



FEHR & PEERS  
TRANSPORTATION CONSULTANTS

*Final Report*

# GRANT AVENUE ACCESS STUDY

*May 2006*

*Prepared for:  
City of Winters*

*SA05-0046*

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## EXECUTIVE SUMMARY

Grant Avenue is the principal east-west arterial traversing the city of Winters, California and is slated to be improved to meet future travel demands. The purpose of this study is to evaluate several access options for Grant Avenue between Railroad Avenue and Interstate 505 (I-505). With input from City staff, we developed project alternatives for both near-term and cumulative conditions.

Under existing conditions, Grant Avenue (State Route 128) is a two-lane arterial between Railroad Avenue and East Main Street. A center two-way left-turn lane exists between the supermarket driveway and Morgan Street. Caltrans recently installed a traffic signal at the Railroad Avenue intersection. All other intersections in the study area (Dutton Street, Walnut Lane, Morgan Street, and East Main Street) are side-street stop-controlled.

The near-term analysis uses several evaluation criteria to compare the existing lane configuration to near-term Access Option A, which has two components. First, we propose extending the two-way left-turn lane from its current terminus, westward to Railroad Avenue. Second, access to East Street between Grant Avenue and Baker Street is eliminated so that turns onto and off of Dutton Street and Walnut Lane can be made more safely.

The near-term analysis results reveal that Option A would offer operational and vehicle safety improvements compared to the existing lane configuration without the need for additional right of way.

Under cumulative (long-term) conditions, we evaluated the following seven access options.

- Option I widens Grant Avenue to four lanes and installs traffic signals at the Dutton Street, Morgan Street, and East Main Street intersections. A new south leg at the Dutton Street intersection provides access to the proposed development between Grant Avenue and Baker Street. Access to Walnut Lane from Grant Avenue is closed.
- Option II is similar to Option I, but a new signalized driveway midway between Dutton Street and Morgan Street replaces the southern leg of the Dutton Street intersection.
- Option III widens Grant Avenue to four lanes and access to East Street is closed. In this option, Walnut Lane operates under side-street stop-control, with all other study intersections signalized.
- Option IV realigns Walnut Lane to intersect with Grant Avenue at a 90-degree angle, allowing a full access driveway opposite of Walnut Lane. Grant Avenue is widened to four lanes and access to Dutton and East Streets is removed.
- Option V is similar to Option IV except that Grant Avenue is two lanes between Railroad Avenue and Morgan Street, and three (two westbound lanes) lanes between Morgan Street and East Main Street. Single-lane roundabouts control traffic at the Dutton Street, Walnut Lane, and Morgan Street intersections.
- Option VI is similar to Option V except Grant Avenue is two lanes between Railroad Avenue and East Main Street and a roundabout is installed at Grant Avenue/East Main Street in lieu of a traffic signal.
- Option VII is another roundabout based option, but only two roundabouts are installed—one at Dutton Street, the other at Walnut Lane. Grant Avenue is four lanes from Morgan Street to I-505.

The following summarizes the conclusions drawn for the four widening options. The options are ranked based on their relative performance against the evaluation criteria.

- Option I (Dutton Street Only) has the best overall performance since it provides the least delay and the best access; the main drawback to this option relates to the Anderson Avenue extension.
- Option IV (Walnut Lane only) is nearly as good as Option I, providing a similar level of service and only lacking the left-access to the medical buildings; however, there are right-of-way issues with the assumed Anderson Avenue extension.
- Option II (Dutton Street and Shopping Center) is similar to Option IV but the additional traffic signal at the shopping center results in slightly higher delay and gives this option the lowest aesthetic score. This option also assumes the construction of the Anderson Avenue extension.
- Option III (Dutton Street and Walnut Lane) requires the least amount of right-of-way, but the intersection configuration limits access to properties along Grant Avenue to the greatest extent and creates a greater potential for auto conflicts given the unsignalized intersection at Walnut Lane.

Below are the results of the cumulative conditions analysis of the roundabout options—ranked based on their performance against the evaluation criteria:

- Option V (three roundabout option) performs well if the City is willing to accept long westbound PM peak hour queues between Morgan Street and East Main Street. The East Main Street extension to Moody Slough Road would be required if any of the roundabout options were implemented.
- Option VII (two roundabout option) has long westbound PM peak hour queues extending from the Railroad Avenue and Morgan Street intersections, which hampers local access to some degree. The long cycle lengths required to minimize queuing have a negative impact on intersection LOS and the pedestrian environment, as well.
- Option VI (four roundabout option) is infeasible due to poor intersection LOS and long westbound PM peak hour queues at East Main Street.

## 1. INTRODUCTION

Grant Avenue (State Route 128) is the principal east-west road through Winters, California and is the main route that connects Winters to Interstate 505 (I-505) and the surrounding cities of Davis, Vacaville, and Woodland. Currently, Grant Avenue operates well as a two-lane arterial, but with a significant amount of new land uses proposed in the City's General Plan, Grant Avenue needs to be improved in order to serve future travel demands.

The Circulation Element of the Winters General Plan recommends the widening of Grant Avenue to four lanes from Railroad Avenue to the northbound I-505 off-ramp with signals installed at several intersections. While the General Plan gives a recommendation as to the size of future roadways, it gives no detail in how to implement the widening. In built-out areas, like sections of Grant Avenue between Railroad Avenue and Morgan Street, decision makers must take into account issues like intersection spacing, right-of-way requirements, and local access when planning for road widening. The purpose of this study is to evaluate the feasibility of different access options on Grant Avenue between Railroad Avenue and East Main Street in Winters. We explore several options including closing access to several side streets, the installation of traffic signals, and the installation of roundabouts.

The remainder of the report is broken into four chapters. Chapter 2 describes the study area and design alternatives. Chapter 3 describes the evaluation criteria and analysis methodology. Chapter 4 presents the analysis results, and Chapter 5 summarizes our conclusions and recommendations.

## 2. ALTERNATIVES

### STUDY AREA

Based on discussions with City staff and a review of the City of Winters Circulation Master Plan (Wilbur Smith Associates, 1992), the study area is defined as the segment of Grant Avenue between Railroad Avenue and East Main Street. The segment between Railroad Avenue and Morgan Street is of the greatest interest due to the closely spaced intersections of Dutton Street, East Street, and Walnut Lane. The portion of Grant Avenue west of Railroad Avenue is constrained by limited right of way and we assume this section remains a two-lane facility into the future. The section of Grant Avenue east of East Main Street is sparsely developed and roadway widening would be required with the development of the proposed office/industrial complex in the area. The intersections within the study area are listed below. Figure 1 shows the existing conditions between Railroad Avenue and Morgan Street.

#### *Study Intersections*

1. Grant Avenue / Railroad Avenue
2. Grant Avenue / Dutton Street
3. Grant Avenue / East Street
4. Grant Avenue / Walnut Lane
5. Grant Avenue / Morgan Street
6. Grant Avenue / East Main Street

### DESCRIPTION OF ALTERNATIVES

Under existing conditions, Grant Avenue operates fairly well between Railroad Avenue and East Main Street, despite the close spacing (100 to 150 feet) of the Dutton Street, East Street, and Walnut Lane intersections. As new housing developments in Winters are completed and occupied, traffic on Grant Avenue is expected to grow by more than 40 percent during the AM and PM peak hours (Winters Highlands, Callahan Estates, Ogando-Hudson, and Creekside Estates Traffic Impact Study, Grandy & Associates and Fehr & Peers Associates, July 2004), substantially increasing delays to motorists making turns onto and off of Grant Avenue. Under cumulative conditions, we forecast traffic on Grant Avenue and some of the side street approaches to grow enough that side-street stop control will no longer function at acceptable service levels at several study intersections.

One of the problems under both near-term and cumulative conditions is that not enough median space would be available to safely store queued vehicles at all three side streets (Dutton Street, East Street, and Walnut Lane) under the current alignment. To address this problem, Fehr & Peers has developed an access option for near-term conditions and several options for cumulative conditions.

### NEAR-TERM ALTERNATIVE

#### *Option A*

In the near-term, extending the existing two-way left-turn lane westward from Morgan Street to Railroad Avenue improves the safety and operations of Grant Avenue. To accommodate turning vehicles in the left-turn lane, we recommend closing access to East Street. Figure 2 depicts the proposed near-term access scenario.





## **CUMULATIVE ALTERNATIVES**

The Winters General Plan shows Grant Avenue as a signalized four-lane arterial. We developed four access alternatives based on the General Plan model with Grant Avenue at four lanes. The four-lane options vary based on side street closures and right-of-way acquisition requirements.

Based on discussions with City staff, we found interest in limiting the number of traffic signals within the City in order to preserve the small-town character of Winters. To this end, we also developed three options that maintain a portion of two-lane roadway and use roundabouts to control traffic at several of the study intersections.

### ***Option I – Dutton Street Only Option***

Option I closes access to Walnut Lane and East Street. This option provides a new full access driveway signal opposite of Dutton Street for the proposed retail development between Grant Avenue and Baker Street. Traffic on Walnut Lane bound for Grant Avenue would use the new Anderson Avenue extension to Dutton Street or Railroad Avenue. Additionally, an evaluation of the peak hour signal warrant for the Grant Avenue/Morgan Street intersection suggests the need for a signal at this location. To accommodate the new signal, the existing driveway to the IGA supermarket is realigned to be opposite of Morgan Street. The Option I improvements are shown on Figure 3. A variant of this option realigns East Street through the City yard to intersect Grant Avenue opposite of Dutton Street. Tight curves and relatively poor intersection operations at the Dutton-East Street intersection rendered this option infeasible.

### ***Option II – Dutton Street and Driveway Option***

Under Option II, we recommend closing both East Street and Walnut Lane at Grant Avenue, while providing a full access intersection for the proposed shopping center between Grant Avenue and Baker Street. Traffic on East Street bound for Grant Avenue would divert to Morgan Street or Railroad Avenue, and traffic on Walnut Lane bound for Grant Avenue would use Anderson Avenue to access Dutton Street or Railroad Avenue. An evaluation of the peak hour signal warrant implies the need to signalize the Dutton Street, Shopping Center, and Morgan Street intersections. As with Option I, we propose realigning the supermarket driveway to be opposite Morgan Street. Figure 4 depicts the improvements recommended under Option II.

### ***Option III – Dutton and Walnut Option***

Providing a signal at the Dutton Street intersection provides enough turn pocket space to allow left turns into and out of Walnut Lane. Under Option III, both Dutton Street and Walnut Lane remain open, with a stop sign controlling operations at the Walnut Lane intersection. Leaving Dutton Street and Walnut Lane open allows this option to be constructed prior to the Anderson Avenue extension. Figure 5 shows the Option III improvements.

### ***Option IV – Walnut Lane Only Option***

Option IV closes access to Dutton Street and realigns Walnut Lane so that it creates a perpendicular intersection with Grant Avenue. The reconfigured intersection allows for a full access driveway into the proposed shopping center between Grant Avenue and Baker Street opposite of Walnut Lane. An evaluation of the peak hour signal warrant suggests the Walnut Lane intersection be signalized. As in Options I and II, it is assumed that Anderson Avenue will be extended from Railroad Avenue to Walnut Lane and traffic on Dutton bound for Grant Avenue can use Anderson Avenue to access Railroad Avenue or Walnut Lane. Figure 6 shows the Option IV improvements.









Options V, VI, and VII depart from the General Plan recommendation to widen Grant Avenue to four-lane arterial standards by exploring the option of maintaining two-lanes through part of the study area. It is important to recognize that we analyzed all cumulative access options under the assumption that East Main Street is extended from Grant Avenue to Moody Slough Road. The East Main Street extension provides a parallel route to Grant Avenue through the northern part of the City reducing congestion in the study area. The cumulative traffic volumes suggest that the East Main Street extension may be delayed until substantial development occurs in the north part of the city if Grant Avenue is widened to four lanes (although an additional study would need to confirm this). However, maintaining Grant Avenue at two-lanes requires the extension of East Main Street to avoid congestion.

#### ***Option V – Three Roundabout Option***

Under Option V, we propose installing roundabouts at the Dutton Street, Walnut Lane, and Morgan Street intersections. The westbound portion of Grant Avenue between Morgan Street and East Main Street would have two through lanes to avoid long queues at East Main Street; the eastbound portion would have a single lane. The intersection of East Main Street would be signalized. To avoid a skewed intersection at Grant Avenue, we recommend realigning Walnut Lane, which allows a full access driveway to the proposed shopping center between Grant Avenue and Baker Street. With Dutton Street and Walnut Lane both open, this option could be constructed prior to the Anderson Avenue extension. Figure 7 shows the proposed roundabouts along Grant Avenue.

#### ***Option VI – Four Roundabout Option***

Option VI is identical to Option V except that the traffic signal at East Main Street is replaced with a roundabout and the entire stretch of Grant Avenue between Railroad Avenue and East Main Street has a single lane in each direction. To accommodate the heavy westbound right turning movement in the AM peak hour, we recommend adding a turning lane to the northeast quadrant of the roundabout to separate right turning vehicles from westbound through traffic. This configuration would look similar to the roundabout shown at Grant Avenue/Morgan Street shown in Figure 7.

#### ***Option VII – Two Roundabout Option***

Option VII signalizes the intersections with the heaviest side street movements, leaving roundabouts at Dutton Street and Walnut Lane only. Again, a full access driveway is provided opposite of Walnut Lane and the Anderson Avenue extension is not assumed. Under this option, Grant Avenue is a four-lane arterial from Morgan Street to I-505. Figure 8 depicts the improvements recommended under Option VII.





### 3. EVALUATION CRITERIA

The access options are evaluated using several qualitative and quantitative measures, including intersection Level of Service (LOS), queuing, vehicle safety, pedestrian environment, right of way requirements, and aesthetics. The following sections describe each of the evaluation criteria.

#### **Intersection Level of Service (LOS)**

Intersection LOS is a measure of how well traffic flows through an intersection. Intersection LOS is defined by control delay, which is the amount of delay imposed by a traffic control device when compared to freely flowing traffic. Control delay and LOS at roundabouts and signalized intersections are reported for the intersection as a whole and are based on the average delay experienced by all approaches. For side-street stop-controlled intersections, control delay and LOS are reported for the intersection as a whole and for the highest delay approach. The LOS methodology evaluates an intersection’s operation and average control delay using the methodology described in the *Highway Capacity Manual* (Transportation Research Board, 2000). We analyzed intersection operations using the SimTraffic software package and related to the LOS designation listed in Table 1.

<b>TABLE 1 LEVEL OF SERVICE DESCRIPTION AT INTERSECTIONS</b>			
<b>Level of Service (LOS)</b>	<b>Description<sup>1</sup></b>	<b>Average Control Delay (seconds/vehicle)</b>	
		<b>Signalized Intersections</b>	<b>Unsignalized Intersections</b>
A	Very low delay, extremely favorable progression.	≤ 10	≤ 10
B	Low delay, short cycle lengths, good progression.	> 10 - 20	> 10 - 15
C	Moderate delay, fair progression.	> 20 - 35	> 15 - 25
D	Noticeable congestion and cycle failures.	> 35 - 55	> 25 - 35
E	High delays, poor progression, some cycle failures.	> 55 - 80	> 35 - 50
F	Oversaturation, frequent cycle failures or long cycle lengths.	> 80	> 50

Source: *Highway Capacity Manual* – Transportation Research Board, 2000.  
<sup>1</sup> Description relates to signalized intersections

The Winters General Plan notes that the goal of the City’s transportation system is to provide for the safe and efficient movement of people and goods throughout Winters. To that end, the City strives to maintain an LOS of C or better at all intersections, with the exception of the Grant Avenue/Railroad Avenue intersection that has an LOS goal of D or better.

### ***Queuing***

Long queues of vehicles exacerbate congestion by blocking adjacent intersections and create the need to build long turn pockets, which can limit mid-block access to properties. We report the maximum eastbound and westbound left turning queues for each study intersection and discuss the overall level of queuing for each access option.

The tools used to evaluate the access options have some randomness built in to better capture the events that occur in reality. To obtain the performance reports, we average the results of five runs using different random number seeds. Since a detailed calibration of the operations model was not performed, the intersection delays/LOS and queuing results should be evaluated on a comparative basis rather than focusing on the absolute delays or queue lengths.

### ***Vehicle Safety***

Roadway and intersection configuration has a strong influence on vehicle safety. We include a qualitative description of the safety characteristics of each access option.

### ***Pedestrian Environment***

Roadway and intersection configurations also influence pedestrian safety and comfort. Some designs are more pleasant to walk along, while others provide safer crossings. This report includes a qualitative discussion about how each design affects pedestrian safety and the walking environment.

### ***Right of Way Requirements***

A major roadblock for many highway improvements is right-of-way acquisition, which can be expensive, time consuming, and may require the displacement of residents and businesses. We provide a qualitative description of the right-of-way requirements for each of the access scenarios.

### ***Aesthetics***

Discussions with City staff indicate that some members of the community are concerned with maintaining the small town atmosphere of Winters and feel that a wide arterial with traffic signals may erode some of the town's charm. To provide an overview of the visual impact of each access option, we include a qualitative discussion of aesthetics with particular attention paid to how each option fits in with the existing town.

## 4. ANALYSIS RESULTS

### NEAR-TERM CONDITIONS

As described in Chapter 2, near-term access Option A would extend the two-way left-turn lane (TWLTL) from its current terminus near Morgan Street, westward to Railroad Avenue. Adding the TWLTL would be a relatively minor project that would require some additional pavement between Railroad Avenue and Morgan Street to maintain the existing lane and shoulder widths. New signing and striping would also be required.

#### LOS Results

Figure 8 shows the current lane configurations with the near-term traffic volumes and Figure 9 shows the Option A improvements and the near-term traffic volumes. Table 2 compares the LOS results for near-term conditions with and without the Option A improvements.

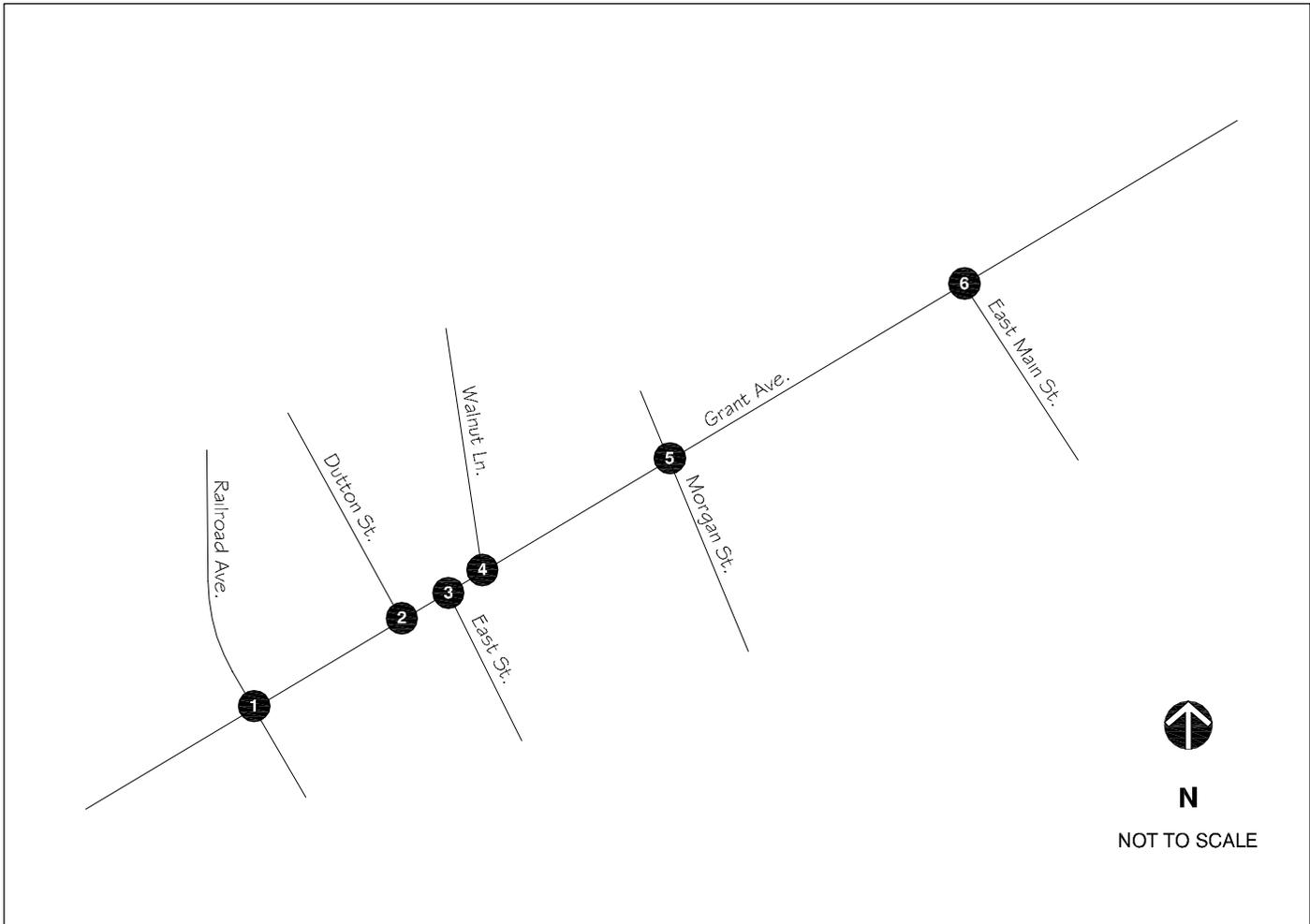
Intersection	AM Existing Configuration			AM Option A		
	Control <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>3</sup>	Control	Delay	LOS
1. Grant Ave / Railroad Ave	Signal	25	C	Signal	27	C
2. Grant Ave / Dutton St	SSSC	3 (27)	A (D)	SSSC	2 (15)	A (C)
3. Grant Ave / East St	SSSC	1 (16)	A (C)	Closed	N/A	N/A
4. Grant Ave / Walnut Ln	SSSC	2 (27)	A (D)	SSSC	1 (20)	A (C)
5. Grant Ave / Morgan St	SSSC	3 (28)	A (D)	SSSC	4 (38)	A (E)
6. Grant Ave / Main St	SSSC	2 (20)	A (C)	SSSC	2 (17)	A (C)
	PM Existing Configuration			PM Option A		
1. Grant Ave / Railroad Ave	Signal	28	C	Signal	28	C
2. Grant Ave / Dutton St	SSSC	8 (> 50)	B (F)	SSSC	4 (> 50)	A (F)
3. Grant Ave / East St	SSSC	5 (> 50)	A (F)	Closed	N/A	N/A
4. Grant Ave / Walnut Ln	SSSC	18 (> 50)	C (F)	SSSC	6 (> 50)	A (F)
5. Grant Ave / Morgan St	SSSC	16 (> 50)	B (F)	SSSC	8 (> 50)	A (F)
6. Grant Ave / Main St	SSSC	3 (24)	A (C)	SSSC	3 (19)	A (C)

Notes:

<sup>1</sup> SSSC = Side-Street Stop-Control

<sup>2</sup> Average control delay expressed in seconds per vehicle using the methodologies presented in the *Highway Capacity Manual* (Transportation Research Board, 2000). For roundabouts and signalized intersections, the control delay for all approaches is averaged for the entire intersection. For side-street stop-controlled intersections, control delay is reported for both the entire intersection and for the worst-case approach. XX (YY) = Entire Intersection (Worst-Case Approach)

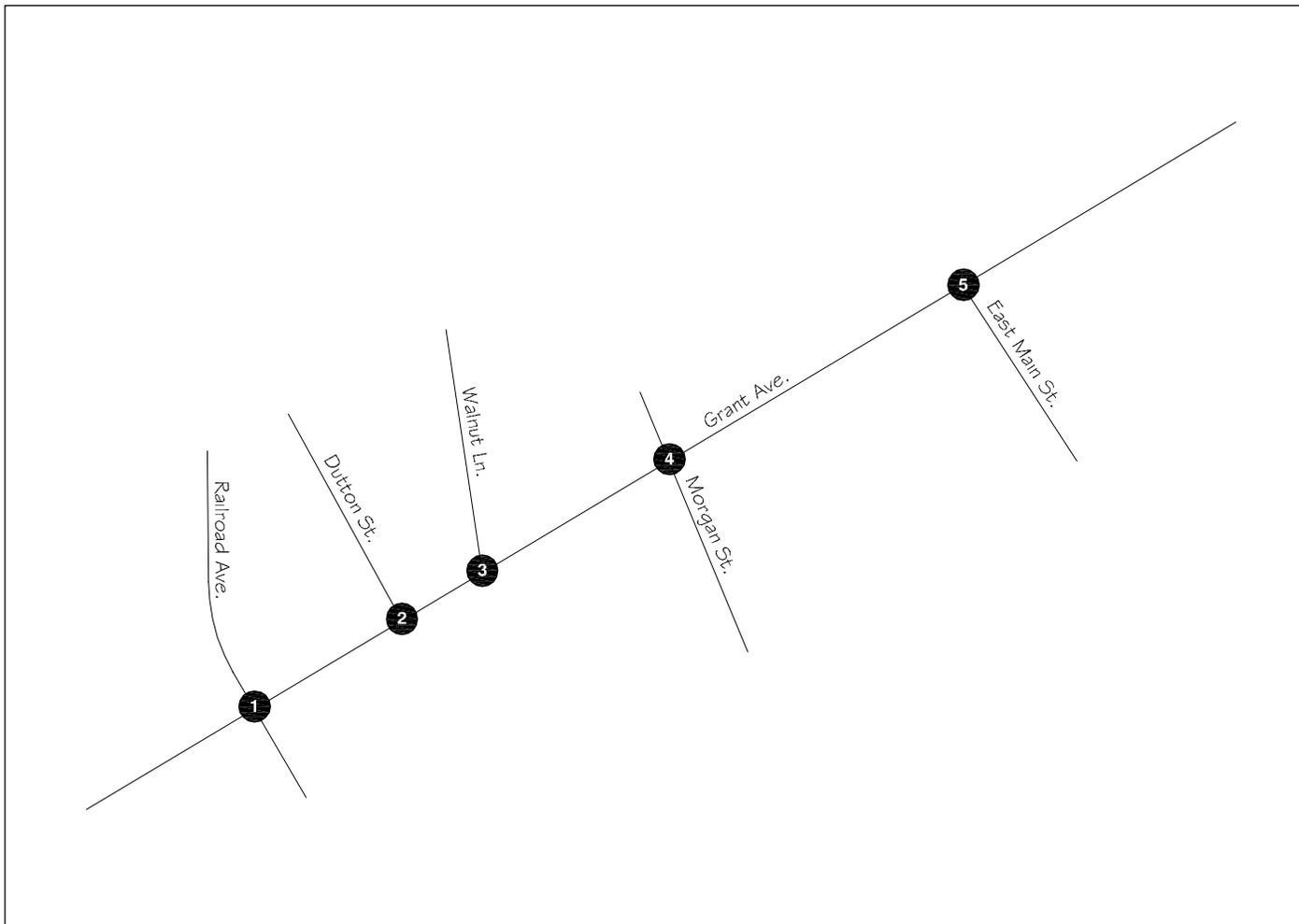
<sup>3</sup> LOS = Level of Service



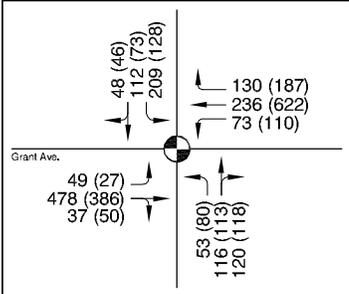
1. Railroad Ave./Grant Ave.		2. Dutton St./Grant Ave.		3. East St./Grant Ave.		4. Walnut Ln./Grant Ave.		5. Morgan St./Grant Ave.		6. East Main St./Grant Ave.	

**LEGEND**

- Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
- Study Intersection
- Traffic Signal
- Stop Sign



**1. Railroad Ave./Grant Ave.**



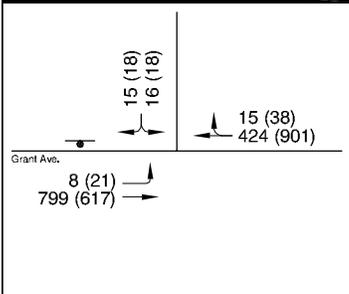
**N**

NOT TO SCALE

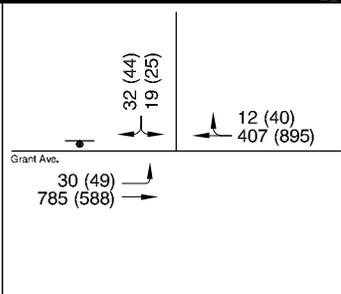
**LEGEND**

- Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
- Study Intersection
- Traffic Signal
- Stop Sign

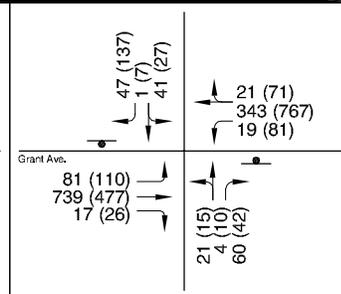
**2. Dutton St./Grant Ave.**



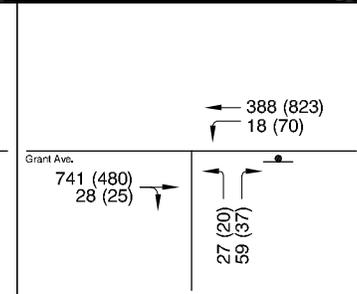
**3. Walnut Ln./Grant Ave.**



**4. Morgan St./Grant Ave.**



**5. East Main St./Grant Ave.**



Under both near-term access scenarios, all intersections operate with an overall LOS of C or better, but many of the side street approaches experience long delays due to heavy through traffic on Grant Avenue. An evaluation of the peak hour signal warrant at all unsignalized intersections showed that no intersection met the recommended threshold for installing a signal under near-term conditions.

As can be seen in Table 2, the near-term access Option A has a moderate effect on traffic operations along Grant Avenue during the PM peak hour. By providing the TWLTL, left turning vehicles no longer block the through lane, which reduces delay along Dutton Street and Walnut Lane. Eliminating access to East Street improves operations at Walnut Lane and Morgan Street since the PM peak hour queue generated by left turning vehicles at East Street occasionally extends beyond Morgan Street.

It is important to note that SimTraffic does not model “two stage gap acceptance” where a vehicle crosses one direction of traffic and waits in the median for a gap in the other direction of traffic. Because of this limitation the results for Option A may over-estimate the actual delay.

### ***Queuing***

We observed significant queues under the existing configuration option when left turning vehicles obstructed the progress of through traffic. Notable examples seen are frequent eastbound queues extending from Walnut Lane to Railroad Avenue, and occasional westbound queues extending from East Street to beyond Morgan Street. Side-street queues are also quite long in the PM peak hour as traffic has difficulty turning onto Grant Avenue at the unsignalized intersections.

With the addition of the TWLTL, queuing is no longer an issue on Grant Avenue, although side-street queues remained long.

### ***Vehicle Safety***

Given the near- and long-term design options under consideration, the existing lane configuration results in the greatest number of vehicle conflicts. The lack of a median or TWLTL creates several potential conflicts:

- Left turning vehicles could be struck from behind by inattentive drivers.
- Aggressive drivers may use the shoulder to drive around the left turning vehicles or queued through vehicles.
- Left turns onto Grant Avenue from Dutton Street, East Street, and Walnut Lane are difficult since the driver must be aware of not only east- and westbound traffic, but also other vehicles entering from adjacent intersections.

The closure of East Street and the TWLWL eliminates many of these conflicts. However, given the volume of through traffic on Grant Avenue during the AM and PM peak hours, turns from the minor streets will continue to be difficult.

### ***Pedestrian Environment***

The existing pedestrian environment along Grant Avenue is poor due to the lack of sidewalks, high speeds along Grant Avenue, and the lack of safe crossing areas. The proposed TWLTL may improve pedestrian safety somewhat as pedestrians could cross one direction of Grant Avenue at a time. However, unless

sidewalks/streetscaping are included as part of the near-term Option A improvements, the pedestrian environment would not be significantly improved.

**Right of Way Requirements**

The existing right of way would be sufficient for the Option A improvements.

**Aesthetics**

Option A may be less in keeping with the current character of Winters compared to the current lane configuration since the TWLTL would require a wider roadway. However, streetscaping and other frontage improvements can make the near-term access option look like other streets within the City.

**Summary**

When comparing the two near-term access scenarios side by side, Option A performs better due to vehicle and pedestrian safety improvements, reduced queuing, and slightly improved traffic operations. Table 3 summarizes the comparison.

TABLE 3 NEAR-TERM CONDITIONS – RESULTS SUMMARY		
Criterion	Existing Configuration	Option A (Close East St & add TWLTL)
Intersection LOS		
Queuing		
Vehicle Safety		
Pedestrian Environment		
Right of Way Needs		
Aesthetics		

	Poor		Fair
	Satisfactory		Good
			Excellent

## CUMULATIVE CONDITIONS

Under cumulative conditions, the land use and traffic patterns in Winters are expected to change significantly and peak hour traffic along Grant Avenue is expected become more evenly balanced in both the eastbound and westbound directions. The additional development expected along Grant Avenue will lead to increased side-street and driveway traffic and will create the need to provide enhanced traffic control (e.g. signals, roundabouts). The access options are briefly summarized below.

- Option I widens Grant Avenue to four lanes and installs traffic signals at the Dutton Street, Morgan Street, and East Main Street intersections. A new south leg at the Dutton Street intersection provides access to the proposed development between Grant Avenue and Baker Street. Access to Walnut Lane from Grant Avenue is closed.
- Option II is similar to Option I, but a new signalized driveway midway between Dutton Street and Morgan Street replaces the southern leg of the Dutton Street intersection.
- Option III widens Grant Avenue to four lanes and access to East Street is closed. In this option, Walnut Lane operates under side-street stop-control, with all other study intersections signalized.
- Option IV realigns Walnut Lane to intersect with Grant Avenue at a 90-degree angle, allowing a full access driveway opposite of Walnut Lane. Grant Avenue is widened to four lanes and access to Dutton and East Streets is removed.
- Option V is similar to Option IV except that Grant Avenue is two lanes between Railroad Avenue and Morgan Street, and three (two westbound lanes) lanes between Morgan Street and East Main Street. Single-lane roundabouts control traffic at the Dutton Street, Walnut Lane, and Morgan Street intersections.
- Option VI is similar to Option V except Grant Avenue is two lanes between Railroad Avenue and East Main Street and a roundabout is installed at Grant Avenue/East Main Street in lieu of a traffic signal.
- Option VII is another roundabout based option, but only two roundabouts are installed--one at Dutton Street, the other at Walnut Lane. Grant Avenue is four lanes from Morgan Street to I-505.

### LOS Results

Table 4 illustrates that Options I-V and VII operate well with Grant Avenue/Railroad Avenue at LOS D or better and all other intersections operating at LOS C or better during the AM and PM peak hours. In Option VI, the roundabout at East Main Street is operating near capacity and with moderate side street volumes this intersection operates at LOS D during the PM peak hour.

**TABLE 4  
INTERSECTION LEVELS OF SERVICE – CUMULATIVE CONDITIONS**

Intersection	AM Option I – Dutton Street Only Option			AM Option II – Dutton Street and Driveway Option			AM Option III – Dutton Street and Walnut Lane Option			AM Option IV – Walnut Lane Only Option			AM Option V – Three Roundabout Option			AM Option VI – Four Roundabout Option			AM Option VII – Two Roundabout Option		
	Control <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>3</sup>	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS
1. Grant Ave / Railroad Ave	Signal	32	C	Signal	33	C	Signal	33	C	Signal	35	D	Signal	37	D	Signal	43	D	Signal	42	D
2. Grant Ave / Dutton St	Signal	12	B	Signal	8	A	Signal	6	A	Removed	N/A	N/A	Roundabout	6	A	Roundabout	6	A	Roundabout	6	A
3. Grant Ave / Walnut Ln	Closed	N/A	N/A	Closed	N/A	N/A	SSSC	3 (23)	A (C)	Signal	10	B	Roundabout	5	A	Roundabout	5	A	Roundabout	6	A
4. Grant Ave / Shopping Ctr	N/A	N/A	N/A	Signal	4	A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5. Grant Ave / Morgan St	Signal	18	B	Signal	15	B	Signal	17	B	Signal	15	B	Roundabout	9	A	Roundabout	9	A	Signal	16	B
6. Grant Ave / Main St	Signal	10	B	Signal	8	A	Signal	8	A	Signal	8	A	Signal	9	A	Roundabout	8	A	Signal	8	A
	<b>PM Option I</b>			<b>PM Option II</b>			<b>PM Option III</b>			<b>PM Option IV</b>			<b>PM Option V</b>			<b>PM Option VI</b>			<b>PM Option VII</b>		
1. Grant Ave / Railroad Ave	Signal	31	C	Signal	36	D	Signal	35	D	Signal	34	C	Signal	36	D	Signal	43	D	Signal	44	D
2. Grant Ave / Dutton St	Signal	16	B	Signal	9	A	Signal	5	A	Removed	N/A	N/A	Roundabout	6	A	Roundabout	7	A	Roundabout	6	A
3. Grant Ave / Walnut Ln	Closed	N/A	N/A	Closed	N/A	N/A	SSSC	4 (24)	A (C)	Signal	16	B	Roundabout	6	A	Roundabout	6	A	Roundabout	8	A
4. Grant Ave / Shopping Ctr	N/A	N/A	N/A	Signal	9	A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5. Grant Ave / Morgan St	Signal	25	C	Signal	25	C	Signal	28	C	Signal	21	C	Roundabout	25	C	Roundabout	25	C	Signal	30	C
6. Grant Ave / Main St	Signal	23	C	Signal	20	C	Signal	19	B	Signal	20	B	Signal	18	B	Roundabout	50	D	Signal	21	C

Notes:

<sup>1</sup> SSSC = Side-Street Stop-Control

<sup>2</sup> Average control delay expressed in seconds per vehicle using the methodologies presented in the *Highway Capacity Manual* (Transportation Research Board, 2000). For roundabouts and signalized intersections, the control delay for all approaches is averaged for the entire intersection. For side-street stop-controlled intersections, control delay is reported for both the entire intersection and for the worst-case approach. XX (YY) = Entire Intersection (Worst-Case Approach)

<sup>3</sup> LOS = Level of Service

The traffic volumes and lane configurations for each of the cumulative access options are shown on Figures 11 through 17, which are located at the end of this chapter.

### Queuing

The access options influence queuing in two ways. By closing access to some side-streets, motorists are directed to other intersections which increases the length of queues in left turn pockets. In the roundabout options, queues occur because of the capacity limitations of the single-lane roundabouts. Table 5 presents the queuing results for the left turns and discussion of through traffic queuing follows.

<b>Intersection -Movement</b>	<b>Option I<sup>1</sup></b>	<b>Option II</b>	<b>Option III</b>	<b>Option IV</b>	<b>Option V</b>	<b>Option VI</b>	<b>Option VII</b>
1. Grant Ave/Railroad Ave – Eastbound Left	150 (6)	175 (6)	125 (5)	150 (6)	150 (6)	125 (5)	150 (6)
1. Grant Ave/Railroad Ave – Westbound Left	225 (9)	250 (10)	275 (11)	250 (10)	225 (9)	225 (9)	250 (10)
2. Grant Ave/Dutton St – Eastbound Left	125 (5)	75 (3)	75 (3)	N/A	N/A	N/A	N/A
2. Grant Ave/East St – Westbound Left	150 (6)	N/A	N/A	N/A	N/A	N/A	N/A
3. Grant Ave/Walnut Ln – Eastbound Left	N/A	N/A	75 (3)	125 (5)	N/A	N/A	N/A
3. Grant Ave/Walnut Ln – Westbound Left	N/A	N/A	N/A	125 (5)	N/A	N/A	N/A
4. Grant Ave/Morgan St – Eastbound Left	225 (9)	225 (9)	200 (8)	225 (9)	N/A	N/A	225 (9)
4. Grant Ave/Morgan St – Westbound Left	300(12)	300 (12)	350 (14)	250 (10)	N/A	N/A	350 (14)*
5. Grant Ave/Main St – Eastbound Left	75 (3)	50 (2)	75 (3)	75 (3)	75 (3)	N/A	100 (4)
5. Grant Ave/Main St – Westbound Left	150 (6)	175 (7)	150 (6)	150 (6)	125 (5)	N/A	175 (7)
Notes:							
<sup>1</sup> 95 <sup>th</sup> percentile queue length reported in feet, rounded to the nearest 25 feet (car lengths). Each car is assumed to occupy 25 feet of roadway space.							
* The left turn queue is exacerbated by the through lane queue occasionally blocking the turn pocket.							

In general, none of the access options creates excessive queuing for the left turn movements, although the westbound left turn queue at Morgan Street is quite long under Options III and VII. Overall, Option I offers the lowest level of queuing because traffic heading south has three streets (Railroad Avenue, East Street, and Morgan Street) to choose from, while the other options have only two. Options II and IV improve queuing conditions for the westbound left turn at Morgan Street because the full access driveway into the shopping center attracts some of the trips that otherwise would have turned at Morgan Street. Under Option VII, the long cycle length erodes the benefits of the shopping center opposite of Walnut Lane.

Through traffic queuing is not a significant issue under Options I-IV since the four through lanes provide ample capacity for vehicles waiting at the traffic signals. However, the westbound PM peak hour through traffic queue at Railroad Avenue is between 450 and 500 feet under scenarios I-VI and longer under scenario VII. This queue cannot be avoided without the addition of another through lane west of Railroad Avenue.

Under the roundabout options, through traffic queuing becomes more significant. Under Options V and VI the westbound PM peak hour queue at the Morgan Street intersection extends back to East Main Street. Queues at Morgan Street extend about two-thirds of the way to East Main Street under Option VII, as the signal limits queuing slightly. Under Option VII, queuing at Railroad Avenue become more pronounced as the queue often extends beyond Dutton Street, blocking the Dutton Street roundabout.

The most problematic queue occurs under Option VI where the westbound PM peak hour queue at East Main Street is expected to be 1,200 feet, which is two-thirds the distance to the southbound I-505 off-ramp. The cause of the long queue is the single lane roundabout at East Main Street operating near capacity. For comparison, the typical 95<sup>th</sup> percentile westbound PM peak hour queue at East Main Street under the other options is about 375 feet.

The long queues along Grant Avenue expected under Options V, VI, and VII are significant since these queues would make exiting driveways very difficult during parts of the PM peak hour. This problem could be reduced by eliminating driveway access along Grant Avenue through the congested stretch, but this may not be a viable option considering economic factors and relatively short duration of heavy traffic.

### **Local Access**

With several scenarios evaluated under cumulative conditions, we also evaluated variations in local access.

Option I provides the greatest amount of local access, with a full-access driveway to the proposed retail center and left-in access to the medical building.

Option II provides a good amount of local access, lacking only the left-in access to the medical building when compared to Options I, V, VI, and VII.

Option III preserves access to Dutton Street and Walnut Lane, but the intersection configuration would not allow any left turn traffic into or out of the shopping center between Grant Avenue and Baker Street.

Option IV provides the same amount of access as Option II.

Options V, VI, and VII provide full access to the shopping center and left-in access to the medical building on the north side of Grant Avenue between Walnut Lane and Morgan Street, but the long queues in the PM peak hour hamper access, particularly for Options VI and VII.

### **Vehicle Safety**

Compared to the existing configuration, all cumulative access options improve traffic safety by reducing vehicle conflicts. Options V, VI, and VII provide additional safety benefits since research shows that roundabouts reduce the severity and rate of side-impact crashes. A May 13, 2000 report issued by the Insurance Institute for Highway Safety finds that roundabouts reduced the rate of all crashes by 39 percent and the rate of injury crashes by 76 percent at the 24 intersections studied. While the roundabout intersections in Option VI may be safer, the long queue of vehicles on the westbound approach to East Main Street may increase the rate of rear-end crashes, particularly since the I-505 overpass limits sight distance to some degree.

### ***Pedestrian Environment***

The pedestrian environment is a significant issue under cumulative conditions since the General Plan allows for considerable retail/commercial development along Grant Avenue. The intensity of the retail/commercial centers coupled with their close proximity to housing could generate a fair amount of pedestrian activity along the corridor. Because sidewalks and improved crossings are included in all cumulative access options, overall pedestrian safety would be improved over the existing configuration of Grant Avenue.

Options I, III, and IV provide four signalized crosswalks for pedestrian use and Option II provides five. While signalized crossings give pedestrians a dedicated cycle in which to cross the street, some argue that these crossings provide a false sense of safety particularly when pedestrians have to cross a high speed road. Roundabouts offer benefits to pedestrians due to the shorter crossing distances and lower conflicting vehicle speeds. The drawbacks to roundabouts stem from the unsignalized crossings, which can make crossing difficult during times of heavy traffic. The blind community has also raised concerns about roundabouts because the unusual geometry makes oncoming traffic difficult to hear and a protected pedestrian phase is not provided. The queue of vehicles extending into the Dutton Street roundabout also makes Option VII less attractive for the pedestrian environment.

In terms of creating an environment that is conducive to walking, the roundabout options are better since Grant Avenue is narrower and vehicles travel at lower speeds.

### ***Right-of-Way Requirements***

Enough right-of-way has been set aside to accommodate Grant Avenue as a four-lane arterial throughout the study area, but right-of-way is a concern for the Anderson Avenue extension, the options where side streets are realigned, and where the roundabouts are proposed.

Options I, II, and IV close either Dutton Street or Walnut Lane, which requires the extension of Anderson Avenue to accommodate diverted traffic. The land owners to the north of Grant Avenue between Railroad Avenue and Walnut Lane would be impacted by the extension since no right of way has been reserved. Depending on the willingness of the land owners to sell either all or part of their property, or their resistance to condemnation, the Anderson Avenue extension could be difficult and expensive to build.

In addition to the Anderson Avenue extension, Option I places a driveway to the proposed retail project between Grant Avenue and Baker Street through the City yard. Based on our conversations with City staff, relocating the yard should not be a problem and the driveway placement does not have any right-of-way issues.

Option II has no right of way concerns beyond the Anderson Avenue extension.

The Anderson Avenue extension is not necessary under Option III as both Dutton Street and Walnut Lane remain open.

Option IV realigns Walnut Lane to be perpendicular to Grant Avenue. Additional right-of-way from the parcel of the northeast corner of the Walnut Lane intersection is necessary to accommodate the realignment. There are no existing buildings on the parcel, but splitting the property would create a small triangular shaped parcel, which may not have much economic viability.

Option V has right of way issues similar to those discussed for Option IV. Additionally, the roundabouts at Dutton Street and Walnut Lane will require additional right-of-way. The roundabout at Dutton Street may need to take land on the northwest and northeast quadrants of the intersection. The amount of land needed from these two properties varies with how much land is taken from the City-owned parcel south of Dutton Street. The roundabout

at Walnut Lane would need additional right-of-way from the parcel located at the northeast corner of the intersection and potentially some from the northwest corner as well. If the plans for the development south of the Walnut Lane intersection accommodate the roundabout option, the property owners could grant the City some land in exchange for a full access driveway at the roundabout. The roundabout proposed at Morgan Street does not have any right-of-way issues, assuming the property owners adjacent to the intersection accommodate the roundabout when developing their plans.

The right-of-way concerns for Option VI and VII are similar to those of Option V.

Reviewing the right-of-way issues for all the design options, Option III has no right-of-way issues and the right-of-way requirements for Options V, VI, and VII are modest, assuming future development accommodates the roundabouts. The remaining options require the construction of the Anderson Avenue extension, and the ability of the City to acquire the right-of-way for the new roadway is unknown.

### Aesthetics

In terms of the visual impact of the cumulative access options, Options V, VI, and VII, which maintain more of the two-lane roadway, are more in character with the small-town atmosphere compared to Options I-IV, which widen Grant Avenue to four lanes.

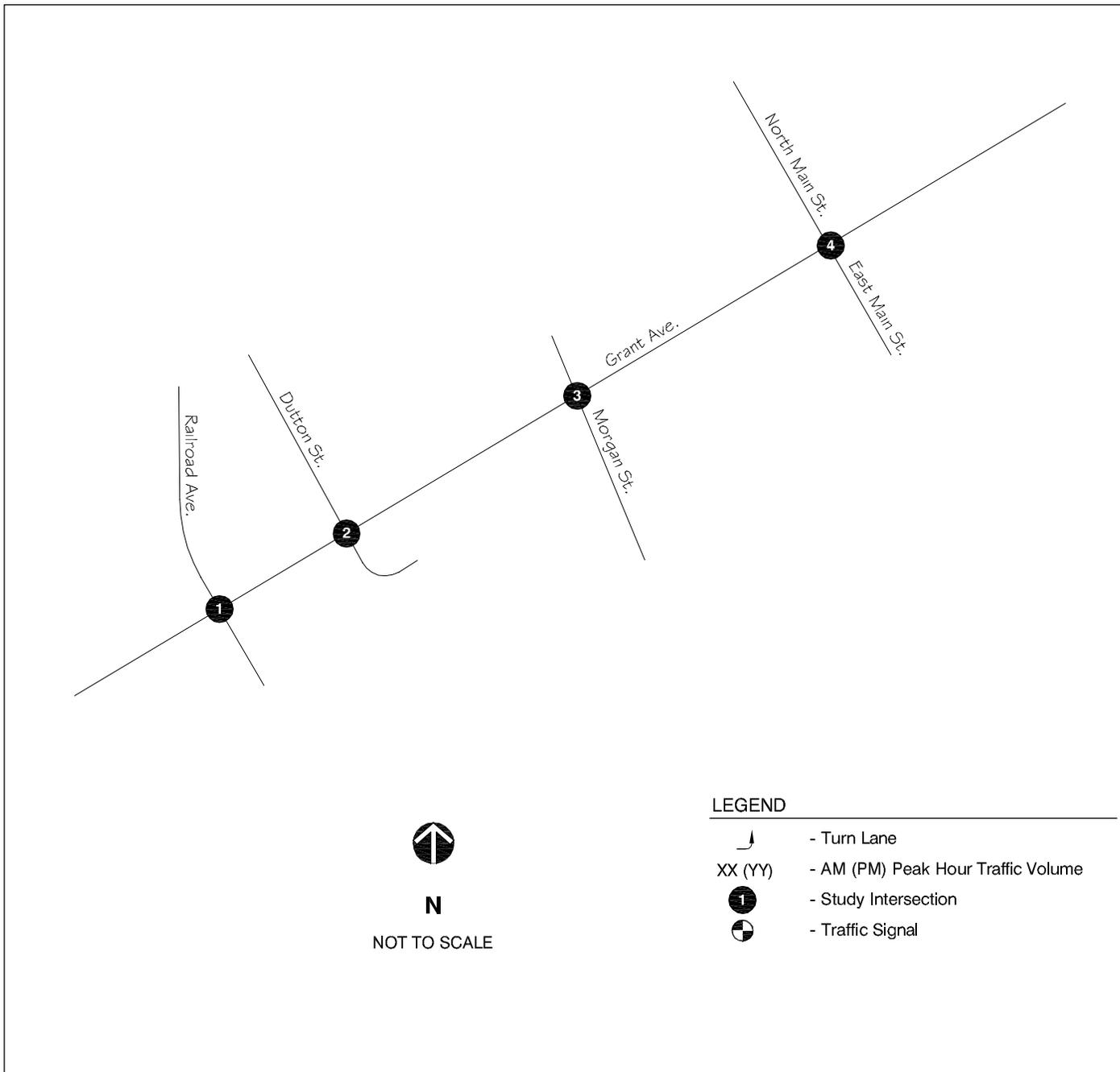
### Summary

Table 6 summarizes the analysis results of each of the cumulative access options.

TABLE 6 CUMULATIVE CONDITIONS – RESULTS SUMMARY							
Criterion	Option I	Option II	Option III	Option IV	Option V	Option VI	Option VII
Intersection LOS							
Queuing							
Local Access							
Vehicle Safety							
Pedestrian Environment							
Right of Way Needs							
Aesthetics							

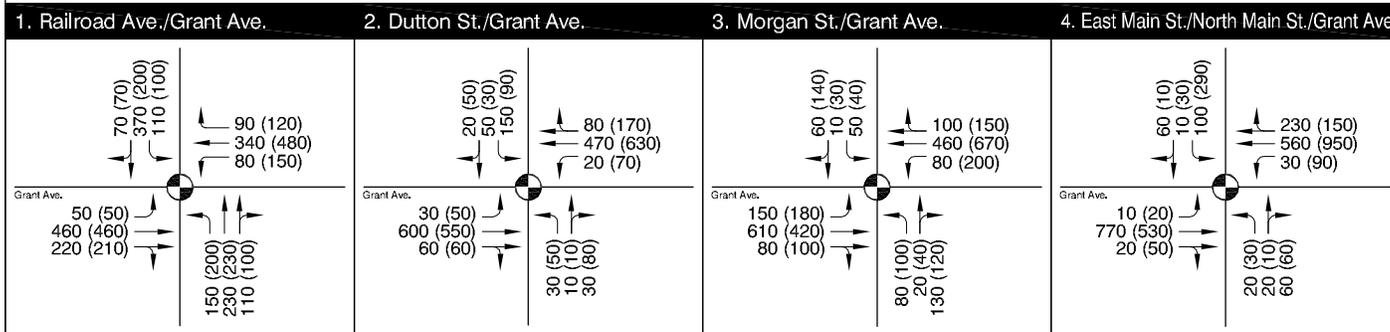
  

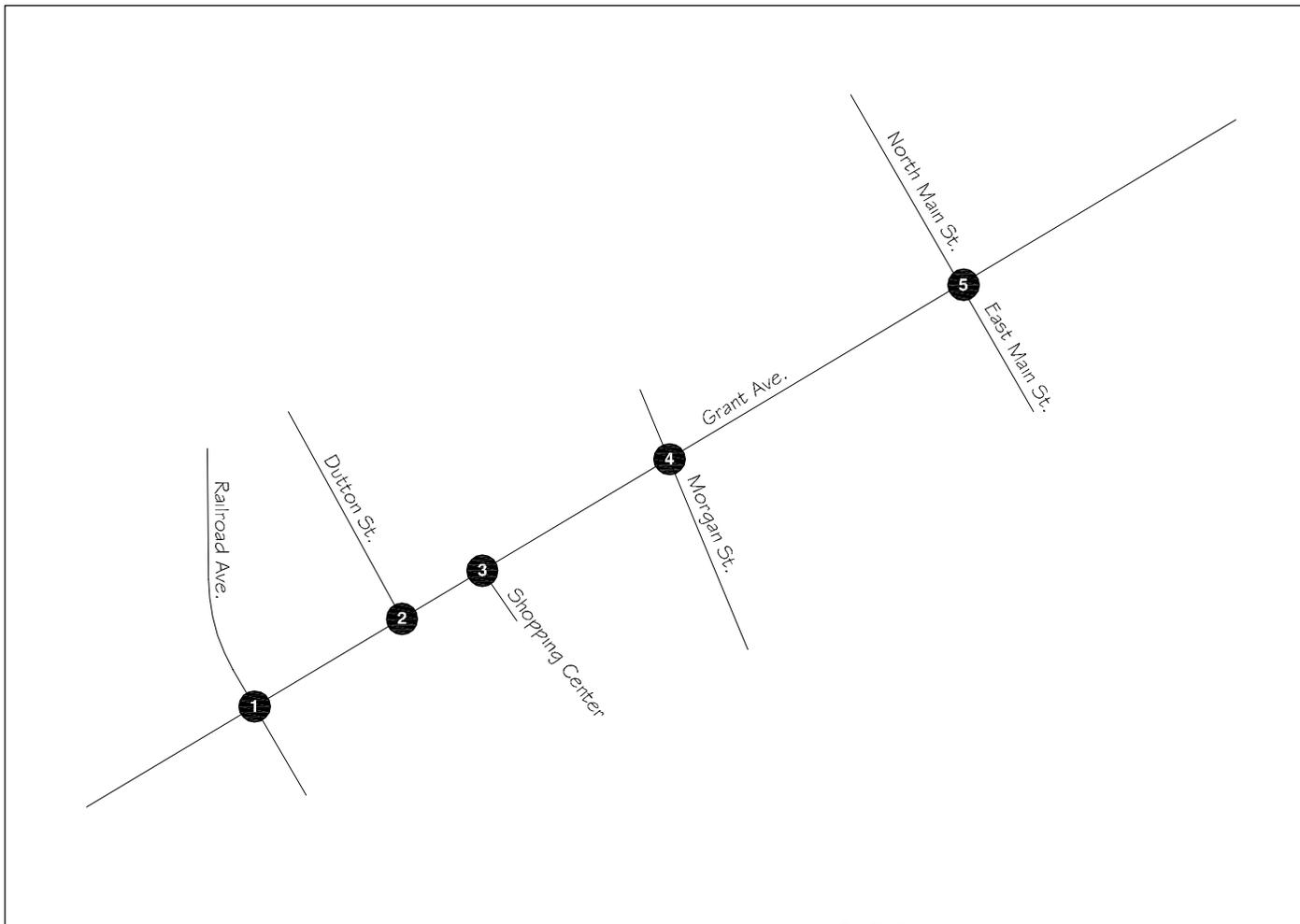
	Poor		Fair
	Satisfactory		Good
	Excellent		



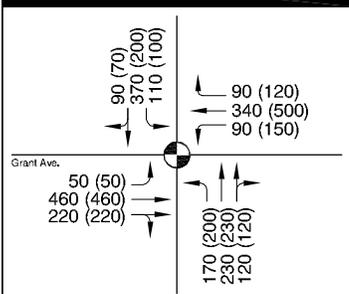
**LEGEND**

-  - Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
-  - Study Intersection
-  - Traffic Signal





**1. Railroad Ave./Grant Ave.**



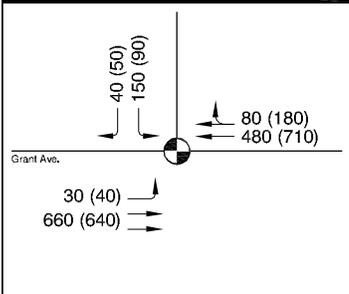
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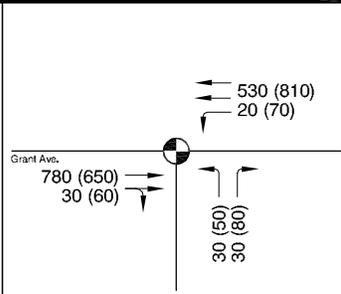
**LEGEND**

-  - Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
-  - Study Intersection
-  - Traffic Signal

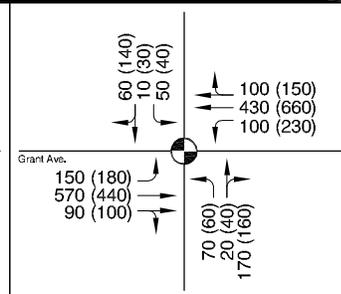
**2. Dutton St./Grant Ave.**



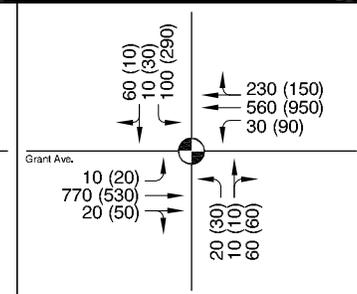
**3. Shopping Center/Grant Ave.**

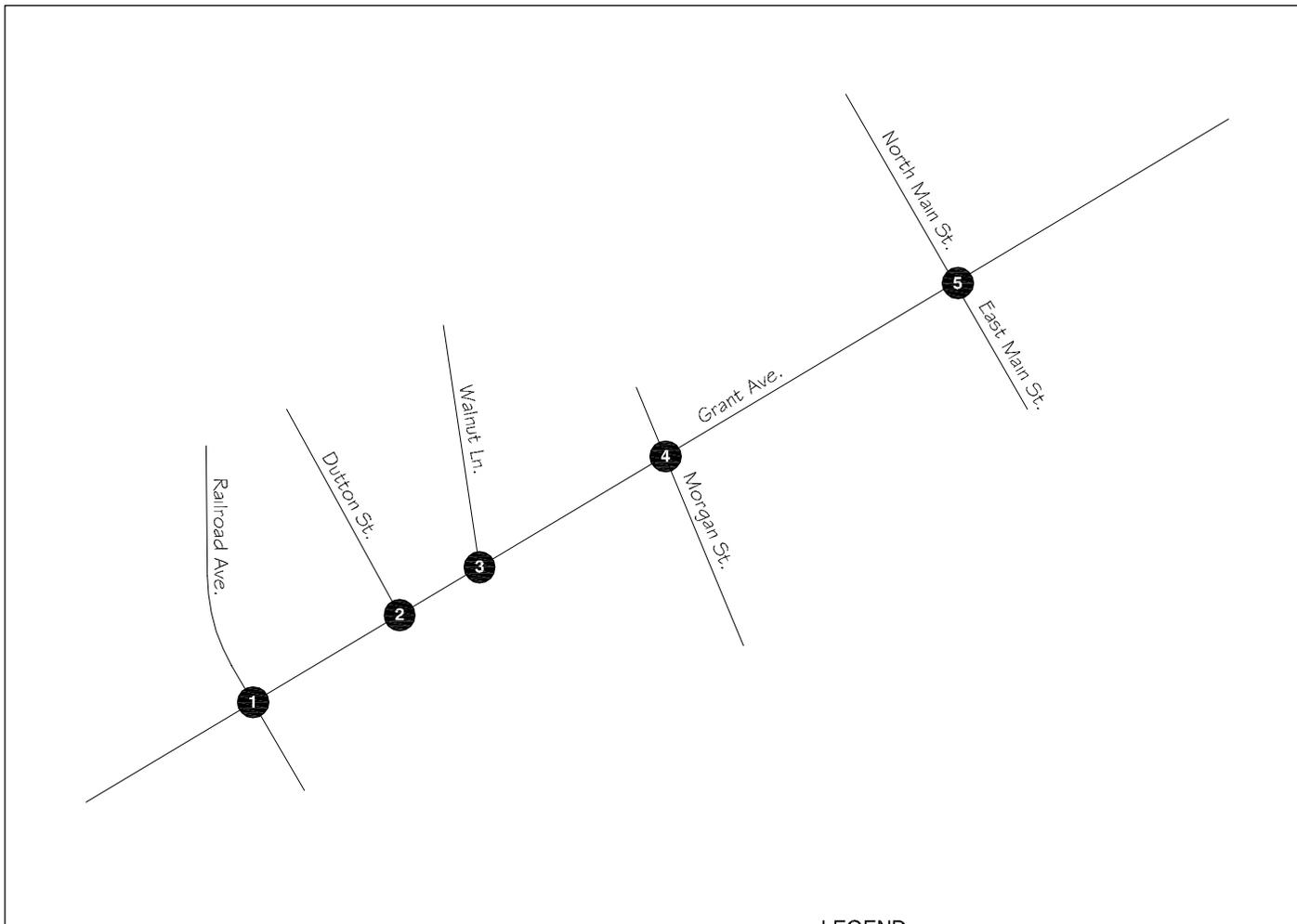


**4. Morgan St./Grant Ave.**

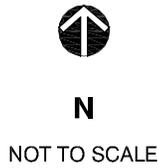
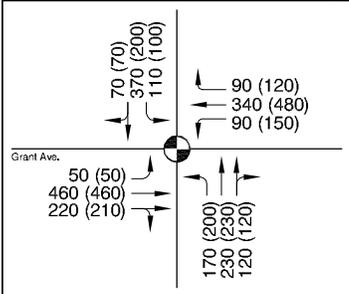


**5. East Main St./North Main St./Grant Ave.**





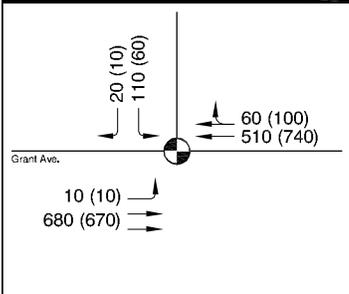
**1. Railroad Ave./Grant Ave.**



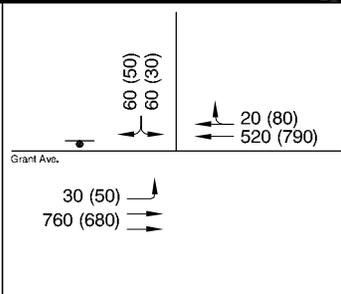
**LEGEND**

- Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
- Study Intersection
- Traffic Signal
- Stop Sign

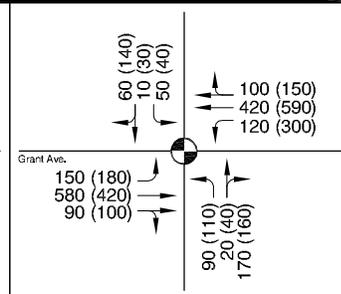
**2. Dutton St./Grant Ave.**



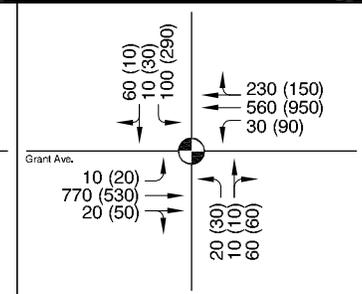
**3. Walnut Ln./Grant Ave.**

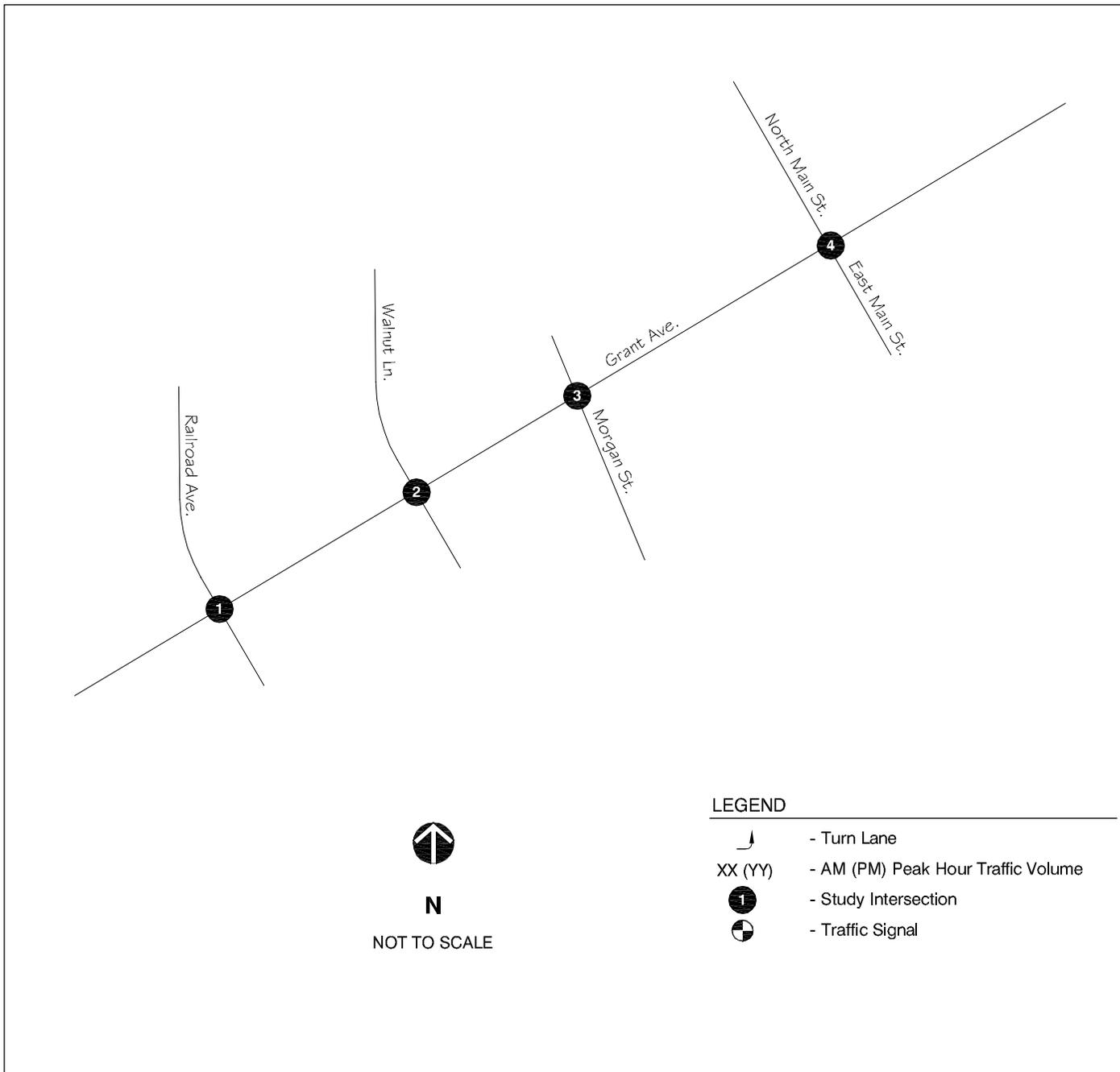


**4. Morgan St./Grant Ave.**



**5. East Main St./North Main St./Grant Ave.**

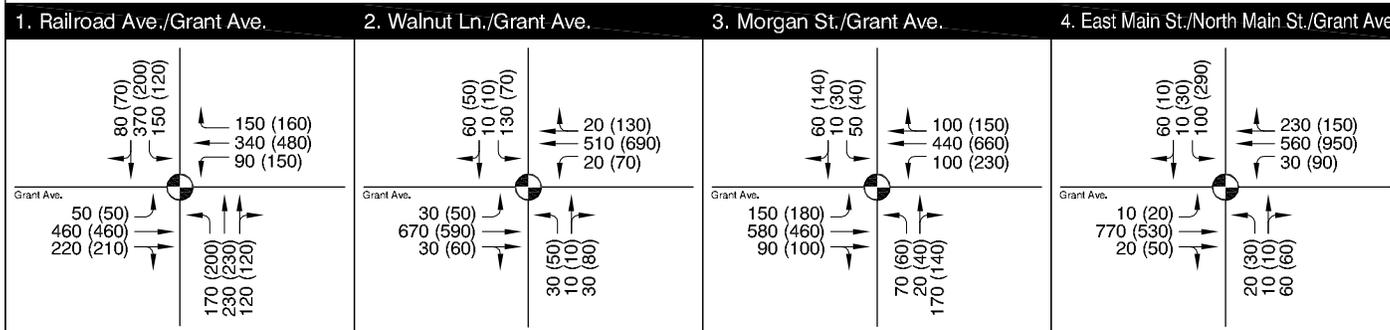


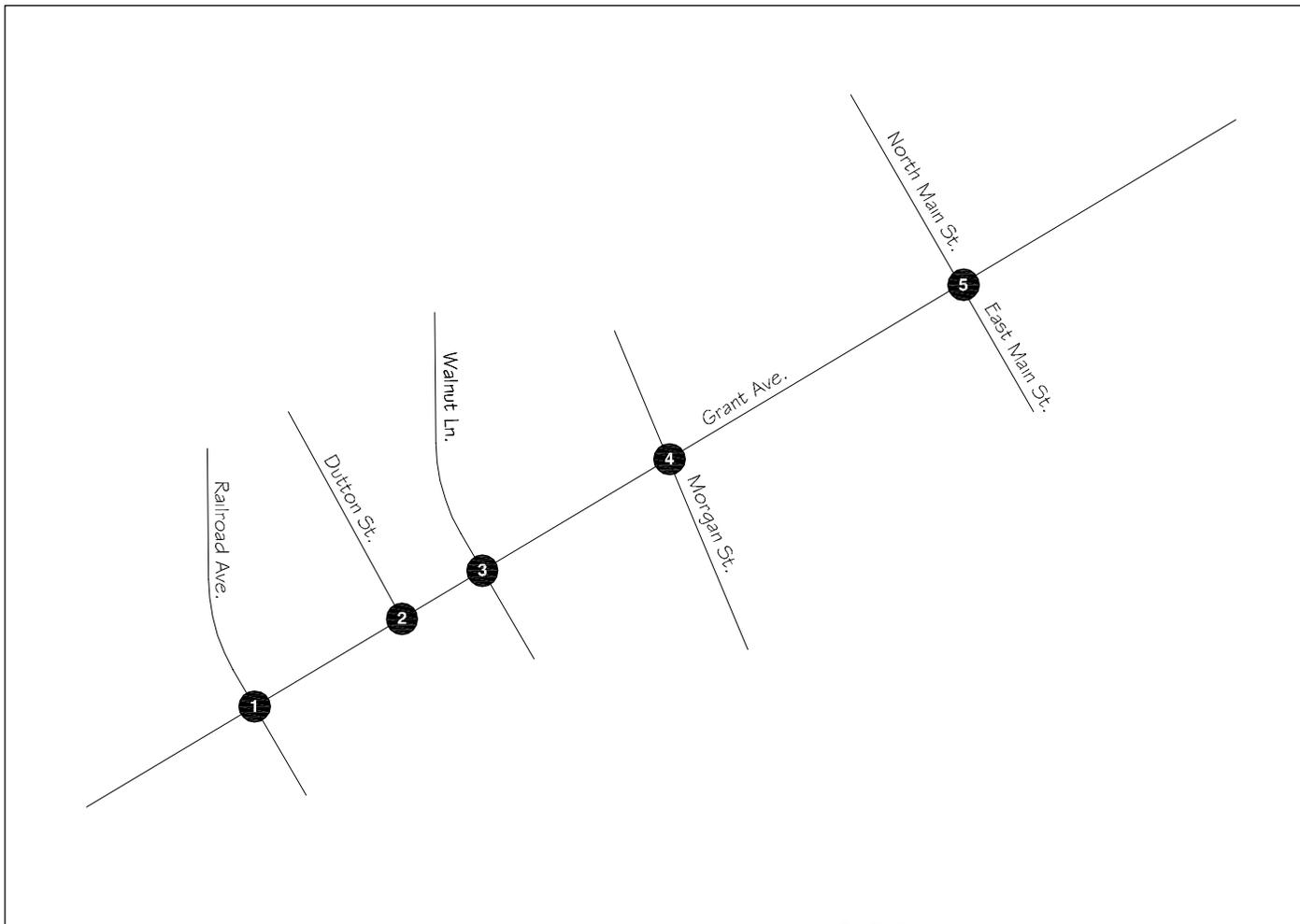


**LEGEND**

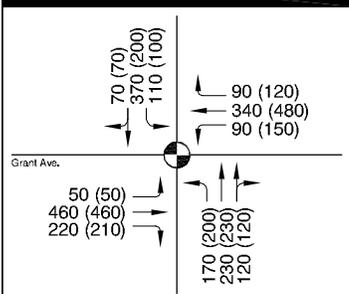
-  - Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
-  - Study Intersection
-  - Traffic Signal

  
**N**  
 NOT TO SCALE





**1. Railroad Ave./Grant Ave.**



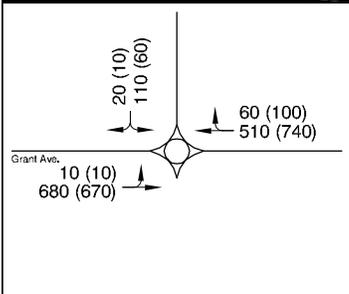
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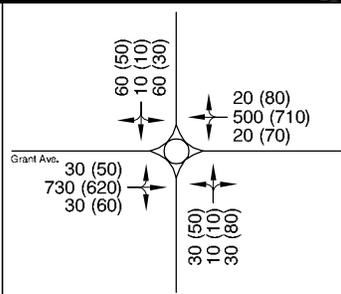
**LEGEND**

- Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
- Study Intersection
- Traffic Signal
- Roundabout

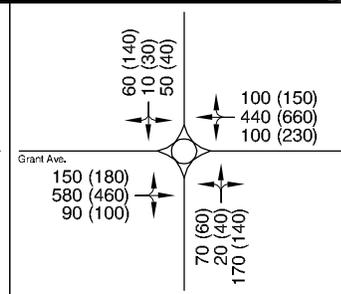
**2. Dutton St./Grant Ave.**



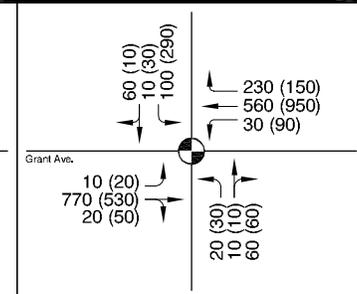
**3. Walnut Ln./Grant Ave.**

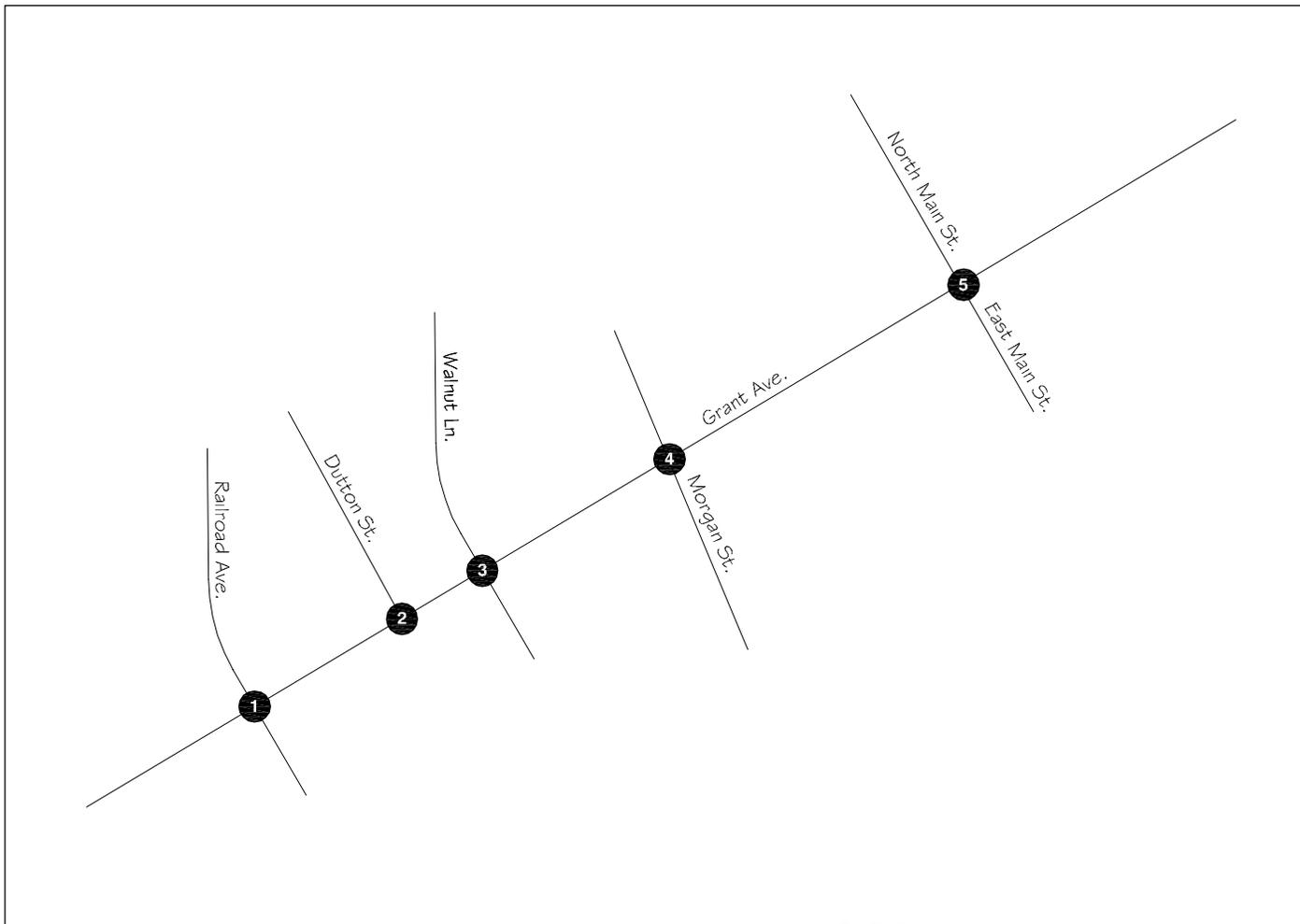


**4. Morgan St./Grant Ave.**

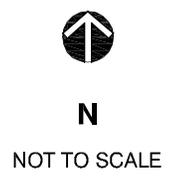
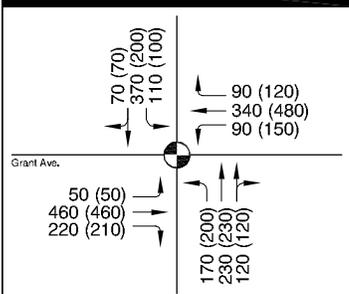


**5. East Main St./North Main St./Grant Ave.**





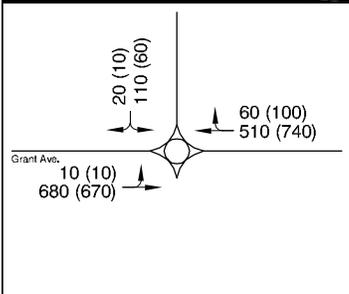
**1. Railroad Ave./Grant Ave.**



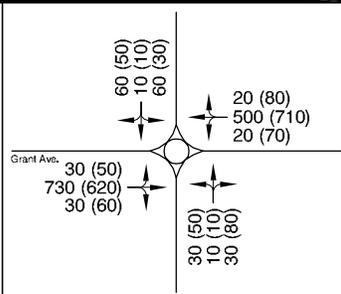
**LEGEND**

- Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
- Study Intersection
- Traffic Signal
- Roundabout
- F - \*Free\* Right Turn

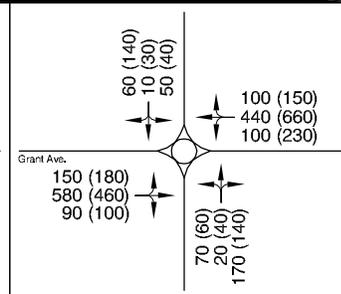
**2. Dutton St./Grant Ave.**



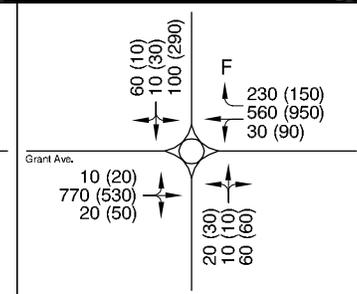
**3. Walnut Ln./Grant Ave.**

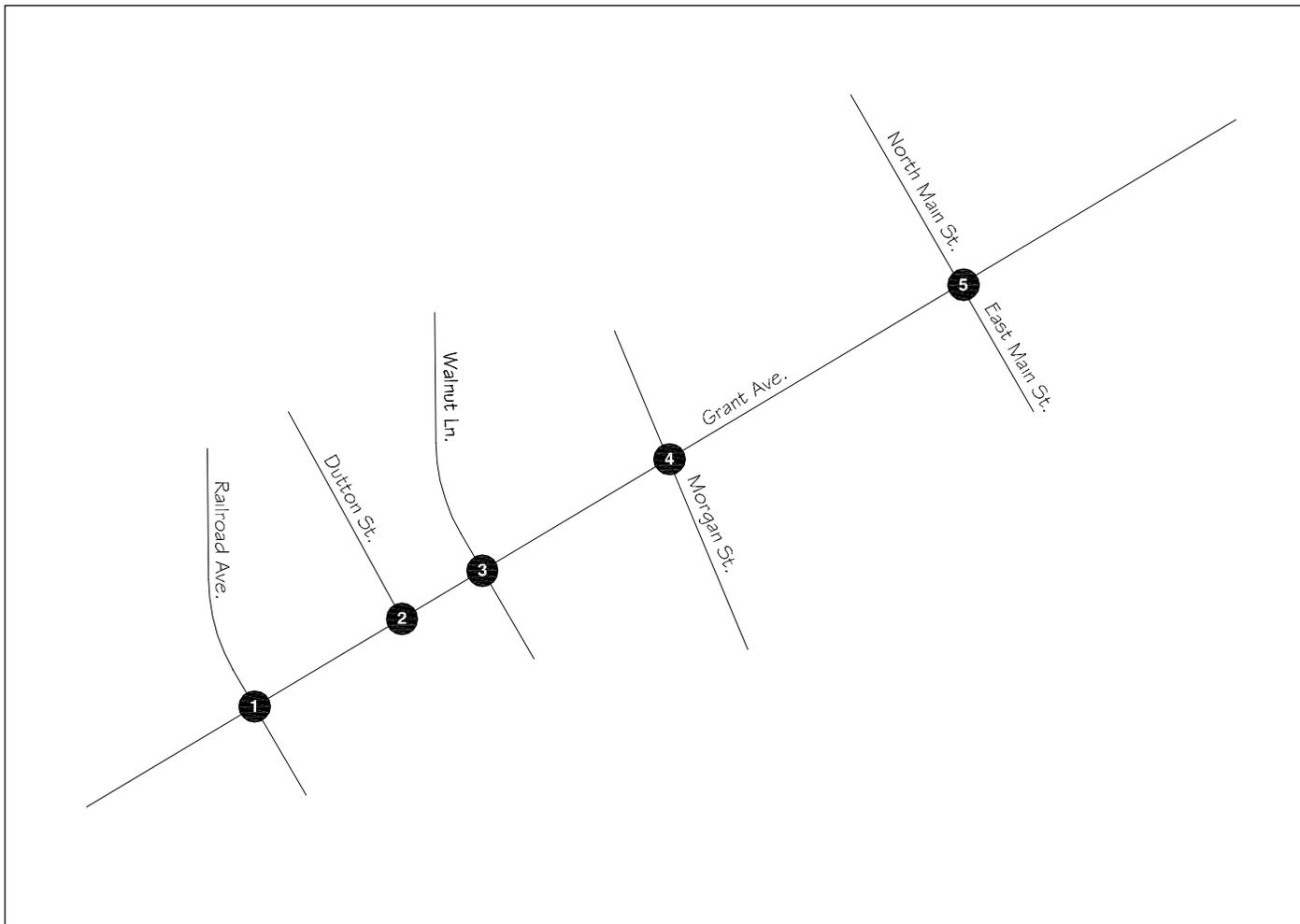


**4. Morgan St./Grant Ave.**

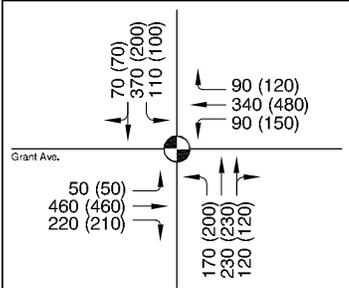


**5. East Main St./North Main St./Grant Ave.**





**1. Railroad Ave./Grant Ave.**



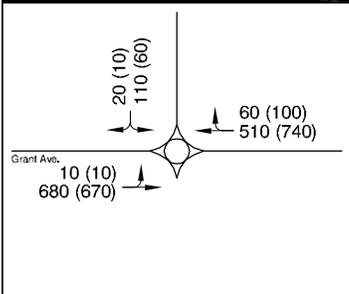
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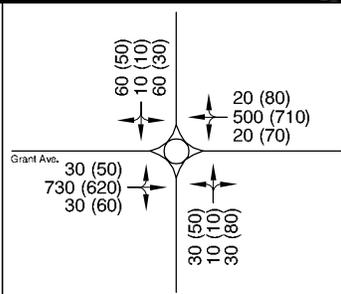
**LEGEND**

- Turn Lane
- XX (YY) - AM (PM) Peak Hour Traffic Volume
- Study Intersection
- Traffic Signal
- Stop Sign

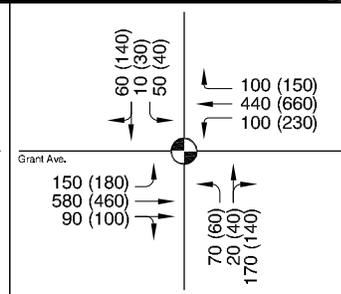
**2. Dutton St./Grant Ave.**



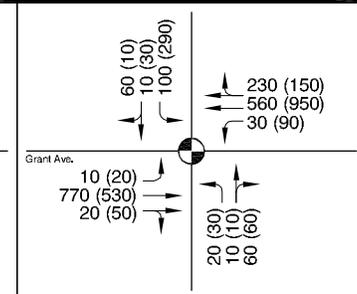
**3. Walnut Ln./Grant Ave.**



**4. Morgan St./Grant Ave.**



**5. East Main St./North Main St./Grant Ave.**



## 5. CONCLUSIONS

Under near-term conditions, the study results indicate that conditions along Grant Avenue would improve by implementing the near-term Option A improvements. Option A improves operations, reduces queuing, improves vehicle and pedestrian safety, and does not require any additional right of way.

The following summarizes the conclusions drawn for the four widening options. The options are ranked based on their relative performance against the evaluation criteria.

- Option I (Dutton Street Only) has the best overall performance since it provides the least delay and the best access; the main drawback to this option relates to the Anderson Avenue extension.
- Option IV (Walnut Lane only) is nearly as good as Option I, providing a similar level of service and only lacking the left-access to the medical buildings; however, there are right-of-way issues with the assumed Anderson Avenue extension.
- Option II (Dutton Street and Shopping Center) is similar to Option IV but the additional traffic signal at the shopping center results in slightly higher delay and gives this option the lowest aesthetic score. This option also assumes the construction of the Anderson Avenue extension.
- Option III (Dutton Street and Walnut Lane) requires the least amount of right-of-way, but the intersection configuration limits access to properties along Grant Avenue to the greatest extent and creates a greater potential for auto conflicts given the unsignalized intersection at Walnut Lane.

Below are the results of the cumulative conditions analysis of the roundabout options—ranked based on their performance against the evaluation criteria:

- Option V (three roundabout option) performs well if the City is willing to accept long westbound PM peak hour queues between Morgan Street and East Main Street. The East Main Street extension to Moody Slough Road would be required if any of the roundabout options were implemented.
- Option VII (two roundabout option) has long westbound PM peak hour queues extending from the Railroad Avenue and Morgan Street intersections, which hampers local access to some degree. The long cycle lengths required to minimize queuing have a negative impact on intersection LOS and the pedestrian environment, as well.
- Option VI (four roundabout option) is infeasible due to poor intersection LOS and long westbound PM peak hour queues at East Main Street.

## APPENDIX A LOS AND QUEUING CALCULATION WORKSHEETS

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	1.0	0.1	0.2	0.3	0.1	0.1	0.3	0.1	0.6	0.2	0.0
Delay / Veh (s)	42.5	29.0	23.6	40.3	19.0	5.6	35.3	25.8	14.8	38.2	22.0	11.0
Stop Delay (hr)	0.1	0.7	0.0	0.2	0.2	0.0	0.1	0.2	0.1	0.5	0.1	0.0
Vehicles Entered	11	124	10	16	64	34	15	35	28	55	29	14
Vehicles Exited	11	121	9	16	63	34	15	36	28	54	30	13
Hourly Exit Rate	44	484	36	64	252	136	60	144	112	216	120	52

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	3.0
Delay / Veh (s)	25.4
Stop Delay (hr)	2.3
Vehicles Entered	435
Vehicles Exited	430
Hourly Exit Rate	1720

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.2
Delay / Veh (s)	5.9	3.4	0.4	0.5	27.1	8.1	2.7
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	1	200	110	5	4	4	324
Vehicles Exited	1	202	110	5	4	4	326
Hourly Exit Rate	4	808	440	20	16	16	1304

3: Grant Ave & East St. Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Delay / Veh (s)	0.6	0.0	10.3	1.3	15.5	13.9	1.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	206	1	5	114	1	8	335
Vehicles Exited	206	1	5	114	1	8	335
Hourly Exit Rate	824	4	20	456	4	32	1340

4: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.0	0.2
Delay / Veh (s)	3.4	1.0	2.0	0.7	26.5	6.8	1.8
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	9	208	113	3	4	6	343
Vehicles Exited	9	208	112	3	4	7	343
Hourly Exit Rate	36	832	448	12	16	28	1372

5: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	All
Total Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Delay / Veh (s)	3.5	1.9	2.6	6.8	1.4	0.4	28.4	16.6	11.7	17.9	9.6	3.1
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Vehicles Entered	20	196	4	2	98	6	4	1	8	10	12	361
Vehicles Exited	20	197	4	2	98	6	4	1	8	10	12	362
Hourly Exit Rate	80	788	16	8	392	24	16	4	32	40	48	1448

6: Grant Ave & East Main St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Delay / Veh (s)	1.5	0.4	9.5	0.8	19.8	5.9	1.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	208	6	6	95	6	17	338
Vehicles Exited	208	6	6	95	6	17	338
Hourly Exit Rate	832	24	24	380	24	68	1352

Total Network Performance

Total Delay (hr)	4.2
Delay / Veh (s)	29.2
Stop Delay (hr)	2.8
Vehicles Entered	525
Vehicles Exited	518
Hourly Exit Rate	2072

Queuing and Blocking Report  
Near-Term AM

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Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	142	425	103	210	113	88	183	179	209
Average Queue (ft)	47	262	58	120	50	47	114	125	87
95th Queue (ft)	115	465	106	226	118	95	176	189	200
Link Distance (ft)		722		558			506		857
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150		150		100	150		150	
Storage Blk Time (%)		0.24		0.08	0.00		0.02	0.06	0.01
Queuing Penalty (veh)		13		17	0		1	10	3

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	41	54
Average Queue (ft)	9	25
95th Queue (ft)	66	62
Link Distance (ft)	558	752
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Grant Ave & East St.

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	25	84	57
Average Queue (ft)	5	30	30
95th Queue (ft)	29	95	64
Link Distance (ft)	47	95	904
Upstream Blk Time (%)	0.00	0.01	
Queuing Penalty (veh)	3	7	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Grant Ave & Walnut Ln.

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	88	42	53
Average Queue (ft)	27	7	23
95th Queue (ft)	88	47	47
Link Distance (ft)	95	610	753
Upstream Blk Time (%)	0.01		
Queuing Penalty (veh)	6		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Grant Ave & Morgan St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	L	LT	R	LT	R
Maximum Queue (ft)	38	26	44	36	47	50
Average Queue (ft)	21	6	18	21	27	30
95th Queue (ft)	48	23	49	45	53	53
Link Distance (ft)			722		221	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200	175		75		75
Storage Blk Time (%)			0.00		0.00	0.00
Queuing Penalty (veh)			0		0	0

Intersection: 6: Grant Ave & East Main St

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	29	54	51
Average Queue (ft)	12	23	34
95th Queue (ft)	35	61	59
Link Distance (ft)			630
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 60

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.1	0.3	1.4	0.3	0.2	0.2	0.2	0.3	0.1	0.0
Delay / Veh (s)	36.8	22.8	16.7	46.9	32.4	21.4	35.3	27.7	18.9	37.2	22.0	12.2
Stop Delay (hr)	0.1	0.5	0.0	0.2	0.9	0.2	0.1	0.2	0.1	0.3	0.1	0.0
Vehicles Entered	7	103	11	23	163	52	16	29	30	31	17	13
Vehicles Exited	7	104	11	22	158	50	16	30	29	32	17	13
Hourly Exit Rate	28	416	44	88	632	200	64	120	116	128	68	52

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	3.8
Delay / Veh (s)	28.1
Stop Delay (hr)	2.7
Vehicles Entered	495
Vehicles Exited	489
Hourly Exit Rate	1956

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.5	0.1	0.0	0.1	0.1	0.9
Delay / Veh (s)	21.5	12.0	2.2	0.2	129.3	58.3	8.1
Stop Delay (hr)	0.0	0.2	0.0	0.0	0.1	0.1	0.5
Vehicles Entered	6	159	233	10	5	5	418
Vehicles Exited	6	157	233	10	4	4	414
Hourly Exit Rate	24	628	932	40	16	16	1656

3: Grant Ave & East St. Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.1	0.0	0.0	0.3	0.0	0.1	0.6
Delay / Veh (s)	3.0	0.1	9.5	4.3	168.5	48.7	4.9
Stop Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.1	0.3
Vehicles Entered	161	4	10	243	1	6	425
Vehicles Exited	160	4	10	242	1	6	423
Hourly Exit Rate	640	16	40	968	4	24	1692

4: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.2	1.0	0.0	0.3	0.6	2.2
Delay / Veh (s)	19.8	4.3	14.2	9.8	314.9	219.5	18.0
Stop Delay (hr)	0.1	0.1	0.4	0.0	0.3	0.6	1.5
Vehicles Entered	11	157	251	11	7	12	449
Vehicles Exited	10	156	247	11	4	7	435
Hourly Exit Rate	40	624	988	44	16	28	1740

5: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.1	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.3	0.1	0.6
Delay / Veh (s)	21.5	2.6	1.5	9.0	6.8	4.2	132.4	153.0	27.2	150.9	131.9	61.8
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.3	0.1	0.6
Vehicles Entered	28	126	5	13	219	20	5	2	6	6	2	38
Vehicles Exited	28	126	5	13	217	19	4	2	6	6	2	36
Hourly Exit Rate	112	504	20	52	868	76	16	8	24	24	8	144

5: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	2.0
Delay / Veh (s)	15.5
Stop Delay (hr)	1.5
Vehicles Entered	470
Vehicles Exited	464
Hourly Exit Rate	1856

6: Grant Ave & East Main St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.0	0.3
Delay / Veh (s)	1.7	0.9	7.5	2.2	23.5	5.2	2.6
Stop Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.2
Vehicles Entered	131	7	16	224	6	13	397
Vehicles Exited	131	7	15	224	6	13	396
Hourly Exit Rate	524	28	60	896	24	52	1584

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Total Network Performance

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Total Delay (hr)	10.0
Delay / Veh (s)	57.3
Stop Delay (hr)	6.8
Vehicles Entered	644
Vehicles Exited	616
Hourly Exit Rate	2464

Queuing and Blocking Report  
Near-Term PM

12/20/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	62	372	178	584	129	126	212	134	102
Average Queue (ft)	24	195	91	429	65	56	118	77	54
95th Queue (ft)	64	362	184	686	158	130	218	136	110
Link Distance (ft)		722		558			506		857
Upstream Blk Time (%)				0.07					
Queuing Penalty (veh)				67					
Storage Bay Dist (ft)	150		150		100	150		150	
Storage Blk Time (%)		0.12	0.00	0.33	0.00		0.05	0.00	0.00
Queuing Penalty (veh)		4	0	104	0		4	0	0

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	392	59	92
Average Queue (ft)	143	22	48
95th Queue (ft)	390	68	103
Link Distance (ft)	558	47	752
Upstream Blk Time (%)	0.00	0.05	
Queuing Penalty (veh)	1	54	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & East St.

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	57	114	66
Average Queue (ft)	30	66	34
95th Queue (ft)	73	147	79
Link Distance (ft)	47	95	660
Upstream Blk Time (%)	0.11	0.10	
Queuing Penalty (veh)	77	107	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report  
Near-Term PM

12/20/2005

Intersection: 4: Grant Ave & Walnut Ln.

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	111	506	225
Average Queue (ft)	68	173	113
95th Queue (ft)	141	519	240
Link Distance (ft)	95	610	753
Upstream Blk Time (%)	0.14	0.01	
Queuing Penalty (veh)	97	9	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Grant Ave & Morgan St.

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	LT	R	LT	R
Maximum Queue (ft)	111	44	45	67	95	54	224	106
Average Queue (ft)	57	6	19	17	48	24	101	79
95th Queue (ft)	119	72	50	74	124	72	251	127
Link Distance (ft)		610		1163	722		220	
Upstream Blk Time (%)							0.11	
Queuing Penalty (veh)							0	
Storage Bay Dist (ft)	200		175			75		75
Storage Blk Time (%)	0.00				0.14	0.00	0.22	0.26
Queuing Penalty (veh)	2				3	0	33	10

Intersection: 6: Grant Ave & East Main St

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	8	32	38	54
Average Queue (ft)	1	16	21	32
95th Queue (ft)	10	39	50	62
Link Distance (ft)	1163			672
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		150	150	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 573

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.1	0.1	0.2	0.3	0.0	0.2	0.2	0.1	0.6	0.2	0.0
Delay / Veh (s)	39.3	31.7	24.8	37.9	17.9	4.8	38.3	26.4	15.3	38.8	23.5	14.4
Stop Delay (hr)	0.1	0.8	0.0	0.2	0.2	0.0	0.1	0.2	0.1	0.5	0.2	0.0
Vehicles Entered	15	124	10	21	66	34	15	29	30	55	35	11
Vehicles Exited	15	121	9	22	66	34	15	29	31	55	35	11
Hourly Exit Rate	60	484	36	88	264	136	60	116	124	220	140	44

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	3.3
Delay / Veh (s)	26.5
Stop Delay (hr)	2.5
Vehicles Entered	445
Vehicles Exited	443
Hourly Exit Rate	1772

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.2
Delay / Veh (s)	4.6	2.5	0.6	0.1	15.1	5.9	2.0
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	1	206	117	5	5	4	338
Vehicles Exited	1	206	118	5	5	4	339
Hourly Exit Rate	4	824	472	20	20	16	1356

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Delay / Veh (s)	3.1	0.3	1.1	0.3	20.3	6.6	1.1
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	7	204	113	2	5	10	341
Vehicles Exited	7	204	111	2	5	11	340
Hourly Exit Rate	28	816	444	8	20	44	1360

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0
Delay / Veh (s)	4.2	1.8	0.9	4.5	1.4	0.4	37.6	29.2	14.8	25.0		10.0
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0
Vehicles Entered	25	191	3	6	91	7	7	2	16	8	0	16
Vehicles Exited	25	191	3	6	91	7	6	2	16	8	0	16
Hourly Exit Rate	100	764	12	24	364	28	24	8	64	32	0	64

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	0.4
Delay / Veh (s)	4.1
Stop Delay (hr)	0.3
Vehicles Entered	372
Vehicles Exited	371
Hourly Exit Rate	1484

22: Grant Ave & East Main St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Delay / Veh (s)	1.7	0.9	9.7	0.8	17.2	8.1	2.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	208	6	4	93	8	16	335
Vehicles Exited	209	6	4	92	8	16	335
Hourly Exit Rate	836	24	16	368	32	64	1340

Total Network Performance

Total Delay (hr)	4.3
Delay / Veh (s)	29.4
Stop Delay (hr)	3.0
Vehicles Entered	532
Vehicles Exited	527
Hourly Exit Rate	2108

Queuing and Blocking Report  
Near-Term AM Option 1

12/12/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	135	435	114	207	114	127	186	166	197
Average Queue (ft)	58	276	70	103	40	53	108	120	104
95th Queue (ft)	143	446	124	220	108	124	191	190	230
Link Distance (ft)		722		558			506		857
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150		150		100	150		150	
Storage Blk Time (%)		0.25	0.00	0.07	0.00		0.02	0.06	0.01
Queuing Penalty (veh)		13	1	16	0		1	10	2

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	10	39
Average Queue (ft)	2	23
95th Queue (ft)	13	52
Link Distance (ft)		752
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	200	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	36	57
Average Queue (ft)	12	25
95th Queue (ft)	38	56
Link Distance (ft)		753
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	200	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	L	LT	R	LT	R
Maximum Queue (ft)	48	32	56	57	56	56
Average Queue (ft)	24	9	28	29	28	31
95th Queue (ft)	51	32	67	61	60	59
Link Distance (ft)			722		221	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200	175		75		75
Storage Blk Time (%)			0.02		0.00	0.00
Queuing Penalty (veh)			1		0	0

Intersection: 22: Grant Ave & East Main St

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	30	42	66
Average Queue (ft)	9	27	35
95th Queue (ft)	34	51	69
Link Distance (ft)			630
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 45

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.1	0.4	1.3	0.2	0.2	0.2	0.2	0.4	0.1	0.0
Delay / Veh (s)	44.2	25.3	16.9	47.3	29.0	15.9	35.7	28.4	18.4	41.6	23.6	11.8
Stop Delay (hr)	0.1	0.5	0.1	0.3	0.7	0.1	0.2	0.2	0.1	0.4	0.1	0.0
Vehicles Entered	7	101	18	30	162	50	21	31	34	32	19	12
Vehicles Exited	8	103	18	30	158	50	21	31	34	34	19	12
Hourly Exit Rate	32	412	72	120	632	200	84	124	136	136	76	48

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	4.0
Delay / Veh (s)	27.7
Stop Delay (hr)	2.8
Vehicles Entered	517
Vehicles Exited	518
Hourly Exit Rate	2072

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.1	0.2	0.0	0.1	0.0	0.5
Delay / Veh (s)	13.5	2.4	3.2	0.8	67.3	36.6	3.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.2
Vehicles Entered	5	170	238	10	5	4	432
Vehicles Exited	5	170	237	10	4	4	430
Hourly Exit Rate	20	680	948	40	16	16	1720

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.0	0.3	0.0	0.2	0.2	0.8
Delay / Veh (s)	16.3	0.3	4.3	1.6	93.2	70.7	6.4
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.2	0.2	0.5
Vehicles Entered	13	161	237	9	7	12	439
Vehicles Exited	13	160	236	9	7	11	436
Hourly Exit Rate	52	640	944	36	28	44	1744

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.1	0.0	0.2
Delay / Veh (s)	12.7	1.3	0.4	7.6	5.2	2.6	103.7	49.6	14.2	99.6	82.0	17.3
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2
Vehicles Entered	31	128	7	21	205	20	3	2	12	5	2	34
Vehicles Exited	31	130	7	21	205	21	4	2	12	5	2	35
Hourly Exit Rate	124	520	28	84	820	84	16	8	48	20	8	140

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	1.0
Delay / Veh (s)	7.8
Stop Delay (hr)	0.7
Vehicles Entered	470
Vehicles Exited	475
Hourly Exit Rate	1900

22: Grant Ave & East Main St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.1	0.0	0.0	0.2	0.0	0.0	0.3
Delay / Veh (s)	1.3	0.6	8.8	2.6	18.9	5.1	2.6
Stop Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.2
Vehicles Entered	141	7	18	221	4	8	399
Vehicles Exited	141	7	18	220	4	8	398
Hourly Exit Rate	564	28	72	880	16	32	1592

Total Network Performance

Total Delay (hr)	6.7
Delay / Veh (s)	37.8
Stop Delay (hr)	4.3
Vehicles Entered	642
Vehicles Exited	639
Hourly Exit Rate	2556

Queuing and Blocking Report  
Near-Term PM Option 1

12/12/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	65	331	178	514	129	100	197	148	122
Average Queue (ft)	32	221	100	366	70	56	118	88	57
95th Queue (ft)	69	359	185	596	162	107	191	150	120
Link Distance (ft)		722		558			506		857
Upstream Blk Time (%)				0.03					
Queuing Penalty (veh)				31					
Storage Bay Dist (ft)	150		150		100	150		150	
Storage Blk Time (%)		0.17	0.00	0.32	0.00	0.00	0.03	0.02	
Queuing Penalty (veh)		5	0	102	1	1	3	3	

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	31	90	80
Average Queue (ft)	15	25	34
95th Queue (ft)	40	121	70
Link Distance (ft)		197	752
Upstream Blk Time (%)		0.01	
Queuing Penalty (veh)		7	
Storage Bay Dist (ft)	200		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	55	70	141
Average Queue (ft)	32	7	70
95th Queue (ft)	63	48	161
Link Distance (ft)		610	753
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report  
Near-Term PM Option 1

12/12/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	LT	R	LT	R
Maximum Queue (ft)	87	45	23	49	44	84	103
Average Queue (ft)	51	26	4	24	27	42	60
95th Queue (ft)	97	54	21	60	51	97	107
Link Distance (ft)			1163	722		220	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200	175			75		75
Storage Blk Time (%)				0.02	0.01	0.08	0.02
Queuing Penalty (veh)				1	0	11	1

Intersection: 22: Grant Ave & East Main St

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	40	38	47
Average Queue (ft)	18	13	25
95th Queue (ft)	42	42	55
Link Distance (ft)			672
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 166

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.2	0.4	0.3	0.7	0.0	0.4	0.4	0.2	0.4	0.9	0.1
Delay / Veh (s)	61.8	36.5	27.8	44.4	28.5	3.7	39.1	24.9	19.6	50.6	34.7	28.2
Stop Delay (hr)	0.2	0.8	0.3	0.3	0.5	0.0	0.4	0.3	0.1	0.4	0.7	0.1
Vehicles Entered	13	119	51	24	91	21	38	60	33	28	93	18
Vehicles Exited	13	116	51	25	90	22	38	61	34	28	92	18
Hourly Exit Rate	52	464	204	100	360	88	152	244	136	112	368	72

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	5.3
Delay / Veh (s)	32.4
Stop Delay (hr)	4.0
Vehicles Entered	589
Vehicles Exited	588
Hourly Exit Rate	2352

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.2	0.1	0.0
Delay / Veh (s)	25.8	9.4	6.8	28.5	10.1	3.8	26.8	18.9	5.1	21.9	15.7	6.2
Stop Delay (hr)	0.0	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.1	0.0
Vehicles Entered	8	158	17	7	124	19	8	2	8	37	14	6
Vehicles Exited	8	159	17	7	121	19	8	2	8	36	14	6
Hourly Exit Rate	32	636	68	28	484	76	32	8	32	144	56	24

2: Grant Ave & Dutton St. Performance by movement

Movement	All
Total Delay (hr)	1.3
Delay / Veh (s)	11.6
Stop Delay (hr)	0.7
Vehicles Entered	408
Vehicles Exited	405
Hourly Exit Rate	1620

3: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.6	0.1	0.2	0.5	0.1	0.2	0.0	0.1	0.1	0.0	0.0
Delay / Veh (s)	28.7	15.5	9.7	29.5	17.4	8.9	31.7	25.6	9.4	34.5	28.0	4.3
Stop Delay (hr)	0.2	0.3	0.0	0.2	0.3	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Vehicles Entered	36	147	23	28	112	28	21	6	49	16	2	18
Vehicles Exited	37	147	22	27	112	27	21	6	49	15	2	18
Hourly Exit Rate	148	588	88	108	448	108	84	24	196	60	8	72

3: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	2.4
Delay / Veh (s)	17.5
Stop Delay (hr)	1.6
Vehicles Entered	486
Vehicles Exited	483
Hourly Exit Rate	1932

10: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.6	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	34.9	10.9	9.0	26.3	7.3	3.4	33.1	23.5	5.0	25.7	17.4	4.1
Stop Delay (hr)	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Vehicles Entered	3	204	4	8	146	62	5	5	15	27	4	16
Vehicles Exited	3	200	4	8	145	62	5	5	15	28	4	16
Hourly Exit Rate	12	800	16	32	580	248	20	20	60	112	16	64

10: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.4
Delay / Veh (s)	10.1
Stop Delay (hr)	0.8
Vehicles Entered	499
Vehicles Exited	495
Hourly Exit Rate	1980

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Total Network Performance

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Total Delay (hr)	10.8
Delay / Veh (s)	41.6
Stop Delay (hr)	7.1
Vehicles Entered	937
Vehicles Exited	924
Hourly Exit Rate	3696

Queuing and Blocking Report  
 Cumulative Option 1 Alt AM

3/15/2006

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	130	421	158	144	256	55	209	304	188	361
Average Queue (ft)	56	224	133	77	167	25	108	175	96	236
95th Queue (ft)	132	467	182	155	301	57	198	298	199	402
Link Distance (ft)		938			547	547		494		857
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		125	250			250		250	
Storage Blk Time (%)	0.01	0.15	0.14		0.02			0.02	0.00	0.08
Queuing Penalty (veh)	4	78	40		2			4	0	9

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	58	154	133	68	169	73	44	48	110	67
Average Queue (ft)	27	77	73	26	86	33	29	26	68	43
95th Queue (ft)	66	162	141	73	185	74	56	54	113	82
Link Distance (ft)		547	547		866	866		634		740
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125			150			100		100	
Storage Blk Time (%)		0.02			0.01				0.02	0.01
Queuing Penalty (veh)		1			0				1	1

Intersection: 3: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	138	191	220	131	197	136	84	151	83	53
Average Queue (ft)	80	93	105	67	114	77	53	78	46	34
95th Queue (ft)	144	179	204	128	190	161	95	160	88	58
Link Distance (ft)		866	866		1176	1176		722		207
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)		0.01					0.01	0.01		
Queuing Penalty (veh)		1					2	1		

Queuing and Blocking Report  
 Cumulative Option 1 Alt AM

3/15/2006

Intersection: 10: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	34	204	224	66	161	151	47	67	123	61
Average Queue (ft)	12	98	103	25	84	65	20	37	68	31
95th Queue (ft)	38	225	234	69	162	136	55	69	125	64
Link Distance (ft)		1176	1176		859	859		614		803
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.05			0.01					
Queuing Penalty (veh)		1			0					

Network Summary

Network wide Queuing Penalty: 146

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.1	0.3	0.5	0.7	0.0	0.7	0.5	0.2	0.4	0.5	0.1
Delay / Veh (s)	61.5	33.0	23.2	52.8	19.0	3.6	51.8	31.0	24.0	52.1	33.4	22.1
Stop Delay (hr)	0.2	0.8	0.3	0.4	0.4	0.0	0.7	0.4	0.1	0.3	0.4	0.1

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	5.2
Delay / Veh (s)	31.2
Stop Delay (hr)	4.1

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.6	0.0	0.2	0.4	0.1	0.2	0.0	0.1	0.3	0.0	0.0
Delay / Veh (s)	45.5	14.9	8.8	45.5	9.6	4.6	44.9	43.5	11.2	43.3	59.5	9.3
Stop Delay (hr)	0.1	0.4	0.0	0.2	0.1	0.0	0.2	0.0	0.1	0.3	0.0	0.0

2: Grant Ave & Dutton St. Performance by movement

Movement	All
Total Delay (hr)	2.1
Delay / Veh (s)	16.1
Stop Delay (hr)	1.4

3: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	0.6	0.1	0.9	1.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2
Delay / Veh (s)	42.2	18.8	14.1	55.1	21.7	13.3	50.1	37.1	12.6	42.5	43.7	16.0
Stop Delay (hr)	0.5	0.4	0.1	0.7	0.5	0.1	0.2	0.1	0.1	0.1	0.1	0.1

3: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	4.2
Delay / Veh (s)	26.1
Stop Delay (hr)	2.9

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.8	0.0	0.3	1.1	0.1	0.1	0.0	0.0	0.9	0.1	0.0
Delay / Veh (s)	52.2	20.3	13.6	55.7	15.5	7.0	39.5	39.8	8.8	44.1	42.2	13.3
Stop Delay (hr)	0.1	0.5	0.0	0.3	0.6	0.0	0.1	0.0	0.0	0.8	0.1	0.0

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	3.5
Delay / Veh (s)	21.9
Stop Delay (hr)	2.5

Total Network Performance

Total Delay (hr)	15.4
Delay / Veh (s)	53.2
Stop Delay (hr)	11.0

Queuing and Blocking Report  
 Cumulative Option 1 alt PM

3/20/2006

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	129	385	154	209	352	50	243	304	139	215
Average Queue (ft)	58	234	134	113	182	25	166	178	86	150
95th Queue (ft)	126	444	187	207	351	57	263	301	146	239
Link Distance (ft)		938			547	547		494		857
Upstream Blk Time (%)					0					
Queuing Penalty (veh)					0					
Storage Bay Dist (ft)	125		125	250			250		250	
Storage Blk Time (%)	0	18	11		3		1	2		0
Queuing Penalty (veh)	2	91	33		4		2	3		0

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	100	200	172	122	200	110	85	108	118	74
Average Queue (ft)	51	123	101	63	75	32	46	54	75	39
95th Queue (ft)	122	223	199	131	210	135	93	106	128	82
Link Distance (ft)		547	547		866	866		634		740
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125			150			100		100	
Storage Blk Time (%)	0	7		0	1		1	1	6	1
Queuing Penalty (veh)	1	4		1	1		1	1	4	1

Intersection: 3: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	198	233	223	282	318	258	87	158	92	209
Average Queue (ft)	134	120	120	164	180	131	43	85	41	97
95th Queue (ft)	217	242	220	290	345	282	93	162	94	206
Link Distance (ft)		866	866		1199	1199		722		207
Upstream Blk Time (%)										2
Queuing Penalty (veh)										0
Storage Bay Dist (ft)	200			300			125		150	
Storage Blk Time (%)	2	1		1	1			4		4
Queuing Penalty (veh)	4	1		4	2			3		2

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	91	256	250	135	329	292	66	66	288	130
Average Queue (ft)	22	138	140	85	203	161	35	39	184	46
95th Queue (ft)	70	263	257	145	351	295	72	67	295	179
Link Distance (ft)		1199	1199		1022	1022		581		799
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		14		2	15				3	
Queuing Penalty (veh)		3		12	14				1	

Network Summary

Network wide Queuing Penalty: 194

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.3	0.4	0.4	0.9	0.0	0.5	0.5	0.1	0.3	0.9	0.2
Delay / Veh (s)	55.6	37.0	27.2	61.2	33.7	5.6	43.1	24.2	16.3	38.4	37.1	29.5
Stop Delay (hr)	0.2	0.9	0.3	0.4	0.6	0.0	0.4	0.3	0.1	0.3	0.7	0.2
Vehicles Entered	11	123	56	23	97	23	39	68	32	28	91	28
Vehicles Exited	12	121	54	24	97	24	41	69	32	28	91	28
Hourly Exit Rate	48	484	216	96	388	96	164	276	128	112	364	112

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	5.7
Delay / Veh (s)	33.4
Stop Delay (hr)	4.4
Vehicles Entered	619
Vehicles Exited	621
Hourly Exit Rate	2484

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.3	0.3	0.0	0.2	0.0	0.8
Delay / Veh (s)	22.5	5.9	7.7	1.6	18.1	3.6	7.8
Stop Delay (hr)	0.1	0.1	0.1	0.0	0.2	0.0	0.4
Vehicles Entered	11	171	132	22	37	14	387
Vehicles Exited	11	172	132	22	37	14	388
Hourly Exit Rate	44	688	528	88	148	56	1552

3: Grant Ave & Shopping Center Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.2	0.0	0.0	0.2	0.0	0.0	0.4
Delay / Veh (s)	3.3	1.2	18.6	4.3	15.4	4.8	4.1
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	200	9	5	147	8	8	377
Vehicles Exited	201	9	5	147	8	8	378
Hourly Exit Rate	804	36	20	588	32	32	1512

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.5	0.1	0.2	0.5	0.0	0.2	0.1	0.1	0.1	0.0	0.0
Delay / Veh (s)	29.0	12.6	8.6	28.4	14.5	5.8	27.7	27.1	7.6	29.8	30.1	4.9
Stop Delay (hr)	0.2	0.3	0.0	0.2	0.2	0.0	0.1	0.0	0.1	0.1	0.0	0.0
Vehicles Entered	36	150	23	28	119	24	19	7	42	11	3	16
Vehicles Exited	35	151	23	27	119	25	20	7	42	11	3	16
Hourly Exit Rate	140	604	92	108	476	100	80	28	168	44	12	64

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	2.0
Delay / Veh (s)	15.3
Stop Delay (hr)	1.4
Vehicles Entered	478
Vehicles Exited	479
Hourly Exit Rate	1916

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.4	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	29.1	8.2	6.4	28.9	5.3	2.7	25.5	22.5	6.2	22.8	17.3	4.3
Stop Delay (hr)	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Vehicles Entered	3	198	4	7	151	62	6	2	18	25	3	15
Vehicles Exited	3	196	4	7	150	61	6	2	18	25	3	16
Hourly Exit Rate	12	784	16	28	600	244	24	8	72	100	12	64

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.1
Delay / Veh (s)	7.9
Stop Delay (hr)	0.6
Vehicles Entered	494
Vehicles Exited	491
Hourly Exit Rate	1964

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Total Network Performance

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Total Delay (hr)	10.5
Delay / Veh (s)	40.5
Stop Delay (hr)	6.9
Vehicles Entered	929
Vehicles Exited	933
Hourly Exit Rate	3732

Queuing and Blocking Report  
 Cumulative Option 2 AM

12/16/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	122	346	181	170	380	66	209	294	192	417
Average Queue (ft)	60	228	155	91	206	35	112	176	95	274
95th Queue (ft)	135	421	219	189	402	66	195	295	212	489
Link Distance (ft)		730			547	547		494		857
Upstream Blk Time (%)					0.00					
Queuing Penalty (veh)					1					
Storage Bay Dist (ft)	150		150	250			250		250	
Storage Blk Time (%)		0.13	0.12	0.00	0.06		0.00	0.02		0.13
Queuing Penalty (veh)		68	36	0	6		0	3		15

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	70	122	110	225	95	109	44
Average Queue (ft)	30	49	49	93	34	63	28
95th Queue (ft)	78	129	120	226	101	107	55
Link Distance (ft)		547	547	288	288		740
Upstream Blk Time (%)				0.01			
Queuing Penalty (veh)				2			
Storage Bay Dist (ft)	100					150	
Storage Blk Time (%)	0.00	0.01				0.00	
Queuing Penalty (veh)	2	0				0	

Intersection: 3: Grant Ave & Shopping Center

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	129	105	41	67	38	44	44
Average Queue (ft)	43	31	16	21	8	26	22
95th Queue (ft)	113	90	46	66	35	54	53
Link Distance (ft)	288	288		513	513	485	485
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Queuing and Blocking Report  
 Cumulative Option 2 AM

12/16/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	128	183	195	103	149	109	92	106	64	64
Average Queue (ft)	80	94	112	64	99	65	50	57	33	35
95th Queue (ft)	135	190	209	112	171	121	97	112	68	68
Link Distance (ft)		513	513		1148	1148		721		207
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)		0.00					0.00	0.00		
Queuing Penalty (veh)		1					1	0		

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	33	146	137	47	127	120	42	60	86	44
Average Queue (ft)	11	65	74	19	69	55	20	36	51	29
95th Queue (ft)	37	154	139	49	145	117	46	68	90	52
Link Distance (ft)		1148	1148		848	848		638		770
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.02			0.01					
Queuing Penalty (veh)		0			0					

Network Summary

Network wide Queuing Penalty: 134

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	1.4	0.5	0.7	0.7	0.0	0.7	0.8	0.3	0.3	0.5	0.1
Delay / Veh (s)	70.5	40.5	29.5	60.1	21.4	4.1	47.8	41.4	31.7	53.5	37.4	26.9
Stop Delay (hr)	0.4	1.0	0.4	0.6	0.4	0.0	0.6	0.6	0.2	0.3	0.4	0.1
Vehicles Entered	23	122	60	40	125	32	50	67	29	24	52	18
Vehicles Exited	24	122	60	39	124	31	53	68	29	23	50	17
Hourly Exit Rate	96	488	240	156	496	124	212	272	116	92	200	68

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.4
Delay / Veh (s)	36.2
Stop Delay (hr)	5.0
Vehicles Entered	642
Vehicles Exited	640
Hourly Exit Rate	2560

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.3	0.3	0.0	0.3	0.0	1.0
Delay / Veh (s)	45.4	7.1	5.1	1.6	38.6	5.4	8.5
Stop Delay (hr)	0.1	0.1	0.1	0.0	0.3	0.0	0.6
Vehicles Entered	11	163	180	47	27	14	442
Vehicles Exited	11	158	179	46	27	14	435
Hourly Exit Rate	44	632	716	184	108	56	1740

3: Grant Ave & Shopping Center Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.5	0.0	0.2	0.3	0.1	0.0	1.1
Delay / Veh (s)	9.8	5.6	51.5	4.5	34.0	5.5	9.1
Stop Delay (hr)	0.2	0.0	0.2	0.0	0.1	0.0	0.6
Vehicles Entered	170	15	15	205	13	20	438
Vehicles Exited	170	16	16	207	13	20	442
Hourly Exit Rate	680	64	64	828	52	80	1768

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	0.5	0.1	0.8	0.9	0.1	0.2	0.1	0.2	0.1	0.1	0.1
Delay / Veh (s)	45.2	15.8	10.8	53.6	20.2	13.4	43.9	41.3	15.4	50.7	34.5	10.4
Stop Delay (hr)	0.5	0.3	0.1	0.7	0.4	0.1	0.2	0.1	0.2	0.1	0.1	0.1
Vehicles Entered	44	115	25	56	170	39	15	10	41	10	7	36
Vehicles Exited	44	115	25	58	166	39	15	10	42	10	7	36
Hourly Exit Rate	176	460	100	232	664	156	60	40	168	40	28	144

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	3.9
Delay / Veh (s)	24.5
Stop Delay (hr)	2.7
Vehicles Entered	568
Vehicles Exited	567
Hourly Exit Rate	2268

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.0	0.3	1.0	0.1	0.1	0.0	0.1	0.8	0.1	0.0
Delay / Veh (s)	60.2	16.0	10.9	52.8	14.7	7.1	40.1	38.2	10.0	40.6	42.2	16.4
Stop Delay (hr)	0.1	0.4	0.0	0.3	0.6	0.1	0.1	0.0	0.0	0.7	0.1	0.0
Vehicles Entered	4	148	13	23	247	41	7	2	19	73	9	2
Vehicles Exited	4	148	12	23	244	40	7	2	19	75	9	2
Hourly Exit Rate	16	592	48	92	976	160	28	8	76	300	36	8

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	3.3
Delay / Veh (s)	20.2
Stop Delay (hr)	2.3
Vehicles Entered	588
Vehicles Exited	585
Hourly Exit Rate	2340

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Total Network Performance

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Total Delay (hr)	16.1
Delay / Veh (s)	53.5
Stop Delay (hr)	11.4
Vehicles Entered	1088
Vehicles Exited	1081
Hourly Exit Rate	4324

Queuing and Blocking Report  
 Cumulative Option 2 PM

12/16/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	147	633	158	230	341	65	259	418	130	266
Average Queue (ft)	102	322	146	136	238	31	166	261	75	158
95th Queue (ft)	178	612	178	233	398	67	282	448	131	266
Link Distance (ft)		730			547	547		494		857
Upstream Blk Time (%)		0.00						0.01		
Queuing Penalty (veh)		0						0		
Storage Bay Dist (ft)	125		125	250			250		250	
Storage Blk Time (%)	0.06	0.21	0.18	0.02	0.04		0.01	0.10		0.02
Queuing Penalty (veh)	40	120	59	10	7		5	21		2

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	69	148	127	154	44	126	60
Average Queue (ft)	42	84	59	63	19	76	32
95th Queue (ft)	78	166	129	147	49	132	65
Link Distance (ft)		547	547	378	378		740
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	100					150	
Storage Blk Time (%)	0.00	0.03				0.00	
Queuing Penalty (veh)	0	1				0	

Intersection: 3: Grant Ave & Shopping Center

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	211	173	99	79	62	79	73
Average Queue (ft)	111	99	55	23	15	43	43
95th Queue (ft)	228	200	100	74	57	87	73
Link Distance (ft)	378	378		425	425	538	538
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)			0.00	0.00			
Queuing Penalty (veh)			0	0			

Queuing and Blocking Report  
 Cumulative Option 2 PM

12/16/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
	L	T	TR	L	T	TR	L	TR	L	TR
Directions Served										
Maximum Queue (ft)	213	219	167	271	289	268	110	199	81	131
Average Queue (ft)	129	98	102	180	169	130	48	103	39	70
95th Queue (ft)	216	191	176	288	315	268	99	208	86	132
Link Distance (ft)		425	425		1144	1144		722		207
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)	0.05			0.01	0.01		0.01	0.08		0.02
Queuing Penalty (veh)	11			4	1		1	5		1

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
	L	T	TR	L	T	TR	L	TR	L	TR
Directions Served										
Maximum Queue (ft)	43	212	210	153	314	270	66	83	259	72
Average Queue (ft)	20	100	109	94	183	143	29	49	184	41
95th Queue (ft)	50	214	215	174	317	267	74	87	268	82
Link Distance (ft)		1144	1144		862	862		555		881
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.09		0.02	0.13		0.00	0.00	0.00	
Queuing Penalty (veh)		2		9	13		0	0	0	

Network Summary

Network wide Queuing Penalty: 312

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.0	0.4	0.4	0.8	0.0	0.6	0.4	0.2	0.4	1.1	0.2
Delay / Veh (s)	54.9	30.9	22.8	59.5	28.8	3.4	47.6	24.8	17.4	50.6	39.7	31.6
Stop Delay (hr)	0.2	0.7	0.3	0.4	0.5	0.0	0.5	0.3	0.1	0.3	0.8	0.1
Vehicles Entered	13	120	59	24	98	22	43	60	34	27	100	22
Vehicles Exited	15	119	57	24	95	21	43	60	34	27	97	20
Hourly Exit Rate	60	476	228	96	380	84	172	240	136	108	388	80

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	5.6
Delay / Veh (s)	32.6
Stop Delay (hr)	4.3
Vehicles Entered	622
Vehicles Exited	612
Hourly Exit Rate	2448

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.3	0.2	0.0	0.2	0.0	0.7
Delay / Veh (s)	20.6	5.3	4.9	1.0	18.5	4.5	6.3
Stop Delay (hr)	0.0	0.1	0.1	0.0	0.2	0.0	0.3
Vehicles Entered	3	176	141	18	33	5	376
Vehicles Exited	3	174	140	18	34	5	374
Hourly Exit Rate	12	696	560	72	136	20	1496

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.1	0.2	0.0	0.1	0.0	0.4
Delay / Veh (s)	7.0	1.1	3.7	1.6	22.8	7.9	3.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Vehicles Entered	7	202	152	4	14	17	396
Vehicles Exited	7	203	153	4	14	18	399
Hourly Exit Rate	28	812	612	16	56	72	1596

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.6	0.0	0.3	0.6	0.1	0.2	0.0	0.1	0.1	0.0	0.0
Delay / Veh (s)	26.2	14.2	7.3	29.4	19.7	9.5	29.3	25.9	8.3	34.3	21.7	5.4
Stop Delay (hr)	0.2	0.3	0.0	0.2	0.4	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Vehicles Entered	39	154	25	34	114	23	25	5	50	15	3	19
Vehicles Exited	39	151	24	32	112	24	25	5	50	14	3	19
Hourly Exit Rate	156	604	96	128	448	96	100	20	200	56	12	76

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	2.4
Delay / Veh (s)	17.3
Stop Delay (hr)	1.7
Vehicles Entered	506
Vehicles Exited	498
Hourly Exit Rate	1992

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.5	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	23.0	8.3	3.9	25.7	4.7	2.3	28.8	31.7	5.2	23.0	18.6	3.3
Stop Delay (hr)	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Vehicles Entered	2	209	4	8	149	61	5	2	16	26	3	16
Vehicles Exited	2	212	4	8	151	60	5	2	16	26	3	16
Hourly Exit Rate	8	848	16	32	604	240	20	8	64	104	12	64

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.1
Delay / Veh (s)	7.6
Stop Delay (hr)	0.6
Vehicles Entered	501
Vehicles Exited	505
Hourly Exit Rate	2020

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Total Network Performance

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Total Delay (hr)	10.4
Delay / Veh (s)	40.0
Stop Delay (hr)	7.1
Vehicles Entered	949
Vehicles Exited	929
Hourly Exit Rate	3716

Queuing and Blocking Report  
 Cumulative Option 3 AM

12/6/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	101	415	184	211	344	50	202	280	166	448
Average Queue (ft)	54	205	140	101	193	24	126	168	87	275
95th Queue (ft)	109	407	209	215	370	53	235	301	183	520
Link Distance (ft)		1301			547	547		494		857
Upstream Blk Time (%)					0.00					0.01
Queuing Penalty (veh)					1					0
Storage Bay Dist (ft)	150		150	250			250		250	
Storage Blk Time (%)		0.08	0.06		0.05		0.02	0.01		0.12
Queuing Penalty (veh)		41	18		5		6	3		14

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	28	145	106	156	58	111	39
Average Queue (ft)	13	51	46	77	30	67	15
95th Queue (ft)	38	143	117	165	70	109	45
Link Distance (ft)		547	547	196	196		740
Upstream Blk Time (%)				0.00			
Queuing Penalty (veh)				1			
Storage Bay Dist (ft)	150					100	
Storage Blk Time (%)		0.00				0.01	
Queuing Penalty (veh)		0				0	

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	42	86
Average Queue (ft)	13	45
95th Queue (ft)	48	88
Link Distance (ft)		740
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)	0.00	
Queuing Penalty (veh)	0	

Queuing and Blocking Report  
 Cumulative Option 3 AM

12/6/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	150	179	195	141	194	185	97	121	72	67
Average Queue (ft)	84	103	111	76	127	93	61	61	39	37
95th Queue (ft)	146	176	197	140	221	187	102	112	78	65
Link Distance (ft)		603	603		1144	1144		722		208
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)	0.00	0.00					0.01	0.01		
Queuing Penalty (veh)	1	0					1	1		

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	26	144	149	36	103	82	42	63	99	40
Average Queue (ft)	5	67	68	20	58	49	20	36	53	27
95th Queue (ft)	26	145	152	43	112	98	51	64	100	48
Link Distance (ft)		1144	1144		674	674		522		882
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.02			0.00					
Queuing Penalty (veh)		0			0					

Network Summary

Network wide Queuing Penalty: 93

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.2	0.4	0.5	1.1	0.0	0.7	0.6	0.3	0.3	0.5	0.1
Delay / Veh (s)	63.5	34.9	27.2	49.5	30.9	4.6	54.2	36.9	25.8	50.0	33.2	24.3
Stop Delay (hr)	0.2	0.9	0.3	0.4	0.7	0.0	0.6	0.5	0.2	0.3	0.4	0.1
Vehicles Entered	15	121	56	40	127	31	50	63	36	22	50	17
Vehicles Exited	14	119	56	39	127	31	49	62	36	22	51	17
Hourly Exit Rate	56	476	224	156	508	124	196	248	144	88	204	68

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.1
Delay / Veh (s)	34.9
Stop Delay (hr)	4.7
Vehicles Entered	628
Vehicles Exited	623
Hourly Exit Rate	2492

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.1	0.2	0.0	0.1	0.0	0.6
Delay / Veh (s)	50.8	3.0	3.5	1.0	32.9	9.1	4.8
Stop Delay (hr)	0.1	0.0	0.1	0.0	0.1	0.0	0.3
Vehicles Entered	3	175	197	26	15	2	418
Vehicles Exited	4	174	197	26	16	2	419
Hourly Exit Rate	16	696	788	104	64	8	1676

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.0	0.3	0.0	0.1	0.0	0.5
Delay / Veh (s)	15.1	0.6	4.9	3.3	24.1	9.0	3.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.2
Vehicles Entered	11	179	210	21	9	14	444
Vehicles Exited	12	179	210	21	9	14	445
Hourly Exit Rate	48	716	840	84	36	56	1780

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	0.6	0.1	0.9	1.2	0.2	0.3	0.1	0.1	0.2	0.1	0.1
Delay / Veh (s)	46.4	19.7	14.2	43.8	27.9	18.1	39.3	35.9	11.3	50.3	30.2	12.4
Stop Delay (hr)	0.5	0.4	0.1	0.7	0.6	0.1	0.3	0.1	0.1	0.1	0.1	0.1
Vehicles Entered	45	118	26	76	159	36	29	8	39	11	8	37
Vehicles Exited	46	116	25	75	160	37	29	9	39	11	8	37
Hourly Exit Rate	184	464	100	300	640	148	116	36	156	44	32	148

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	4.6
Delay / Veh (s)	27.7
Stop Delay (hr)	3.3
Vehicles Entered	592
Vehicles Exited	592
Hourly Exit Rate	2368

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.5	0.0	0.3	1.0	0.1	0.1	0.0	0.0	0.8	0.1	0.0
Delay / Veh (s)	61.3	13.0	8.7	53.1	13.9	7.3	41.1	50.7	12.1	40.9	33.2	21.4
Stop Delay (hr)	0.1	0.3	0.0	0.3	0.5	0.1	0.1	0.0	0.0	0.7	0.1	0.0
Vehicles Entered	5	151	12	23	248	42	9	4	14	75	8	2
Vehicles Exited	4	152	12	23	247	42	9	3	14	73	9	2
Hourly Exit Rate	16	608	48	92	988	168	36	12	56	292	36	8

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	3.2
Delay / Veh (s)	19.2
Stop Delay (hr)	2.2
Vehicles Entered	593
Vehicles Exited	590
Hourly Exit Rate	2360

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Total Network Performance

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Total Delay (hr)	15.2
Delay / Veh (s)	52.3
Stop Delay (hr)	10.7
Vehicles Entered	1046
Vehicles Exited	1040
Hourly Exit Rate	4160

Queuing and Blocking Report  
 Cumulative Option 3 PM

12/6/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	146	486	183	242	476	61	267	442	133	241
Average Queue (ft)	58	240	149	152	316	36	164	258	76	153
95th Queue (ft)	123	487	210	279	494	59	270	466	138	246
Link Distance (ft)		700			546	546		494		857
Upstream Blk Time (%)					0.01			0.01		
Queuing Penalty (veh)					2			0		
Storage Bay Dist (ft)	150		150	250			250		250	
Storage Blk Time (%)		0.12	0.10	0.00	0.12		0.02	0.08		0.01
Queuing Penalty (veh)		59	29	2	19		8	16		1

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	44	58	61	175	57	91	28
Average Queue (ft)	19	14	18	63	20	51	9
95th Queue (ft)	52	78	78	165	57	96	34
Link Distance (ft)		546	546	197	197	740	
Upstream Blk Time (%)				0.01			
Queuing Penalty (veh)				3			
Storage Bay Dist (ft)	100						100
Storage Blk Time (%)	0.00	0.00				0.02	
Queuing Penalty (veh)	0	0				0	

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	63	29	8	75
Average Queue (ft)	30	3	1	35
95th Queue (ft)	68	29	7	83
Link Distance (ft)		603	603	740
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	125			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	190	183	205	306	448	343	125	167	87	154
Average Queue (ft)	131	106	120	196	243	180	77	77	40	81
95th Queue (ft)	201	190	211	335	449	341	133	154	92	162
Link Distance (ft)		603	603		1153	1153		722		207
Upstream Blk Time (%)										0.00
Queuing Penalty (veh)										0
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)	0.02	0.00		0.04	0.01		0.02	0.02	0.00	0.04
Queuing Penalty (veh)	5	1		13	3		4	3	0	2

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	49	165	186	136	338	285	79	79	283	73
Average Queue (ft)	18	96	106	83	184	150	38	41	194	29
95th Queue (ft)	53	190	200	148	347	288	79	81	311	71
Link Distance (ft)		1153	1153		814	814		539		837
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.05		0.03	0.12		0.00	0.00	0.02	
Queuing Penalty (veh)		1		13	11		0	0	1	

Network Summary

Network wide Queuing Penalty: 197

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	1.1	0.3	0.3	0.7	0.0	0.6	0.6	0.2	0.7	1.0	0.2
Delay / Veh (s)	73.0	33.1	23.1	41.4	25.8	4.7	47.3	32.5	22.5	62.1	42.4	37.7
Stop Delay (hr)	0.2	0.8	0.3	0.2	0.5	0.0	0.5	0.5	0.2	0.6	0.8	0.2
Vehicles Entered	13	121	53	25	105	31	45	65	33	42	88	20
Vehicles Exited	13	121	54	23	101	30	49	64	33	41	86	19
Hourly Exit Rate	52	484	216	92	404	120	196	256	132	164	344	76

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.1
Delay / Veh (s)	34.7
Stop Delay (hr)	4.9
Vehicles Entered	641
Vehicles Exited	634
Hourly Exit Rate	2536

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	27.6	7.3	4.7	24.0	8.2	4.8	29.3	23.7	5.2	21.8	20.3	5.7
Stop Delay (hr)	0.1	0.2	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Vehicles Entered	8	178	10	4	140	6	9	3	10	34	3	18
Vehicles Exited	8	176	10	4	138	6	9	3	10	34	3	17
Hourly Exit Rate	32	704	40	16	552	24	36	12	40	136	12	68

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	1.1
Delay / Veh (s)	9.8
Stop Delay (hr)	0.7
Vehicles Entered	423
Vehicles Exited	418
Hourly Exit Rate	1672

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.6	0.1	0.2	0.4	0.1	0.2	0.0	0.1	0.1	0.0	0.0
Delay / Veh (s)	25.0	13.0	11.0	25.3	13.6	8.5	28.4	27.8	7.4	32.1	20.1	4.4
Stop Delay (hr)	0.2	0.4	0.0	0.2	0.3	0.0	0.1	0.0	0.1	0.1	0.0	0.0
Vehicles Entered	40	158	22	28	117	26	22	4	44	11	2	15
Vehicles Exited	39	158	22	27	115	26	21	4	45	11	2	15
Hourly Exit Rate	156	632	88	108	460	104	84	16	180	44	8	60

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	2.0
Delay / Veh (s)	14.9
Stop Delay (hr)	1.5
Vehicles Entered	489
Vehicles Exited	485
Hourly Exit Rate	1940

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.5	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	31.4	8.6	5.5	29.9	6.1	2.8	30.1	20.5	7.1	24.2	20.6	5.1
Stop Delay (hr)	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Vehicles Entered	3	203	6	7	151	64	4	3	17	23	3	19
Vehicles Exited	3	203	6	7	149	63	4	3	17	23	3	18
Hourly Exit Rate	12	812	24	28	596	252	16	12	68	92	12	72

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.2
Delay / Veh (s)	8.3
Stop Delay (hr)	0.7
Vehicles Entered	503
Vehicles Exited	499
Hourly Exit Rate	1996

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Total Network Performance

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Total Delay (hr)	10.8
Delay / Veh (s)	41.6
Stop Delay (hr)	7.8
Vehicles Entered	947
Vehicles Exited	922
Hourly Exit Rate	3688

Queuing and Blocking Report  
 Cumulative Option 4 AM

12/14/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	120	383	182	211	351	66	242	408	234	423
Average Queue (ft)	65	207	152	92	214	37	158	211	136	280
95th Queue (ft)	133	397	211	198	380	73	269	383	242	448
Link Distance (ft)		700			862	862		494		857
Upstream Blk Time (%)								0.00		
Queuing Penalty (veh)								0		
Storage Bay Dist (ft)	150		150	250			250		250	
Storage Blk Time (%)		0.09	0.09		0.06		0.01	0.05	0.01	0.10
Queuing Penalty (veh)		46	26		6		5	8	3	16

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	58	164	142	36	167	112	68	57	125	73
Average Queue (ft)	27	79	72	14	94	46	33	30	66	38
95th Queue (ft)	58	172	151	41	190	109	72	58	122	71
Link Distance (ft)		862	862		550	550		212		775
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			100			100		150	
Storage Blk Time (%)		0.03			0.04		0.00		0.00	
Queuing Penalty (veh)		1			1		0		0	

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	146	194	206	119	163	142	94	131	76	48
Average Queue (ft)	88	109	119	61	98	74	53	61	36	31
95th Queue (ft)	157	200	210	119	168	139	96	123	77	49
Link Distance (ft)		550	550		1156	1156		722		448
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)	0.00	0.01					0.00	0.01	0.00	
Queuing Penalty (veh)	1	1					0	1	0	

Queuing and Blocking Report  
 Cumulative Option 4 AM

12/14/2005

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	46	170	177	44	118	119	41	62	99	74
Average Queue (ft)	15	92	97	23	68	55	17	40	61	37
95th Queue (ft)	51	182	193	53	134	119	48	64	106	78
Link Distance (ft)		1156	1156		868	868		513		970
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.04			0.01					
Queuing Penalty (veh)		0			0					

Network Summary

Network wide Queuing Penalty: 116

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.1	0.4	0.6	1.1	0.1	0.8	0.6	0.2	0.5	0.5	0.1
Delay / Veh (s)	58.6	33.3	23.3	56.4	31.5	5.5	51.6	34.8	24.9	52.3	34.2	27.3
Stop Delay (hr)	0.2	0.8	0.3	0.5	0.8	0.0	0.7	0.5	0.2	0.4	0.4	0.1
Vehicles Entered	13	125	54	38	122	38	54	61	31	30	56	18
Vehicles Exited	12	120	55	37	122	38	57	61	32	32	57	18
Hourly Exit Rate	48	480	220	148	488	152	228	244	128	128	228	72

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.1
Delay / Veh (s)	34.4
Stop Delay (hr)	4.9
Vehicles Entered	640
Vehicles Exited	641
Hourly Exit Rate	2564

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.6	0.1	0.2	0.6	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	42.7	14.1	10.5	42.2	12.2	6.3	41.4	35.7	8.4	40.5	28.9	6.0
Stop Delay (hr)	0.1	0.4	0.0	0.2	0.3	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Vehicles Entered	12	155	20	20	175	28	12	4	21	19	2	13
Vehicles Exited	12	152	20	20	172	28	12	4	21	19	2	13
Hourly Exit Rate	48	608	80	80	688	112	48	16	84	76	8	52

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	2.1
Delay / Veh (s)	16.2
Stop Delay (hr)	1.6
Vehicles Entered	481
Vehicles Exited	475
Hourly Exit Rate	1900

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.5	0.1	0.7	0.7	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Delay / Veh (s)	36.5	17.0	12.3	42.2	15.4	9.5	43.0	31.1	11.7	42.1	40.4	12.6
Stop Delay (hr)	0.4	0.4	0.1	0.5	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Vehicles Entered	49	117	25	56	163	37	15	10	34	10	9	35
Vehicles Exited	49	116	25	56	163	38	16	10	35	10	8	34
Hourly Exit Rate	196	464	100	224	652	152	64	40	140	40	32	136

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	3.3
Delay / Veh (s)	21.2
Stop Delay (hr)	2.5
Vehicles Entered	560
Vehicles Exited	560
Hourly Exit Rate	2240

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.0	0.3	0.9	0.1	0.1	0.0	0.0	0.8	0.1	0.0
Delay / Veh (s)	40.7	18.0	14.3	48.2	12.9	7.9	42.1	36.9	6.1	40.1	30.2	20.1
Stop Delay (hr)	0.0	0.5	0.0	0.3	0.5	0.1	0.1	0.0	0.0	0.7	0.1	0.0
Vehicles Entered	5	142	12	22	243	41	5	3	14	73	8	1
Vehicles Exited	5	141	11	23	239	41	5	3	15	75	9	1
Hourly Exit Rate	20	564	44	92	956	164	20	12	60	300	36	4

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	3.1
Delay / Veh (s)	19.6
Stop Delay (hr)	2.2
Vehicles Entered	569
Vehicles Exited	568
Hourly Exit Rate	2272

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Total Network Performance

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Total Delay (hr)	15.0
Delay / Veh (s)	51.2
Stop Delay (hr)	11.2
Vehicles Entered	1061
Vehicles Exited	1053
Hourly Exit Rate	4212

Queuing and Blocking Report  
 Cumulative Option 4 PM

12/6/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	123	435	180	256	454	81	260	344	163	270
Average Queue (ft)	55	214	145	140	283	46	162	213	100	170
95th Queue (ft)	119	449	212	255	521	86	265	373	174	295
Link Distance (ft)		700			862	862		494		857
Upstream Blk Time (%)		0.00						0.00		
Queuing Penalty (veh)		0						0		
Storage Bay Dist (ft)	150		150	250			250		250	
Storage Blk Time (%)	0.00	0.11	0.07	0.00	0.12		0.03	0.04		0.02
Queuing Penalty (veh)	0	55	21	1	19		11	9		2

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	118	204	191	110	290	186	80	85	109	51
Average Queue (ft)	55	133	114	67	150	90	41	50	63	33
95th Queue (ft)	120	226	212	118	295	185	83	90	113	64
Link Distance (ft)		862	862		550	550		212		775
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			100			100		150	
Storage Blk Time (%)	0.02	0.14		0.02	0.12		0.00	0.01	0.00	
Queuing Penalty (veh)	5	8		9	9		0	0	0	

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	203	209	215	243	222	210	107	170	61	173
Average Queue (ft)	141	113	122	158	126	106	54	78	31	76
95th Queue (ft)	214	211	222	256	230	208	114	171	66	163
Link Distance (ft)		550	550		1156	1156		722		448
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			300			125		125	
Storage Blk Time (%)	0.02	0.01			0.00		0.01	0.04		0.03
Queuing Penalty (veh)	5	2			0		1	2		1

Queuing and Blocking Report  
 Cumulative Option 4 PM

12/6/2005

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	73	208	206	144	285	244	53	62	300	133
Average Queue (ft)	23	132	136	84	166	138	22	36	191	48
95th Queue (ft)	68	232	232	147	283	251	57	63	317	184
Link Distance (ft)		1156	1156		868	868		513		970
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.13		0.01	0.10				0.02	
Queuing Penalty (veh)		3		6	9				1	

Network Summary

Network wide Queuing Penalty: 182

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.5	0.5	0.3	0.6	0.0	0.7	0.5	0.2	0.4	1.1	0.2
Delay / Veh (s)	68.0	47.1	33.7	57.9	22.4	6.6	54.6	29.7	19.9	54.7	41.9	34.4
Stop Delay (hr)	0.2	1.1	0.4	0.3	0.5	0.0	0.6	0.4	0.1	0.4	0.8	0.2
Vehicles Entered	10	115	57	21	96	23	45	61	31	29	96	20
Vehicles Exited	10	112	55	18	95	23	43	60	32	28	95	21
Hourly Exit Rate	40	448	220	72	380	92	172	240	128	112	380	84

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.2
Delay / Veh (s)	37.4
Stop Delay (hr)	4.9
Vehicles Entered	604
Vehicles Exited	592
Hourly Exit Rate	2368

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.1	0.0	0.0	0.0	0.6
Delay / Veh (s)	6.0	7.7	3.8	3.4	4.6	3.7	5.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	3	168	141	15	29	7	363
Vehicles Exited	3	167	139	16	29	7	361
Hourly Exit Rate	12	668	556	64	116	28	1444

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	4.3	5.0	4.2	5.4	5.8	4.7	5.6	4.2	4.8	4.6	5.0	5.0
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	6	183	7	6	136	7	8	4	11	16	2	21
Vehicles Exited	6	185	7	6	135	8	8	4	11	15	3	20
Hourly Exit Rate	24	740	28	24	540	32	32	16	44	60	12	80

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	5.2
Stop Delay (hr)	0.1
Vehicles Entered	407
Vehicles Exited	408
Hourly Exit Rate	1632

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.1	0.1	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Delay / Veh (s)	9.2	10.1	10.0	8.2	10.2	4.0	8.7	9.2	8.9	5.3	6.9	5.3
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Vehicles Entered	36	149	26	29	115	30	18	8	48	14	3	14
Vehicles Exited	37	149	25	29	116	30	19	8	48	14	3	14
Hourly Exit Rate	148	596	100	116	464	120	76	32	192	56	12	56

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	1.2
Delay / Veh (s)	9.1
Stop Delay (hr)	0.3
Vehicles Entered	490
Vehicles Exited	492
Hourly Exit Rate	1968

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.6	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Delay / Veh (s)	27.0	11.1	10.6	47.5	5.5	2.1	35.0	26.7	6.4	34.7	34.0	5.0
Stop Delay (hr)	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Vehicles Entered	3	203	5	9	154	59	4	3	15	27	2	18
Vehicles Exited	3	200	5	10	151	58	4	3	15	28	2	18
Hourly Exit Rate	12	800	20	40	604	232	16	12	60	112	8	72

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.4
Delay / Veh (s)	10.4
Stop Delay (hr)	0.9
Vehicles Entered	502
Vehicles Exited	497
Hourly Exit Rate	1988

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Total Network Performance

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Total Delay (hr)	10.4
Delay / Veh (s)	39.4
Stop Delay (hr)	6.2
Vehicles Entered	958
Vehicles Exited	946
Hourly Exit Rate	3784

Queuing and Blocking Report  
 Cumulative Option 5 AM

12/15/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	114	684	179	184	311	131	210	336	168	472
Average Queue (ft)	56	404	116	86	185	49	127	185	91	301
95th Queue (ft)	146	802	210	204	326	130	220	332	178	517
Link Distance (ft)		1492			508			493		857
Upstream Blk Time (%)								0.00		
Queuing Penalty (veh)								0		
Storage Bay Dist (ft)	150		150	250		150	250		250	
Storage Blk Time (%)		0.31	0.01	0.00	0.12		0.02	0.02		0.13
Queuing Penalty (veh)		88	6	0	24		6	3		15

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	ULT	UTR	ULR
Maximum Queue (ft)	94	25	64
Average Queue (ft)	43	4	33
95th Queue (ft)	92	32	55
Link Distance (ft)	508	170	711
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	94	56	63	65
Average Queue (ft)	41	18	36	35
95th Queue (ft)	85	56	67	74
Link Distance (ft)	170	478	184	748
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report  
 Cumulative Option 5 AM

12/15/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULT	ULTR	ULTR
Maximum Queue (ft)	226	156	110	52
Average Queue (ft)	119	73	63	26
95th Queue (ft)	231	145	109	58
Link Distance (ft)	478	1116	698	410
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	57	368	68	117	81	40	58	113	64
Average Queue (ft)	14	191	35	69	41	14	35	77	35
95th Queue (ft)	57	365	88	136	79	43	69	132	71
Link Distance (ft)		1116		868	868		514		970
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100		125			125		300	
Storage Blk Time (%)		0.11	0.00	0.01					
Queuing Penalty (veh)		1	0	0					

Network Summary

Network wide Queuing Penalty: 143

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.3	0.4	0.6	0.6	0.1	0.8	0.5	0.2	0.5	0.6	0.2
Delay / Veh (s)	68.1	41.8	26.8	52.0	19.8	6.6	55.2	31.2	23.7	61.6	42.9	33.4
Stop Delay (hr)	0.2	1.0	0.3	0.5	0.5	0.0	0.7	0.4	0.2	0.4	0.5	0.2
Vehicles Entered	10	114	56	40	116	28	50	56	33	28	50	23
Vehicles Exited	11	114	56	39	114	28	50	56	33	26	51	22
Hourly Exit Rate	44	456	224	156	456	112	200	224	132	104	204	88

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.0
Delay / Veh (s)	35.6
Stop Delay (hr)	4.8
Vehicles Entered	604
Vehicles Exited	600
Hourly Exit Rate	2400

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.2	0.0	0.0	0.0	0.6
Delay / Veh (s)	5.3	7.5	4.5	3.9	5.0	4.4	5.8
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	3	170	181	25	15	3	397
Vehicles Exited	3	170	182	25	15	3	398
Hourly Exit Rate	12	680	728	100	60	12	1592

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	4.8	5.5	4.7	6.6	7.7	7.3	4.3	2.6	4.6	6.7	6.4	5.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	11	155	19	16	175	21	12	3	19	7	3	14
Vehicles Exited	11	155	19	16	174	21	12	3	19	8	3	14
Hourly Exit Rate	44	620	76	64	696	84	48	12	76	32	12	56

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	0.8
Delay / Veh (s)	6.3
Stop Delay (hr)	0.1
Vehicles Entered	455
Vehicles Exited	455
Hourly Exit Rate	1820

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.1	0.8	2.2	0.1	0.0	0.0	0.1	0.0	0.0	0.1
Delay / Veh (s)	11.4	11.2	9.7	50.1	47.6	9.4	7.9	8.2	8.1	7.9	12.9	10.4
Stop Delay (hr)	0.0	0.1	0.0	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	40	119	27	61	171	39	15	12	35	9	7	35
Vehicles Exited	39	117	27	57	162	38	15	12	34	9	7	35
Hourly Exit Rate	156	468	108	228	648	152	60	48	136	36	28	140

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	4.0
Delay / Veh (s)	25.4
Stop Delay (hr)	2.1
Vehicles Entered	570
Vehicles Exited	552
Hourly Exit Rate	2208

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.0	0.3	1.0	0.1	0.1	0.0	0.0	0.6	0.1	0.0
Delay / Veh (s)	42.8	16.3	11.9	37.6	15.0	7.0	26.7	43.1	7.8	28.0	27.1	9.6
Stop Delay (hr)	0.0	0.4	0.0	0.2	0.4	0.0	0.1	0.0	0.0	0.5	0.1	0.0
Vehicles Entered	5	143	10	26	247	37	8	2	19	74	10	3
Vehicles Exited	5	144	11	25	247	38	8	2	18	72	10	3
Hourly Exit Rate	20	576	44	100	988	152	32	8	72	288	40	12

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	2.9
Delay / Veh (s)	17.9
Stop Delay (hr)	1.8
Vehicles Entered	584
Vehicles Exited	583
Hourly Exit Rate	2332

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Total Network Performance

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Total Delay (hr)	14.7
Delay / Veh (s)	50.3
Stop Delay (hr)	9.0
Vehicles Entered	1060
Vehicles Exited	1036
Hourly Exit Rate	4144

Queuing and Blocking Report  
 Cumulative Option 5 PM

12/15/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	111	534	179	202	360	153	231	325	184	322
Average Queue (ft)	51	359	103	135	219	49	149	191	104	188
95th Queue (ft)	112	601	207	223	358	132	261	358	205	333
Link Distance (ft)		700			508			493		857
Upstream Blk Time (%)		0.02						0.01		
Queuing Penalty (veh)		0						0		
Storage Bay Dist (ft)	150		150	250		150	250		250	
Storage Blk Time (%)		0.28	0.00	0.00	0.14	0.00	0.04	0.01		0.06
Queuing Penalty (veh)		78	1	0	39	0	14	3		6

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	ULT	UTR	ULR
Maximum Queue (ft)	77	33	43
Average Queue (ft)	28	8	24
95th Queue (ft)	82	34	53
Link Distance (ft)	508	170	711
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	146	97	76	74
Average Queue (ft)	70	57	37	35
95th Queue (ft)	159	107	76	81
Link Distance (ft)	170	478	184	748
Upstream Blk Time (%)	0.00			
Queuing Penalty (veh)	3			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report  
 Cumulative Option 5 PM

12/15/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	WB	WB	NB	SB
Directions Served	ULTR	ULT	R	ULTR	ULTR
Maximum Queue (ft)	226	790	729	116	132
Average Queue (ft)	127	510	302	58	55
95th Queue (ft)	242	965	882	120	120
Link Distance (ft)	478	1116	1116	698	410
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	67	314	126	277	226	58	71	213	83
Average Queue (ft)	25	204	71	185	129	25	38	134	33
95th Queue (ft)	68	328	128	287	241	61	73	216	85
Link Distance (ft)		1116		1381	1381		514		969
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100		125			125		300	
Storage Blk Time (%)	0.00	0.21	0.00	0.11			0.00	0.00	
Queuing Penalty (veh)	0	4	1	10			0	0	

Network Summary

Network wide Queuing Penalty: 158

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	2.0	0.8	0.6	0.5	0.0	0.7	0.5	0.2	0.3	1.1	0.2
Delay / Veh (s)	86.9	61.6	43.9	81.8	21.5	6.1	54.4	30.2	20.5	48.2	42.5	33.9
Stop Delay (hr)	0.3	1.5	0.6	0.6	0.4	0.0	0.6	0.4	0.2	0.3	0.9	0.1
Vehicles Entered	13	117	68	28	83	22	48	58	34	25	93	18
Vehicles Exited	13	110	64	25	83	23	47	58	34	25	95	16
Hourly Exit Rate	52	440	256	100	332	92	188	232	136	100	380	64

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	7.2
Delay / Veh (s)	43.1
Stop Delay (hr)	5.7
Vehicles Entered	607
Vehicles Exited	593
Hourly Exit Rate	2372

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.1	0.0	0.0	0.0	0.6
Delay / Veh (s)	8.2	7.9	3.6	3.2	4.4	4.8	5.7
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	1	168	133	17	29	5	353
Vehicles Exited	1	167	134	17	30	5	354
Hourly Exit Rate	4	668	536	68	120	20	1416

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	4.7	5.1	4.6	4.7	5.4	5.5	4.5	7.5	4.4	4.5	5.0	4.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	7	182	9	3	137	5	8	2	6	19	4	13
Vehicles Exited	7	182	9	3	137	5	8	2	6	18	4	13
Hourly Exit Rate	28	728	36	12	548	20	32	8	24	72	16	52

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	5.1
Stop Delay (hr)	0.1
Vehicles Entered	395
Vehicles Exited	394
Hourly Exit Rate	1576

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.1	0.1	0.3	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Delay / Veh (s)	8.5	9.0	8.6	7.5	8.6	8.3	9.1	8.2	9.7	4.6	7.4	4.0
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Vehicles Entered	39	144	23	29	111	24	18	6	45	10	2	13
Vehicles Exited	38	141	23	29	112	25	18	6	46	10	2	14
Hourly Exit Rate	152	564	92	116	448	100	72	24	184	40	8	56

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	1.1
Delay / Veh (s)	8.5
Stop Delay (hr)	0.3
Vehicles Entered	464
Vehicles Exited	464
Hourly Exit Rate	1856

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.5	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Delay / Veh (s)	8.4	9.2	7.9	5.9	8.8	3.0	5.9	6.2	5.4	6.7	8.6	5.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	2	191	3	7	143	61	7	3	15	26	2	14
Vehicles Exited	2	194	4	6	144	61	7	3	15	26	2	14
Hourly Exit Rate	8	776	16	24	576	244	28	12	60	104	8	56

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.0
Delay / Veh (s)	7.8
Stop Delay (hr)	0.1
Vehicles Entered	474
Vehicles Exited	478
Hourly Exit Rate	1912

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Total Network Performance

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Total Delay (hr)	10.8
Delay / Veh (s)	41.9
Stop Delay (hr)	6.2
Vehicles Entered	931
Vehicles Exited	922
Hourly Exit Rate	3688

Queuing and Blocking Report  
 Cumulative Option 6 AM

12/6/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	116	871	185	195	319	134	218	289	232	406
Average Queue (ft)	66	520	117	108	163	44	141	163	91	285
95th Queue (ft)	142	1007	215	209	298	118	229	310	200	427
Link Distance (ft)		1633			508			493		857
Upstream Blk Time (%)								0.00		
Queuing Penalty (veh)								0		
Storage Bay Dist (ft)	150		150	200		150	250		250	
Storage Blk Time (%)	0.02	0.38	0.02	0.06	0.08		0.00	0.03		0.14
Queuing Penalty (veh)	11	109	13	28	15		0	5		17

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	ULT	UTR	ULR
Maximum Queue (ft)	106	26	60
Average Queue (ft)	43	4	31
95th Queue (ft)	100	25	65
Link Distance (ft)	508	170	711
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	116	65	49	71
Average Queue (ft)	50	20	18	33
95th Queue (ft)	113	62	51	70
Link Distance (ft)	170	476	184	748
Upstream Blk Time (%)	0.00			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	200	138	124	46
Average Queue (ft)	103	71	70	28
95th Queue (ft)	199	135	126	54
Link Distance (ft)	476	1083	698	424
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Grant Ave & North Main St

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULT	ULTR	ULTR
Maximum Queue (ft)	93	58	56	61
Average Queue (ft)	50	20	36	32
95th Queue (ft)	96	61	62	61
Link Distance (ft)	1083	818	485	927
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 198

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.9	0.6	0.6	0.8	0.1	0.7	0.6	0.3	0.5	0.8	0.2
Delay / Veh (s)	91.9	55.3	36.8	63.3	25.5	10.0	54.8	38.7	32.1	71.9	47.3	37.5
Stop Delay (hr)	0.2	1.5	0.4	0.6	0.6	0.1	0.7	0.5	0.2	0.5	0.6	0.2
Vehicles Entered	9	124	54	37	117	33	50	60	29	27	59	21
Vehicles Exited	7	120	53	34	114	32	49	60	30	26	61	19
Hourly Exit Rate	28	480	212	136	456	128	196	240	120	104	244	76

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	7.3
Delay / Veh (s)	43.0
Stop Delay (hr)	6.0
Vehicles Entered	620
Vehicles Exited	605
Hourly Exit Rate	2420

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.3	0.0	0.0	0.0	0.7
Delay / Veh (s)	6.7	7.9	5.5	5.7	4.6	6.0	6.5
Stop Delay (hr)	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Vehicles Entered	2	174	185	19	16	3	399
Vehicles Exited	2	176	183	20	15	3	399
Hourly Exit Rate	8	704	732	80	60	12	1596

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	5.4	5.5	4.5	6.9	7.4	6.4	7.3	4.8	6.4	5.6	5.5	4.7
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	11	164	15	15	169	18	14	1	23	8	2	14
Vehicles Exited	11	163	15	14	169	18	13	1	23	8	2	13
Hourly Exit Rate	44	652	60	56	676	72	52	4	92	32	8	52

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	0.8
Delay / Veh (s)	6.3
Stop Delay (hr)	0.1
Vehicles Entered	454
Vehicles Exited	450
Hourly Exit Rate	1800

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.1	0.6	1.9	0.4	0.0	0.0	0.1	0.0	0.0	0.1
Delay / Veh (s)	10.1	11.1	11.0	41.7	44.2	42.3	8.8	9.3	6.9	7.6	8.0	7.7
Stop Delay (hr)	0.0	0.1	0.0	0.4	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	51	119	26	56	157	34	12	10	36	10	7	38
Vehicles Exited	51	119	26	55	154	35	11	10	35	10	6	37
Hourly Exit Rate	204	476	104	220	616	140	44	40	140	40	24	148

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	3.8
Delay / Veh (s)	24.7
Stop Delay (hr)	1.9
Vehicles Entered	556
Vehicles Exited	549
Hourly Exit Rate	2196

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.3	0.0	0.3	3.7	0.1	0.0	0.0	0.0	3.0	0.4	0.1
Delay / Veh (s)	8.2	8.6	7.6	54.6	56.2	9.0	5.0	4.7	5.4	152.4	135.7	145.9
Stop Delay (hr)	0.0	0.0	0.0	0.2	2.1	0.0	0.0	0.0	0.0	2.9	0.4	0.1
Vehicles Entered	6	145	12	22	244	44	10	4	16	77	11	3
Vehicles Exited	6	145	13	21	229	42	10	4	16	64	9	2
Hourly Exit Rate	24	580	52	84	916	168	40	16	64	256	36	8

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	8.0
Delay / Veh (s)	50.1
Stop Delay (hr)	5.8
Vehicles Entered	594
Vehicles Exited	561
Hourly Exit Rate	2244

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Total Network Performance

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Total Delay (hr)	21.1
Delay / Veh (s)	72.7
Stop Delay (hr)	14.1
Vehicles Entered	1075
Vehicles Exited	1013
Hourly Exit Rate	4052

Queuing and Blocking Report  
 Cumulative Option 6 PM

12/6/2005

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	116	646	179	210	498	150	223	315	180	329
Average Queue (ft)	40	488	107	138	291	61	142	209	96	211
95th Queue (ft)	113	765	217	227	534	170	234	317	195	343
Link Distance (ft)		700			508			493		857
Upstream Blk Time (%)		0.05			0.02					
Queuing Penalty (veh)		0			17					
Storage Bay Dist (ft)	150		150	200		150	250		250	
Storage Blk Time (%)		0.38	0.01	0.02	0.20		0.01	0.05	0.00	0.05
Queuing Penalty (veh)		104	3	11	57		2	10	1	5

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	ULT	UTR	ULR
Maximum Queue (ft)	83	68	40
Average Queue (ft)	37	11	26
95th Queue (ft)	88	78	52
Link Distance (ft)	508	170	711
Upstream Blk Time (%)		0.01	
Queuing Penalty (veh)		5	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	131	90	75	50
Average Queue (ft)	66	41	42	28
95th Queue (ft)	135	89	76	58
Link Distance (ft)	170	476	329	748
Upstream Blk Time (%)	0.00			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report  
 Cumulative Option 6 PM

12/6/2005

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	249	746	98	96
Average Queue (ft)	135	452	55	52
95th Queue (ft)	241	987	100	92
Link Distance (ft)	476	1083	698	424
Upstream Blk Time (%)		0.01		
Queuing Penalty (veh)		13		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Grant Ave & North Main St

Movement	EB	WB	WB	NB	SB
Directions Served	ULTR	ULT	R	ULTR	ULTR
Maximum Queue (ft)	97	944	649	60	715
Average Queue (ft)	53	594	327	36	445
95th Queue (ft)	87	1214	1035	67	853
Link Distance (ft)	1083	1632	1632	485	927
Upstream Blk Time (%)					0.04
Queuing Penalty (veh)					0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 231

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.8	0.6	0.3	0.7	0.1	0.6	0.5	0.2	0.5	1.2	0.2
Delay / Veh (s)	73.7	57.5	40.6	53.5	25.5	8.2	50.9	32.5	26.5	60.7	48.4	39.0
Stop Delay (hr)	0.2	1.4	0.4	0.3	0.5	0.0	0.5	0.4	0.2	0.4	1.0	0.2
Vehicles Entered	9	116	53	20	99	23	44	59	30	28	93	19
Vehicles Exited	9	115	53	19	98	23	44	58	31	27	90	20
Hourly Exit Rate	36	460	212	76	392	92	176	232	124	108	360	80

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	6.9
Delay / Veh (s)	42.4
Stop Delay (hr)	5.5
Vehicles Entered	593
Vehicles Exited	587
Hourly Exit Rate	2348

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.2	0.0	0.0	0.0	0.6
Delay / Veh (s)	6.4	7.9	4.2	3.6	4.5	4.1	5.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	3	171	142	17	26	7	366
Vehicles Exited	3	170	142	17	26	7	365
Hourly Exit Rate	12	680	568	68	104	28	1460

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	4.9	5.4	4.8	6.1	7.0	6.1	5.6	7.2	5.6	6.1	6.0	5.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	6	183	6	6	138	6	8	3	11	16	3	20
Vehicles Exited	6	185	6	6	139	6	8	3	11	17	3	20
Hourly Exit Rate	24	740	24	24	556	24	32	12	44	68	12	80

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	0.7
Delay / Veh (s)	6.0
Stop Delay (hr)	0.1
Vehicles Entered	406
Vehicles Exited	410
Hourly Exit Rate	1640

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.5	0.0	0.2	0.6	0.0	0.1	0.0	0.1	0.1	0.0	0.0
Delay / Veh (s)	30.9	12.1	7.1	27.7	18.0	4.9	27.0	25.7	9.6	34.9	34.1	9.2
Stop Delay (hr)	0.3	0.3	0.0	0.2	0.4	0.0	0.1	0.0	0.1	0.1	0.0	0.0
Vehicles Entered	37	150	26	26	115	29	21	7	44	12	5	16
Vehicles Exited	37	150	25	26	114	29	20	7	45	11	5	16
Hourly Exit Rate	148	600	100	104	456	116	80	28	180	44	20	64

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	2.2
Delay / Veh (s)	16.2
Stop Delay (hr)	1.6
Vehicles Entered	488
Vehicles Exited	485
Hourly Exit Rate	1940

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.4	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Delay / Veh (s)	23.7	7.6	4.9	24.0	6.2	2.5	32.6	11.6	5.1	21.6	13.2	3.5
Stop Delay (hr)	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Vehicles Entered	4	197	6	7	149	60	6	4	16	26	3	17
Vehicles Exited	4	195	6	8	147	60	5	4	16	26	3	17
Hourly Exit Rate	16	780	24	32	588	240	20	16	64	104	12	68

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	1.1
Delay / Veh (s)	7.7
Stop Delay (hr)	0.6
Vehicles Entered	495
Vehicles Exited	491
Hourly Exit Rate	1964

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Total Network Performance

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Total Delay (hr)	11.9
Delay / Veh (s)	45.5
Stop Delay (hr)	7.9
Vehicles Entered	942
Vehicles Exited	934
Hourly Exit Rate	3736

Queuing and Blocking Report  
 Cumulative Option 7 AM

1/4/2006

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	111	822	182	178	393	159	211	325	163	546
Average Queue (ft)	48	505	97	79	223	48	140	190	85	328
95th Queue (ft)	113	996	194	168	414	132	246	364	160	582
Link Distance (ft)		1492			508			493		857
Upstream Blk Time (%)					0.00			0.00		
Queuing Penalty (veh)					3			0		
Storage Bay Dist (ft)	150		150	200		150	250		250	
Storage Blk Time (%)		0.37	0.00	0.01	0.15			0.05		0.19
Queuing Penalty (veh)		105	1	5	28			9		22

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	ULT	UTR	ULR
Maximum Queue (ft)	101	44	45
Average Queue (ft)	43	10	28
95th Queue (ft)	94	43	52
Link Distance (ft)	508	172	711
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	164	100	52	65
Average Queue (ft)	66	33	31	40
95th Queue (ft)	161	99	65	75
Link Distance (ft)	172	512	184	748
Upstream Blk Time (%)	0.00			
Queuing Penalty (veh)	3			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report  
 Cumulative Option 7 AM

1/4/2006

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	167	177	164	121	301	54	83	152	71	72
Average Queue (ft)	99	108	97	63	166	34	46	70	31	42
95th Queue (ft)	178	177	169	119	301	66	80	151	62	79
Link Distance (ft)		512			1156	1156		722		448
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		200	300			150		150	
Storage Blk Time (%)	0.01	0.00	0.00		0.01			0.01		
Queuing Penalty (veh)	4	2	1		1			1		

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	42	146	157	46	129	76	48	48	98	67
Average Queue (ft)	12	79	81	24	76	41	21	32	57	35
95th Queue (ft)	42	145	159	55	143	79	58	55	103	66
Link Distance (ft)		1156	1156		868	868		513		970
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)		0.03			0.01					
Queuing Penalty (veh)		0			0					

Network Summary

Network wide Queuing Penalty: 185

1: Grant Ave & Railroad Ave. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	1.4	0.4	0.7	0.8	0.1	1.0	0.7	0.3	0.5	0.8	0.2
Delay / Veh (s)	80.5	44.2	28.3	62.8	25.3	12.8	69.3	45.7	35.9	71.6	59.1	41.9
Stop Delay (hr)	0.2	1.1	0.3	0.7	0.7	0.1	0.9	0.6	0.3	0.5	0.7	0.2
Vehicles Entered	11	113	58	42	119	29	55	59	33	27	48	22
Vehicles Exited	11	118	56	42	121	29	54	56	32	24	45	20
Hourly Exit Rate	44	472	224	168	484	116	216	224	128	96	180	80

1: Grant Ave & Railroad Ave. Performance by movement

Movement	All
Total Delay (hr)	7.4
Delay / Veh (s)	43.5
Stop Delay (hr)	6.1
Vehicles Entered	616
Vehicles Exited	608
Hourly Exit Rate	2432

2: Grant Ave & Dutton St. Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.3	0.0	0.0	0.0	0.7
Delay / Veh (s)	6.0	7.7	5.0	4.6	6.5	4.5	6.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vehicles Entered	2	173	185	20	15	3	398
Vehicles Exited	2	168	186	21	15	3	395
Hourly Exit Rate	8	672	744	84	60	12	1580

3: Grant Ave & Walnut Ln. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.2	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	5.1	5.5	4.9	9.3	10.3	9.3	4.3	4.5	4.3	6.4	11.2	8.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles Entered	11	156	17	17	174	24	13	3	16	6	3	11
Vehicles Exited	11	155	17	16	174	24	13	3	16	6	3	11
Hourly Exit Rate	44	620	68	64	696	96	52	12	64	24	12	44

3: Grant Ave & Walnut Ln. Performance by movement

Movement	All
Total Delay (hr)	1.0
Delay / Veh (s)	7.7
Stop Delay (hr)	0.1
Vehicles Entered	451
Vehicles Exited	449
Hourly Exit Rate	1796

4: Grant Ave & Morgan St. Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.6	0.1	1.0	1.6	0.1	0.2	0.1	0.1	0.2	0.1	0.2
Delay / Veh (s)	45.7	17.4	11.6	54.6	33.0	7.0	58.9	38.5	16.9	52.1	39.3	22.3
Stop Delay (hr)	0.5	0.4	0.1	0.7	0.9	0.0	0.2	0.1	0.1	0.1	0.1	0.2
Vehicles Entered	40	113	26	68	172	43	14	11	32	11	7	35
Vehicles Exited	40	114	27	64	166	42	14	11	32	11	7	34
Hourly Exit Rate	160	456	108	256	664	168	56	44	128	44	28	136

4: Grant Ave & Morgan St. Performance by movement

Movement	All
Total Delay (hr)	4.7
Delay / Veh (s)	30.0
Stop Delay (hr)	3.4
Vehicles Entered	572
Vehicles Exited	562
Hourly Exit Rate	2248

5: Grant Ave & North Main St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.5	0.0	0.3	1.4	0.1	0.1	0.0	0.0	0.6	0.1	0.0
Delay / Veh (s)	59.2	13.4	11.5	49.8	19.8	8.7	37.9	42.4	8.6	30.6	36.6	12.5
Stop Delay (hr)	0.1	0.3	0.0	0.3	0.7	0.1	0.1	0.0	0.0	0.5	0.1	0.0
Vehicles Entered	6	141	11	26	258	40	9	2	17	75	9	3
Vehicles Exited	5	140	11	25	259	41	9	2	16	75	8	3
Hourly Exit Rate	20	560	44	100	1036	164	36	8	64	300	32	12

5: Grant Ave & North Main St Performance by movement

Movement	All
Total Delay (hr)	3.4
Delay / Veh (s)	20.6
Stop Delay (hr)	2.3
Vehicles Entered	597
Vehicles Exited	594
Hourly Exit Rate	2376

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Total Network Performance

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Total Delay (hr)	17.5
Delay / Veh (s)	59.6
Stop Delay (hr)	12.0
Vehicles Entered	1073
Vehicles Exited	1046
Hourly Exit Rate	4184

Queuing and Blocking Report  
 Cumulative Option 7 PM

1/6/2006

Intersection: 1: Grant Ave & Railroad Ave.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	154	674	155	215	518	149	263	454	239	376
Average Queue (ft)	61	421	110	158	301	53	193	284	112	212
95th Queue (ft)	138	729	223	235	564	154	286	493	221	407
Link Distance (ft)		1492			508			932		857
Upstream Blk Time (%)					0.02					
Queuing Penalty (veh)					18					
Storage Bay Dist (ft)	150		150	200		150	250		250	
Storage Blk Time (%)		0.32	0.00	0.02	0.21	0.00	0.06	0.07	0.00	0.07
Queuing Penalty (veh)		87	0	14	61	0	22	15	0	8

Intersection: 2: Grant Ave & Dutton St.

Movement	EB	WB	SB
Directions Served	ULT	UTR	ULR
Maximum Queue (ft)	76	62	57
Average Queue (ft)	34	16	30
95th Queue (ft)	92	74	61
Link Distance (ft)	508	172	711
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Grant Ave & Walnut Ln.

Movement	EB	WB	NB	SB
Directions Served	ULTR	ULTR	ULTR	ULTR
Maximum Queue (ft)	128	203	68	68
Average Queue (ft)	63	86	33	33
95th Queue (ft)	134	211	73	69
Link Distance (ft)	172	512	184	748
Upstream Blk Time (%)	0.00			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report  
 Cumulative Option 7 PM

1/6/2006

Intersection: 4: Grant Ave & Morgan St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	216	331	206	322	721	201	110	187	76	168
Average Queue (ft)	120	134	104	217	404	61	56	84	44	94
95th Queue (ft)	215	294	197	357	797	223	114	186	95	181
Link Distance (ft)		512			1156	1156		722		448
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		200	300			150		150	
Storage Blk Time (%)	0.03	0.01	0.01	0.04	0.11		0.00	0.04		0.02
Queuing Penalty (veh)	16	7	3	26	27		1	2		1

Intersection: 5: Grant Ave & North Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	76	194	204	153	481	283	68	78	237	54
Average Queue (ft)	29	106	109	87	294	164	31	40	161	34
95th Queue (ft)	78	211	225	153	501	318	69	77	256	68
Link Distance (ft)		1156	1156		868	868		513		970
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			125			125		300	
Storage Blk Time (%)	0.00	0.06		0.01	0.19		0.00	0.00	0.00	
Queuing Penalty (veh)	0	1		5	18		0	0	0	

Network Summary

Network wide Queuing Penalty: 335