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Road  
 North/South Street: Masterson  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		3	8			14	2	
Peak-Hour Factor, PHF		0.90	0.90			0.90	0.90	
Hourly Flow Rate, HFR		3	8			15	2	
Percent Heavy Vehicles		0	--	--		--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	1			1	0	
Configuration		LT				TR		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume						0	2	
Peak Hour Factor, PHF						0.90	0.90	
Hourly Flow Rate, HFR						0	2	
Percent Heavy Vehicles						0	0	
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage					/		No /	
Lanes						0	0	
Configuration						LR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound			
			4	7	8		9	10	11	12
Lane Config	1	4		7	8	9		10	11	12
	LT								LR	
v (vph)	3							2		
C(m) (vph)	1613							1069		
v/c	0.00							0.00		
95% queue length	0.01							0.01		
Control Delay	7.2							8.4		
LOS	A							A		
Approach Delay								8.4		
Approach LOS								A		



HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst: MJR  
 Agency/Co.: TENW  
 Date Performed: 10/17/2007  
 Analysis Time Period: PM Peak  
 Intersection: Red Bridge Rd/Masterson Road  
 Jurisdiction: Kittitas  
 Units: U. S. Customary  
 Analysis Year: 2027 with Projects  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Road  
 North/South Street: Masterson  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		3	40			33	2	
Peak-Hour Factor, PHF		0.90	0.90			0.90	0.90	
Hourly Flow Rate, HFR		3	44			36	2	
Percent Heavy Vehicles		0	--	--		--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		0	1			1	0	
Configuration		LT				TR		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume						0	2	
Peak Hour Factor, PHF						0.90	0.90	
Hourly Flow Rate, HFR						0	2	
Percent Heavy Vehicles						0	0	
Percent Grade (%)		0				0		
Flared Approach: Exists?/Storage					/	No /		
Lanes						0	0	
Configuration						LR		

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound			
			4	7	8		9	10	11	12
Lane Config	1	4		7	8	9		10	11	12
	LT								LR	
v (vph)	3							2		
C(m) (vph)	1585							1041		
v/c	0.00							0.00		
95% queue length	0.01							0.01		
Control Delay	7.3							8.5		
LOS	A							A		
Approach Delay								8.5		
Approach LOS								A		

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst:

Agency/Co.: TENW  
 Date Performed: 8/3/2007  
 Analysis Time Period: PM Peak  
 Intersection: #6 - Red Bridge Rd / West Dr  
 Jurisdiction: Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2027 with Projects  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Rd  
 North/South Street: East Site Dr  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound				Westbound		
		1 L	2 T	3 R		4 L	5 T	6 R
Volume		240	17		4	233		
Peak-Hour Factor, PHF		0.90	0.90		0.90	0.90		
Hourly Flow Rate, HFR		266	18		4	258		
Percent Heavy Vehicles		--	--		2	--	--	
Median Type/Storage		Undivided			/			
RT Channelized?								
Lanes		1	0		0	1		
Configuration		TR				LT		
Upstream Signal?		No				No		

Minor Street:	Approach Movement	Northbound				Southbound		
		7 L	8 T	9 R		10 L	11 T	12 R
Volume		10		2				
Peak Hour Factor, PHF		0.90		0.90				
Hourly Flow Rate, HFR		11		2				
Percent Heavy Vehicles		2		2				
Percent Grade (%)			0			0		
Flared Approach: Exists?/Storage				No	/		/	
Lanes		0		0				
Configuration		LR						

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound				Southbound		
			4	7	8		9	10	11
Lane Config	1	LT		LR					
v (vph)		4		13					
C(m) (vph)		1278		528					
v/c		0.00		0.02					
95% queue length		0.01		0.08					
Control Delay		7.8		12.0					
LOS		A		B					
Approach Delay				12.0					
Approach LOS				B					

HCS2000: Unsignalized Intersections Release 4.1f

TWO-WAY STOP CONTROL SUMMARY

Analyst:

Agency/Co.: TENW  
 Date Performed: 8/3/2007  
 Analysis Time Period: PM Peak  
 Intersection: #7 - Red Bridge Rd / West Dr  
 Jurisdiction: Cle Elum  
 Units: U. S. Customary  
 Analysis Year: 2027 With Projects  
 Project ID: Gleason Properties  
 East/West Street: Red Bridge Rd  
 North/South Street: West Site Dr  
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound			Westbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume		255	17	4	238		
Peak-Hour Factor, PHF		0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR		283	18	4	264		
Percent Heavy Vehicles		--	--	2	--	--	
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		1	0		0	1	
Configuration			TR		LT		
Upstream Signal?		No				No	

Minor Street:	Approach Movement	Northbound			Southbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume		10		2			
Peak Hour Factor, PHF		0.90		0.90			
Hourly Flow Rate, HFR		11		2			
Percent Heavy Vehicles		2		2			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage			No	/		/	
Lanes		0		0			
Configuration			LR				

Delay, Queue Length, and Level of Service

Approach Movement	EB	WB	Northbound			Southbound		
			1	4	7	8	9	10
Lane Config		LT		LR				
v (vph)		4		13				
C(m) (vph)		1260		513				
v/c		0.00		0.03				
95% queue length		0.01		0.08				
Control Delay		7.9		12.2				
LOS		A		B				
Approach Delay				12.2				
Approach LOS				B				

# Appendix C

## Future Traffic Volume Estimates



# Red Bridge Road Subdivision

## 2027 PM Peak Hour Turning Movement Volumes

Growth Rate = **2.0%**  
 Existing Year = **2007**  
 Future Year = **2027**

enter Exit  
 40 24

**TM INFO**

**2007 Existing**

**2027 Baseline**

**Trip Distribution**

**Project Trips**

**2027 With Project**

Count Date: 7/31/07 Count Source: ATDS, Inc.	1 SR 970 / SR 10	0	0	0	0
Count Peak Hour: 4:00 - 5:00 p.m.					
%HV PHF					
EB 4.0 0.90	222	350	301	18	368
WB 5.0 0.81	160	252	300	30	282
NB 0.0 0.88	56	88	2	18	88
SB - -	32	50	5	3	50
Total 4.0 0.93	57	90	55	1	91
					Project Share = 6.9%
Count Date: 7/31/07 Count Source: ATDS, Inc.	2 SR 970 / Red Bridge Road	0	0	0	0
Count Peak Hour: 4:15 - 5:15 p.m.					
%HV PHF					
EB 0.0 0.82	168	265	252	19	284
WB 0.0 0.73	7	11	0	32	43
NB 0.0 0.75	172	271	248	19	271
SB 0.0 0.63	2	3	5	0	3
Total 0.0 0.89	5	8	5	0	8
					Project Share = 8.4%
Count Date: 7/31/07 Count Source: ATDS, Inc.	3 SR 970 / Teanaway Rd	0	0	0	0
Count Peak Hour: 4:15 - 5:15 p.m.					
%HV PHF					
EB 15.0 0.81	157	248	237	5	248
WB 16.0 0.74	17	27	8	8	27
NB - -	175	276	229	13	276
SB 0.0 0.47	5	0	0	0	0
Total 15.0 0.93	0	0	0	0	0
					Project Share = 2.2%
Count Date: Count Source:	4 Red Bridge Road / Teanaway Road	0	0	0	0
Count Peak Hour:					
%HV PHF					
EB	8	13	0	8	21
WB	1	2	0	5	0
NB	5	7	0	5	12
SB	6	9	0	8	17
Total	15	24	32	5	28
					Project Share = 17.6%
Count Date: Count Source:	5 Red Bridge Road / Masterson Road	0	0	0	0
Count Peak Hour:					
%HV PHF					
EB	10	16	16	19	35
WB	2	3	2	32	40
NB	5	8	14	19	40
SB	1	0	0	0	0
Total	0	0	8	0	0
					Project Share = 64.3%