

LAURELHURST NORTH NEIGHBORHOOD

TRANSPORTATION MANAGEMENT PLAN

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TABLE OF CONTENTS

INTRODUCTION.....	1
NEIGHBORHOOD TRAFFIC ISSUES	2
Issues Identified by Neighbors	2
Traffic Volumes	3
Traffic Speeds	5
Accident History.....	7
Proposed Changes at Villa Academy	8
TRAFFIC CALMING DEVICES	9
Traffic Circles.....	9
Chicanes	9
Speed Humps.....	10
Curb Bulbs.....	10
Choker	10
Traffic Diverters	10
Partial Street Closure.....	11
Speed Cushions	11
Petition and Approval Process	12
REGULATORY TRAFFIC CONTROL.....	14
Traffic Signals	14
Stop Signs.....	14
Crosswalks	15
RECOMMENDATIONS	16
Summary of Recommendations.....	22
BIBLIOGRAPHY	

FIGURES

Figure 1. Study Area	1
Figure 2. Hourly Traffic Volumes on 47th Avenue NE North of NE 50th Street - March 2002.....	4
Figure 3. Hourly Traffic Volumes on NE 50th Street East of 47th Avenue NE - March 2002	5
Figure 4. Recommended Transportation Improvements	25

TABLES

Table 1. Existing and Historic Traffic Volumes.....	4
Table 2. Vehicle Speeds	6
Table 3. Accident Records from City of Seattle - 1996 through 2001	7
Table 4. Summary of Neighborhood Traffic Control Devices	11
Table 5. Point Criteria for Traffic Circles	13
Table 6. Summary of Recommendations.....	23

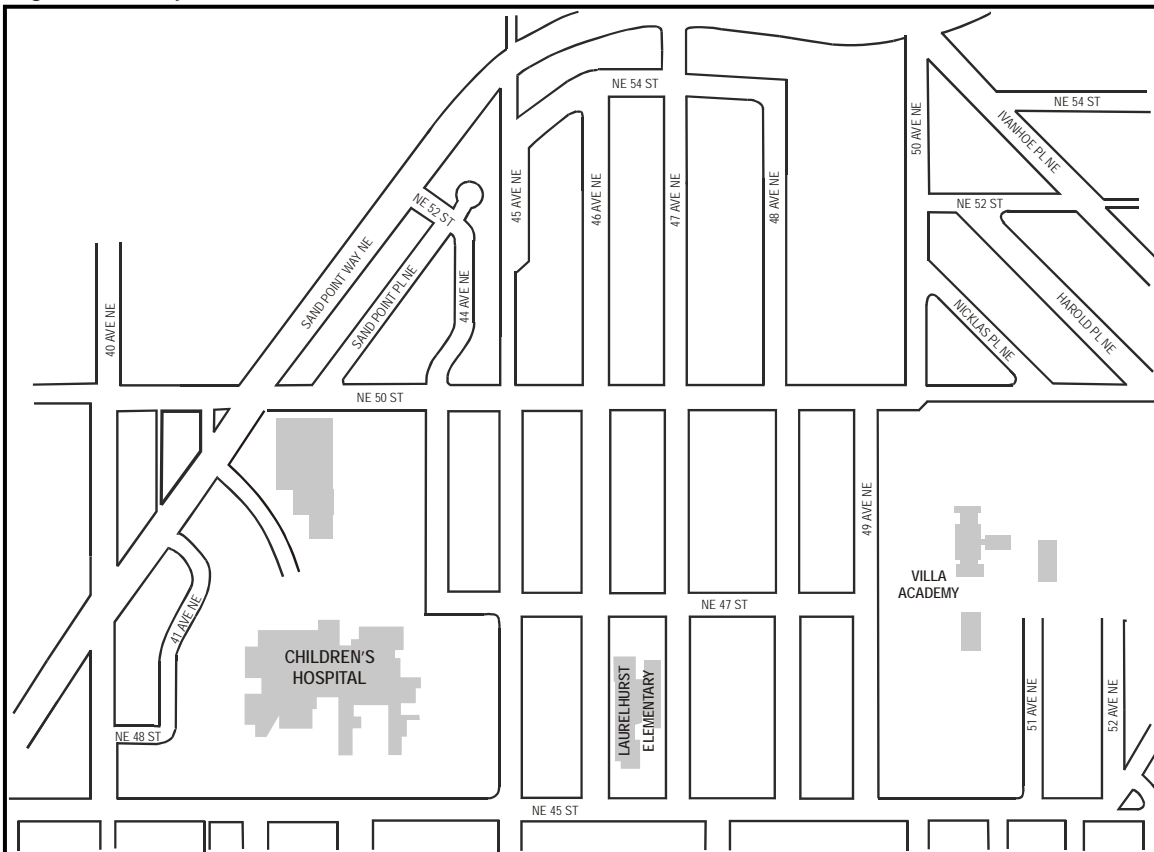
INTRODUCTION

The Laurelhurst Community Club commissioned this study to identify transportation improvements and traffic calming needs in the north part of the Laurelhurst neighborhood. Through the course of this study, Heffron Transportation worked with community members, met several times with the Laurelhurst Transportation Steering Committee, received input by e-mail, and coordinated potential improvement suggestions with Seattle Department of Transportation (SDOT, formerly called SeaTran) staff to develop the preliminary recommendations. These preliminary recommendations were then presented at a public meeting and to the City in late May 2002. The final recommendations were developed using input received from the community and the City. Most of the recommended improvements focus on traffic calming to reduce travel speeds on the neighborhood streets. Other measures are intended to improve the connection between the neighborhood and Sand Point Way.

The study area for this project is bounded by Sand Point Way on the west and north, 52nd Avenue NE on the east, and NE 45th Street on the south. Within the study area are Children's Hospital, Villa Academy, and Laurelhurst Elementary School. The study area is shown on Figure 1.

The following chapters of this report include *Neighborhood Traffic Issues*, which describes existing issues in the neighborhood; *Traffic Calming Devices*, which describes various measures and how they are used; *Regulatory Traffic Control*, which describes the requirements for traffic signals, stop signs, and crosswalks; and *Recommendations*, which presents Heffron Transportation's recommendations by location.

Figure 1. Study Area



NEIGHBORHOOD TRAFFIC ISSUES

Issues Identified by Neighbors

The Laurelhurst Transportation Steering Committee had previously defined several issues on the key streets in the area. These issues were identified at the outset of the project and were then updated with information provided at subsequent meetings. The following describes the neighborhood's issues.

NE 50th Street

- Speeding, especially at intersection with 48th Avenue NE and near Sand Point Way.
- Difficult to navigate the transition from 49th Avenue NE to 50th Avenue NE when cars are parked on both sides of the street.
- Very difficult and dangerous entrance/egress at the intersection with Sand Point Way NE.
- Possible RPZ being reviewed for north of CHMC. There is currently a 2-hour parking limit in this area, and local resident vehicles are being towed.
- East of 50th Avenue NE, poor pavement and unimproved (Villa Academy) side of the street leads to navigation difficulties.

50th Avenue NE

- Speeding, which has increased since "No Parking" signs were installed on the east side of the street.
- Heavy traffic at peak times (Villa Academy drop off and pick up, St. Bridget's events).
- Traffic flow and pedestrian safety at intersection with Sand Point Way both in and out at peak traffic times. A traffic signal is scheduled for installation at the Sand Point Way/50th Avenue NE/Ivanhoe Way intersection.
- Egress from side streets is difficult at peak traffic times.

49th Avenue NE

- Speeding (both institutional and neighborhood traffic) now reduced by speed humps.
- Heavy traffic volume at peak Villa Academy times.
- Villa Academy has proposed to connect their entrance drive at NE 50th Street with their east-west drive entering from 49th Avenue NE at NE 47th Street (the old convent driveway and now the Villa Academy pre-school), which might increase traffic on an already busy residential street.

48th Avenue NE

- Speed humps on 49th Avenue have diverted traffic to this street.
- Speeding.
- Parking is only allowed on one side of the street to reduce congestion caused by St. Stephen's parishioners who circulate through the neighborhood for parking. The neighbors do not want parking re-established on both sides of the street.

51st Avenue NE

- Although signed as not an entrance to Villa Academy, parents still drive up it from the south and turn around in driveways to drop their children off.
- Speeding.
- Heavy traffic at peak times.

47th Avenue NE (Arterial)

- Heavy traffic and parking from Laurelhurst Elementary School drop-off/pick-up and events.
- Intersection at 47th Avenue NE/NE 50th Street is dangerous with limited sight lines.
- Wide street and long distances between intersections that encourages speeding.

NE 45th Street (Arterial)

- Speeding
- Traffic and parking generated from St. Stephen's church services, pre-school, and other activities (St. Stephen's has no off-street parking).

Nicholas Place NE/50th Avenue NE and NE 52nd Street/Harold Place NE Intersections

- Wide turns lend to unsafe driving and pedestrian crossing.

50th Avenue NE/Ivanhoe Place NE Intersection

- Difficult/dangerous pedestrian crossing in all directions, especially when cars park on the curved corner.

Sand Point Way NE

- No sidewalk exists between NE 50th Street and 47th Avenue NE on Laurelhurst (east) side of street.
- No sidewalk exists from the pre-school east to Princeton Street on the other side of the street.
- Occupants of the houses on the other side of the street park illegally on right of way, blocking pedestrians.
- No pedestrian safety mechanisms (sidewalk, barriers, etc.) at curve where houses are on the other side of street. This is a particularly dangerous spot because speeding cars lose control here and run off the road.
- Speed limit is too high and varies often along its length.
- Unsafe crosswalk at 50th Avenue NE across Sand Point Way NE.
- Speeding.

General Concerns

- Villa Academy traffic patterns/upcoming development.
- St. Bridget's Church overflow parking.
- Displacing traffic problems from one street to another.

Traffic Volumes

Existing traffic volumes were compiled from all available sources including the SDOT, past studies performed for Children's Hospital, and archives of neighborhood residents. In addition, new two-day traffic counts were performed on NE 50th Street and 47th Avenue NE in March 2002, and short-duration (spot) counts were performed at key intersections in February 2002. These counts were compiled to show the morning and afternoon peak hour volumes, as well as the daily traffic volumes where available. Table 1 summarizes the existing and historic traffic volumes in the study area.

Unfortunately, there are very few historic counts available for the neighborhood that could show how traffic volumes have changed over time. However, because Laurelhurst is a stable neighborhood where little new development has occurred in recent years, it is likely that traffic volumes have not changed substantially. The closest count locations are those on 47th Avenue NE. One of these counts was performed north of NE 50th Street in 2002 and the other was performed south of 47th Street in 1988. The volumes on these two counts performed 14 years apart are very similar, which confirms that little growth, if any, has occurred in the neighborhood.

The two new counts performed on 47th Avenue NE and on NE 50th Street were compiled to show the traffic volumes by time of day. Both counts were performed for two-days, and the summary is an average of the two days. Figure 2 shows the hourly traffic volumes on 47th Avenue NE, and Figure 3 shows the traffic volumes on NE 50th Street. Both graphs show peaks corresponding to peak commute periods and school pick-up and drop-off times.

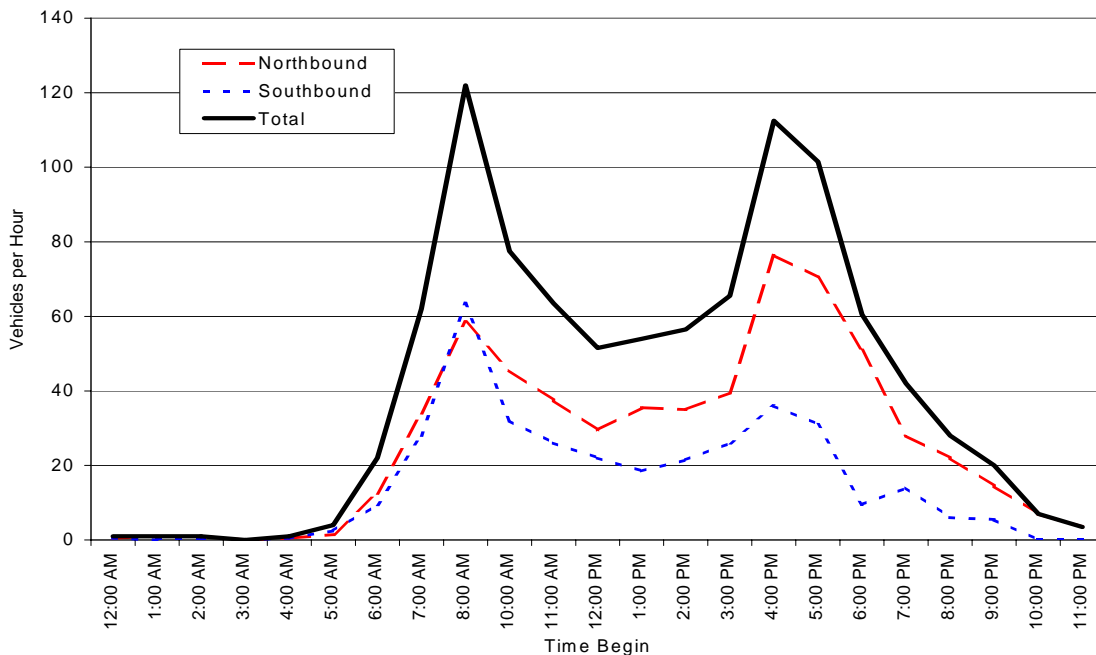
Table 1. Existing and Historic Traffic Volumes

Location	Count Date	Weekday Traffic	AM Peak Hour Traffic		PM Peak Hour Traffic	
			Time Begin	Volume	Time Begin	Volume
Sand Point Wy west of 50th Ave NE ^a	09/27/99	18,500	7:30 A.M.	1,390	4:30 P.M.	1,720
50th Ave NE south of Sand Point Wy ^a	10/05/99	3,100	7:45 A.M.	300	4:45 P.M.	240
NE 50th St east of 47th Ave NE ^b	03/06/02	860	7:45 A.M.	125	2:45 P.M.	105
47th Ave NE north of NE 50th St ^b	03/06/02	960	8:15 A.M.	135	3:00 P.M.	115
NE 50th Street east of 44th Ave NE ^c	02/05/02	n/a		n/a	3:00 P.M.	85
48th Ave NE south of 50th St ^c	02/05/02	n/a		n/a	4:00 P.M.	36
49th Ave NE south of 50th St ^c	02/05/02	n/a		n/a	3:00 P.M.	140
47th Ave NE south of NE 47th St ^a	5/31/88	1,500	8:15 A.M.	140	5:15 P.M.	170
NE 47th Street west of 47th Ave NE ^a	5/31/88	280	8:30 A.M.	60	3:00 P.M.	50

Note: Traffic volumes are for both directions of traffic.

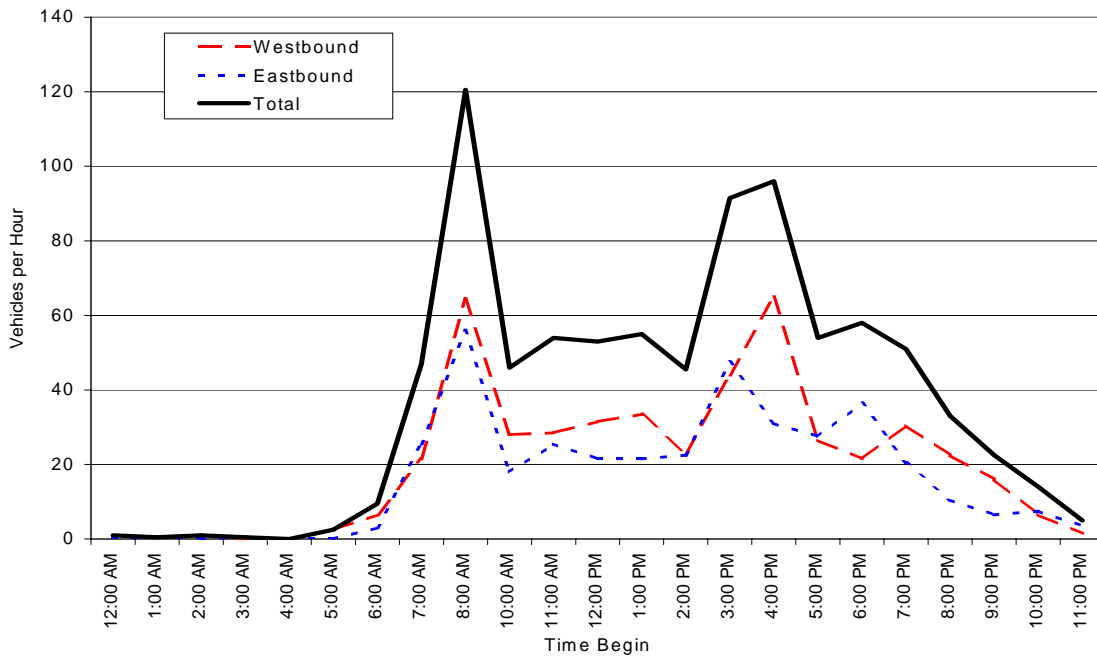
- a. From seven-day machine counts from SDOT.
- b. From two-day machine count performed for Heffron Transportation, Inc.
- c. From spot counts performed by Heffron Transportation, Inc.

Figure 2. Hourly Traffic Volumes on 47th Avenue NE North of NE 50th Street - March 2002



Source: Traffic count performed for Heffron Transportation, Inc., March 6 and 7, 2002.

Figure 3. Hourly Traffic Volumes on NE 50th Street East of 47th Avenue NE - March 2002



Source: Traffic count performed for Heffron Transportation, Inc., March 6 and 7, 2002.

Traffic Speeds

Vehicle speed surveys were performed in February 2002 using a hand-held radar gun. In addition, machine speed surveys were performed on NE 50th Street and 47th Avenue NE in conjunction with the traffic counts in March 2002. Finally, historic records of speed studies were obtained from SDOT. The results of these speed studies are summarized in Table 2. The speeds are reported as the average speed, and 85th-percentile speed, which is the speed below which 85% of the vehicles were traveling. This is the threshold most often used by traffic engineers to determine the speed characteristics of a roadway or to set the speed limit on a highway. Speed limits in Seattle are 30 mph for arterial streets and 25 mph for non-arterial streets unless otherwise posted.

Table 2. Vehicle Speeds

Location/Time Period	Average Speed		85th Percentile Speed		% of Vehicles Exceeding 30 mph
	NB or WB	SB or EB	NB or WB	SB or EB	
47th Avenue NE north of NE 50th Street ^a					
All Day	29.3	29.5	34.2	34.4	45% (30 mph arterial)
47th Avenue NE north of NE 47th Street ^b					
All Day	28.0	28.5	34.1	32.4	35% (30 mph arterial)
47th Avenue NE (south of 50th Street) ^c					
3:25 to 3:55 P.M.	24.3	27.3	30.0	31.1	56% (30 mph arterial)
NE 50th Street east of 47th Avenue NE ^a					
All Day	21.5	20.1	24.8	24.0	1%
NE 50th Street (between 48th Avenue and 49th Avenue) ^c					
7:30 to 8:30 A.M.	22.7	21.8	27.0	25.5	
2:20 to 2:50 P.M.	24.8	22.7	29.3	27.0	21%
3:30 to 4:00 P.M.	22.0	22.6	26.0	26.8	
NE 50th Street (east of 44th Avenue) ^c					
2:55 to 3:25 P.M.	26.8	24.1	31.9	27.1	46%
48th Avenue NE (south of 50th Street) ^c					
8:30 to 9:30 A.M.	24.3	24.3	25.3	29.3	
4:00 to 5:00 P.M.	26.9	21.9	32.1	25.0	29%
49th Avenue NE (south of 47th Street) ^c					
12:45 to 1:45 P.M.	19.9	19.9	22.2	23.0	7%
50th Avenue NE (north of Nicklas Place) ^c					
2:00 to 2:30 P.M.	23.3	22.3	29.0	26.6	
3:00 to 3:30 P.M.	26.5	24.0	30.9	27.3	31%

a. From machine speed survey performed for Heffron Transportation, March 6 and 7, 2002.

b. From City of Seattle Radar Speed Survey, June, 3, 1988.

c. From surveys performed with radar gun by Heffron Transportation, February, 2002.

The above speed data show that the 85th-percentile speeds exceed 30 mph on several residential streets in the study area, supporting the resident’s perceptions that speeding does occur. These locations are:

- NE 50th Street between 47th Avenue NE and Sand Point Way
- 48th Avenue NE south of NE 50th Street
- 50th Avenue NE between NE 50th Street and Sand Point Way.

However, these data also show that speeding may not be as prevalent as perceived by residents. Most of the 85th-percentile speeds are below 30 mph on the non-arterial streets, and below 35 mph on 47th Avenue NE, which is an arterial posted for 30 mph. While these excess speeds are not desirable for neighborhoods where children walk to school or play near the street, they show that modest measures may work to reduce speeds to the legal limit. The speed data also showed the effect of the speed humps on 49th Avenue NE, which reduced the speeds on that street to an average of about 20 mph.

Accident History

Accident data were obtained from the City of Seattle to determine if there are any unusual traffic safety conditions in the study area. Staff at the SDOT queried all intersections in the study area for accident data over the past six years (1996 through 2001); the results of this query are summarized in Table 3. This table lists all of the intersections that were reviewed for accident data. Only five of the intersections (shown in **bold** in the table) had accident records.

The City of Seattle defines “high accident locations” as signalized intersections with 10 or more reported accidents per year and unsignalized intersections with five or more reported accidents per year. It is recognized that many accidents go unreported; therefore, the City’s records do not include all of the minor accidents at a location, nor do the City’s data reflect near-misses that can also indicate a potential problem. However, most agencies base their safety assessment on “reported” accidents, which does provide a measure of severe accidents with property damage, injuries, or fatalities. None of the intersections in the study are approaching the thresholds for a high accident intersection. In fact, most had no accident history, and those with accident histories had an average of one or fewer accidents per year. Compared to other locations throughout the City, Laurelhurst has had a very low number of accidents.

Table 3. Accident Records from City of Seattle - 1996 through 2001

Intersection	Rear-End	Side-Swp	Left Turn	Right Angle	Peds/ Cycl	Other	Total	Ave/ Year
NE 54th St/47th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/44th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/45th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/46th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/47th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/48th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/49th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/50th Ave NE	0	0	0	0	0	0	0	0.0
NE 50th St/Sand Pt Wy	0	2	4	0	0	0	6	1.0
NE 47th St/45th Ave NE	0	0	0	0	0	0	0	0.0
NE 47th St/46th Ave NE	0	0	0	0	0	0	0	0.0
NE 47th St/47th Ave NE	0	0	0	0	0	0	0	0.0
NE 47th St/48th Ave NE	0	0	0	1	0	0	1	0.2
NE 47th St/49th Ave NE	0	0	0	0	0	0	0	0.0
NE 45th St/46th Ave NE	0	0	1	0	0	1	2	0.3
NE 45th St/47th Ave NE	0	0	0	2	0	0	2	0.3
NE 45th St/48th Ave NE ^a	0	0	0	0	0	0	0	0.0
NE 45th St/49th Ave NE	0	0	0	0	0	0	0	0.0
50th Ave NE/Sand Pt Wy	0	1	1	5	0	0	7	1.2
50th Ave NE/NE 52nd St	0	0	0	0	0	0	0	0.0
50th Ave NE/Nicklas Pl	0	0	0	0	0	0	0	0.0

Source: City of Seattle Department of Transportation, March 2002.

^a Both the east and west roadways of this intersection were queried.

Proposed Changes at Villa Academy

Villa Academy, as part of a master planning process, has proposed a new entrance/exit driveway on 49th Avenue NE that will provide access to a new parking area and a one-way circular drop-off/pick-up loop. This will connect to the existing driveway located at the intersection of NE 50th Street/50th Avenue NE, which will be widened and realigned to form a more typical intersection. Both driveways would allow two-way traffic and parents could circulate through the parking lot to get to the drop-off loop. The driveways on the back (east) side of the Villa site would be limited to staff parking and access, with a possible provision to use it for evening activities at the gym. The neighbors who will benefit from the changes include all those on the north side of the school (50th Street, 50th Avenue, Nicklas Place) who will likely see a reduction in traffic. The neighbors who will likely see an increase in traffic are those along 49th Avenue south of the school driveway and 47th Street (which does not likely experience much, if any, Villa Academy traffic today). All neighbors will benefit from these changes that move congestion away from the neighborhood streets and onto the school grounds in the drop-off/pick-up loop or the improved parking lots.

TRAFFIC CALMING DEVICES

Most of the concerns raised by the community related to cut-through traffic and the perception of high traffic speeds on non-arterial streets. These are the types of issues that are appropriately addressed with traffic calming devices. According to *Traffic Calming, State of the Practice* (Ewing, Reid. Institute of Transportation Engineers and the US Department of Transportation, August 1999), “Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. Unlike other traffic control devices such as stop signs and speed limit signs, which are regulatory measures, traffic calming devices are intended to be self-enforcing.”

The City of Seattle was a pioneer in the development and use of neighborhood traffic calming devices, and has a wealth of experience in the use, benefits, and negative effects associated with various types of devices. Information about potential traffic calming devices was obtained from a City of Seattle report, *Making Streets That Work* (May 1996). This information was augmented with information from *Traffic Calming, State of the Practice*, and other references outlined in the bibliography. The sections below describe various measures and where they could or should not be used.

Before the City will install any device, it must be approved by 60% of the neighbors who live within one block of its proposed location. Such approval only gains the device a place on the City’s waiting list for funding. The City receives more than 600 petitions for new traffic circles each year, but is only able to fund installation for about fifteen. The funding priority for these devices is based on need and benefit. If approved by the neighbors and the City, private funding sources (e.g., mitigation as part of a new development project) and neighborhood matching grants can also be used to implement traffic control devices, which could reduce or eliminate the time spent on the waiting list for funding. Further information about the City’s process for the petition and approval are presented later in this chapter.

Traffic Circles

Traffic circles are the calming device preferred by the City of Seattle for most locations, since they have a long history of demonstrated benefits with very few negative effects. Traffic circles are raised islands constructed at intersections that cause motorists to decrease speed in order to maneuver around the circle. Traffic circles are also very effective at reducing angle accidents at intersections, by slowing drivers down and drawing their attention to the intersection. SeaTran has documented a decrease in accidents of about 90% at intersections where traffic circles have been installed. Traffic circles may be landscaped if neighbors agree to maintain the plantings and the plantings do not obstruct sight lines.

Past studies have shown that traffic circles are effective at reducing speeds along the approaching streets. However, this speed reduction tends to be limited to the immediate vicinity of the traffic circle. If speed reduction is desired along the length of a street, traffic circles at adjacent intersections should be considered. Traffic circles usually do not divert traffic to other streets, which is another benefit of this device. Traffic circles are less effective at reducing speeds when there is no curb to define the intersection. At T-intersections (three-legged intersections), a traffic circle is often combined with small curb-side islands on the straight side of the intersection to improve their effectiveness.

Chicanes

Chicanes are also used in the City of Seattle primarily as a means to reduce both speed and traffic volumes. Chicanes are usually constructed as a set of two or three closely spaced curb bulbs on alternating sides of the street that narrow a roadway to one lane of traffic and force drivers to perform S-turns to maneuver through them. This substantially reduces traffic speeds through the chicane. Some of the negative effects of chicanes are that they can divert traffic to parallel streets and eliminate on-street parking. Chicanes are not used if they

would block driveways, are located on a steep grade that could cause maneuvering difficulties in ice or snow, or would be along a transit route or a major emergency access route.

Speed Humps

Speed humps are used when there are no other feasible traffic control devices available for the location. Speed humps are raised mounds of pavement approximately 3-inches high that extend the width of the street. They are typically used in tandem or groups spaced at about 400-foot intervals to slow traffic over the length of a roadway. Speed humps were recently installed along 49th Avenue NE adjacent to Villa Academy.

Speed humps are generally not used on steep grades because of their ability to “launch” downhill traffic and stall uphill traffic. Such a device on a steep grade can also create issues with control when the roadway is covered with ice or snow. Speed humps are also difficult to maneuver on a bicycle or motorcycle. Finally, because they slow emergency vehicle access, and are disliked by the fire department, they are not used unless 85% of the traffic is traveling at speeds of 35 mph or greater on a residential street, and the traffic volumes are greater than 400 vehicles per day.

Curb Bulbs

Curb bulbs extend the sidewalk into the street. In most cases, these are used to enhance pedestrian conditions by shortening the street-crossing distance and improving visibility between a pedestrian and an approaching motorist. They also prevent vehicles from parking too close to an intersection, which can block sight lines or curb ramps. As a traffic control device, curb bulbs can reduce speeds by narrowing the roadway. Less expensive curb bulbs that construct a small island adjacent to the curb have also been used. This eliminates the need to remove the existing curb, and can also reduce the need to change a street’s drainage system. Curb bulbs should not be used at intersections where a large curb radius is needed for transit and/or truck traffic, or where the curb lane is needed for vehicular capacity (e.g., peak hour parking restrictions, auxiliary turn lane, or on an arterial that could need additional travel lanes in the future). Curb bulbs can create maneuvering difficulties for bicyclists.

SDOT requires that a curb bulb be a minimum of 6-feet wide so that it is visible to approaching motorists. The driving lanes must be at least 12-feet wide to accommodate buses and turning maneuvers. Thus, the minimum street width for curb bulbs on an arterial street is 36-feet.

Choker

A choker is a set of two curb bulbs that extend into the street near an intersection to narrow the street and cause motorists to slow down when entering and leaving the street. Such a device is used to reduce a high volume of cut-through traffic, reduce speeds, and to protect a residential street from traffic associated with an adjacent commercial area. They should not be used on narrow streets (less than 25 feet), where traffic would be diverted onto another residential street, or near arterial intersections.

Traffic Diverters

Traffic diverters are used on streets with high volumes of cut-through traffic. They are usually implemented by constructing an island that connects from corner to corner at an intersection. This forces traffic to turn at the intersection and prohibits through traffic. Traffic diverters should not be used if it would divert traffic onto other residential streets, or if the street is a major emergency or school bus route.

Partial Street Closure

A partial street closure is usually implemented with a curb bulb on one side of the street that physically blocks one direction of traffic. This is usually done adjacent to an intersection and would include signage and striping (e.g., “Do Not Enter”) to indicate the closure. Although only one direction of traffic would be allowed at that location, two-way traffic could be permitted for the rest of the street. This device is used if a street has a high volume of cut-through traffic. It would not be used if it would divert traffic onto other residential streets, or if the street is a major emergency or school bus route.

Speed Cushions

Speed cushions consist of either recycled rubber or asphalt, raised about 3 inches in height. The length of the cushion is about 10 feet, and there are spaces between the cushions that allow emergency vehicles to partially straddle the device. Speed cushions are used to reduce vehicle speeds with minimal impact to emergency vehicles. They may divert traffic to other streets.

Speed cushions have been used in Great Britain for many years and are now gaining popularity through the U.S. The City of Bellevue recently performed a demonstration project for these devices. However, they have not yet been used in the City of Seattle.

Table 4. Summary of Neighborhood Traffic Control Devices

	Benefits of Device			Do Not Use If		
	Speed Reduction	Accident Reduction	Traffic Reduction	Divert traffic to other streets	Located on steep grade	On emergency or bus route
Traffic Circles	✓	✓				
Chicanes	✓	✓	✓	✓	✓	✓
Speed Humps	✓		✓	✓	✓	✓
Curb Bulbs	✓					
Choker	✓		✓	✓		✓
Traffic Diverter	✓	✓	✓	✓		✓
Partial Street Closure			✓	✓		✓
Speed Cushions	✓		✓	✓	✓	

Petition and Approval Process

If the neighborhood decides to proceed with any traffic-calming project, petition forms will be given to the applicant, and signatures must be gathered from at least 60% of the households (owners or renters) and businesses (property or business owner) within one block of the proposed traffic calming device. If the device is supported by the neighbors, then the SDOT will evaluate the safety record of each location based on collision history, speed data and traffic volume counts, and will assess the measure to determine if it is feasible and would not create other traffic issues.

Once SDOT deems the device appropriate for the location, the project is assessed a point value based on a set of pre-established criteria. The point value is used to prioritize the desired measure relative to other neighborhood traffic control needs throughout the City. This prioritized list is used by the City to determine which projects are funded each year. Some projects may not qualify for City funding, but can still be implemented with alternate funding if the project is approved by SDOT.

Table 5 summarizes the City's current point criteria for traffic circles. The same or similar criteria would likely be applied to other traffic calming devices.

Table 5. Point Criteria for Traffic Circles

Accident History	
Points are determined from annual Accident Rates - average number of reported accidents over the past three years.	
Points	Annual Accident Rate (accidents/year) at intersection
0.5	If accidents on a midblock section of street exceed 2 per year over the last three years.
1	0.5 - 0.875
2	0.876 - 1.250
3	1.251 - 1.625
4	1.626 - 2.000
5	2.001 - 2.375
6	2.376 - 2.750

Traffic Volumes	
(Vehicles per Day - Average Weekday Traffic)	
Points	Traffic Volumes
0.5	500 – 1100
1.0	1101 – 1700
1.5	1701 – 2300
2.0	2301 – 2700

Traffic Speeds	
(85th Percentile Speed)	
Points	Traffic Speeds (mph)
0.5	26 – 29
1.0	29.1 – 32
1.5	32.1 – 35
2.0	35.1 – 38
2.5	38.1 – 41
3.0	41.1 – 44

Source: City of Seattle, Neighborhood Traffic Control Program, Typical Traffic Calming Measures, from City's web site: <http://www.ci.seattle.wa.us/td/nlcprog.asp>, February 28, 2002.

REGULATORY TRAFFIC CONTROL

Several of the improvements evaluated for Laurelhurst are regulatory measures such as stop signs, cross walks, traffic signals, and speed limits. Such devices require a motorist to “obey a law” to be effective. A stop sign, for example, does not physically stop or slow a motorist. It is only the “law” and social etiquette that causes a motorist to stop at this sign. As such, the requirements related to the use and installation of regulatory measures is much more stringent than for traffic calming devices. This section of the report describes the thresholds and engineering judgment used for various regulatory measures.

Traffic Signals

Before SDOT would install a traffic signal at any intersection, it must first meet certain thresholds for traffic volumes, which are known as signal warrants. Traffic signals that are installed where minimum volume thresholds are not met can be safety hazards because they will seldom change, and drivers can then be surprised when the signal does change. If a signal is set to change when there are no vehicles or pedestrians present, drivers will become frustrated by being unnecessarily delayed.

Traffic volume thresholds for signal warrants are outlined in the *Manual on Uniform Traffic Control Devices (MUTCD)*, June 2001. Two of the most commonly used signal warrants (Warrants 1 and 2) require certain traffic volume thresholds to be met on both the major and minor street. Warrant 1 requires a lower threshold of traffic be met for at least eight hours of the day; Warrant 2 requires higher traffic volumes for four hours of the day.

Another commonly used traffic signal warrant is Pedestrian Volumes (Warrant 4), which is used to determine whether a pedestrian signal is needed. For this warrant, the “pedestrian volume crossing the major street at an intersection or midblock location during an average day is 100 or more for each of any 4 hours or 190 or more during any 1 hour; **and** there are fewer than 60 gaps per hour in the traffic stream of adequate length to allow pedestrians to cross...” The warrant also notes that “Where there is a divided street having a median of sufficient width for pedestrians to wait, the requirement applies separately to each direction of vehicular traffic.” This last requirement would apply to most sections of Sand Point Way adjacent to Laurelhurst.

Stop Signs

“Stop” signs are used at intersections to indicate that traffic is always required to stop. In Seattle, “Stop” signs usually control traffic on a local roadway where it intersects an arterial, or where a lesser-class arterial intersects a higher-class arterial. According to the MUTCD, “Stop” signs should not be used for speed control.

All-way stop control is appropriate to control intersections where safety or congestion exists, and where the volume of traffic on the intersecting roads is approximately equal. The MUTCD includes criteria to evaluate the installation of all-way stop control; the following criteria would be applicable to locations in Laurelhurst:

- B. *A crash problem, as indicated by 5 or more reported crashes in a 12-month period that are susceptible to correction by a multiway stop installation. Such crashes include right-and left-turn collisions as well as right-angle collisions.*
- C. *Minimum volumes:*
 - 1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and*
 - 2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but*

3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.

Crosswalks

SDOT staff has drafted new guidelines related to improving pedestrian safety with traffic control devices such as marked pedestrian crosswalks, pedestrian traffic signals, adult crossing guards, and other devices. These guidelines were drafted to update a resolution the City Council adopted in January 1979 related to requests for such pedestrian improvements. Although the new guidelines have not been officially adopted, they are being applied to guide engineering decisions made by the department. The City’s new guidelines related to marked pedestrian crossings were used in this study to evaluate the appropriateness of suggested pedestrian crossing locations. These guidelines are summarized below.

Marked pedestrian crosswalks may be used to delineate preferred pedestrian travel across roadways upon the Department’s evaluation of the following:

- a) *At signalized locations where vehicular traffic might block pedestrian traffic when stopping for a red light;*
- b) *At non-signalized locations where designated school routes cross arterial and residential streets; and*
- c) *At non-signalized locations where, in the judgment of the City Traffic Engineer, the number of motor vehicle lanes, the average daily traffic(ADT), the posted speed limit, the geometry of the location and other factors, would make the use of specially aligned crosswalks desirable for traffic or pedestrian safety.*

Also, typically, there should be at least 200 feet between the proposed marked crossing location and the nearest existing signal on the same arterial, except on one-way streets and in unique situations where there is high pedestrian demand. The new marked crosswalk shall not, in the Department’s judgment, unduly restrict platooned traffic, and shall be coordinated with adjacent signals and marked crosswalk at unsignalized locations.

Finally, an engineering evaluation may be completed before installing a marked crosswalk in accordance with the criteria listed in Figure 1. An engineering evaluation could analyze other factors such as (but not limited to) pedestrian volume, gaps in traffic, approach speed, sight distances, illumination, the needs of special populations. In all cases, good engineering judgment must be applied.

Figure 1. Guidelines for installing marked crosswalks at non-signalized locations

Daily Traffic Volume =	9,000 ADT			9,001 to 12,000 ADT			12,001 to 15,000 ADT			>15,000 ADT		
	30 mph	35 mph	40 mph	30 mph	35 mph	40 mph	30 mph	35 mph	40 mph	30 mph	35 mph	40 mph
2 Lanes												
3 Lanes												
4 Lanes with Raised Median												
4 Lanes with No Median												

Note: Where speed limit exceeds 40 mph, marked crosswalks alone should never be used.

Key:

	Candidate for a marked crosswalk. Marked crosswalks, if installed, must be installed carefully and selectively. Complete engineering evaluation prior to installing marked crosswalk.
	May or may not be a good candidate for a marked crosswalk. Complete engineering evaluation prior to installing marked crosswalk.
	Usually not a good candidate for a marked crosswalk (unless used in combination with other treatments). Complete engineering evaluation prior to installing marked crosswalk.

RECOMMENDATIONS

This section of the report presents recommendations for several locations within the Laurelhurst study area. The rationale for each measure and details about the measure are presented. At the end of this chapter is a summary table listing all of the recommendations. The letter designations for each location are the same in the text and the table.

A. NE 47th Street/48th Avenue NE

Recommendation: Install traffic circle

48th Avenue NE has experienced an increase in traffic since the speed humps were installed on 49th Avenue NE parallel to this street. Residents on this street also report that speeds seemed to have increased. Parking is only allowed on the west side of 48th Avenue NE to reduce congestion associated with St. Stephen's Church parishioners who would use this street for parking.

In addition, Villa Academy has proposed to reconfigure its access and on-site circulation by locating a major access driveway on 49th Avenue NE opposite NE 47th Street. This change is likely to increase traffic volumes on NE 47th Street.

A traffic circle at this intersection would help alleviate speeding on both streets, and would be readily accepted by SDOT.

B. NE 50th Street between 49th and 48th Avenue NE

Recommendation: Install chicane.

NE 50th Street is where the primary access and egress to Villa Academy and St. Bridget's Church are located. Therefore, this residential street is affected by non-residential traffic, and speeds on the street are higher than desired.

Several traffic-calming options were reviewed for this street before concluding that a chicane would be the most feasible measure to reduce speeds. A traffic circle was reviewed for the intersection at NE 50th Street/48th Avenue NE; however, because the north and south legs of this intersection are offset, a traffic circle could result in undesirable turning patterns or could increase conflicts between vehicles on the intersecting streets. Also, the slope on NE 50th Street prevents the use of speed humps.

SDOT has successfully implemented chicanes on slopes in Seattle. Good examples of this measure exist on NW 55th Street just east of 3rd Avenue NW in the Phinney Ridge neighborhood. At that location, there are two sets of chicanes, each having three curb bulbs, which are set about one foot from the existing curb so that the street drainage did not need to be altered. These chicanes are beautifully landscaped.

The disadvantages for chicanes are that they can divert traffic to other streets, although the long north-south blocks in this neighborhood make that less likely. They also eliminate parking on the street, but residents do not currently park along this street, so the only negatively affected party would be the nearby church. Finally, chicanes can be a challenge for bicyclists. This street is near the top of a hill and is not along a bike route.

A chicane at this location could begin with two curb bulbs, and later expanded to three curb bulbs, if needed. A design similar to those on NW 55th Street is recommended.

C. NE 50th Street from 49th Avenue NE to 50th Avenue NE

Recommendation: Install signs for “No Parking Anytime” on both sides of the street

The short section of NE 50th Street between 49th and 50th Avenues NE is where the main access to Villa Academy is located, as well as the major pedestrian crossing between Villa Academy and St. Bridget’s Church where students are picked-up after school. Parents often park along NE 50th Street when waiting for their children, and church parishioners park on this street during Sunday services and other large church events. The on-street parking exacerbates congestion at this intersection, and creates a potential safety hazard for crossing pedestrians because it limits sight lines. Parking on both sides of the street should be prohibited at this location.

D. 50th Avenue NE/Nicklas Place NE

Recommendation 1: Install traffic circle (small circle with curb extensions on west side of street, if needed)

A traffic circle is recommended at this intersection to help reduce speeds on 50th Avenue NE. Because this is a T-intersection, small curb extensions or islands may be needed on the west side of the street to effectively reduce speeds in the uphill (southbound) direction.

Recommendation 2: Add curb extension on northeast corner of intersection

Nicklas Place intersects 50th Avenue NE at an angle. As such, the east throat of the intersection is very wide, which hinders pedestrian mobility along 50th Avenue NE. To narrow the intersection, the northeast corner of the intersection could be extended. A curb extension could eliminate parking on Nicklas Place for the residence on the corner; however, the curb extension would create parking on 50th Avenue NE. The curb extension could be implemented separate from the recommended traffic circle.

E. 50th Avenue NE/ NE 52nd Street

Recommendation: Install traffic circle (small circle with curb extensions on west side of street if needed).

Speed reduction on 50th Avenue NE would be enhanced with traffic circles at both Nicklas Place and NE 52nd Street. If only one traffic circle is funded at a time, the circle at NE 52nd Street should be installed first since it is more centrally located on the length of this street.

F. 50th Avenue NE from NE 52nd Street to Ivanhoe Place NE

Recommendation: Remove “No Parking Zone” on east side of street

A “No Parking” zone was installed on 50th Avenue NE north of NE 52nd Street a few years ago at the request of a resident. Eliminating this parking also eliminated any perceived obstacles that help slow traffic on the street. Re-instating this on-street parking would likely help reduce speeds.

G. 47th Avenue NE at NE 50th Street and NE 47th Street

Recommendation: Add pavement markings on each side of center medians. Consider more permanent extensions that do not need continual repair.

When the center medians on 47th Avenue NE were originally installed, there were painted channelization markings and reflective buttons delineating the outside of the driving lane. These markings effectively reduced the width of the driving lane, which helped to slow traffic. The original paint and reflectors have worn off and should be replaced.

The original design only included pavement markings on the lanes departing (“far side of”) the intersection. Because 47th Avenue NE is a relatively wide street, the lanes approaching the intersection are wide. When vehicles park along the street, it does narrow the perceived driving lane; however, there are many times during the day when no vehicles are parked close to the intersection and there is no perceived narrowing. It is therefore recommended that paint markings also be added to the intersection approach lanes to delineate the parking areas. This same treatment has been successfully used on 3rd Avenue NW in Greenwood.

Because the paint markings require continual maintenance, the City could consider installing raised planter islands on the side of the street to replicate the intent of the paint markings. Because 47th Avenue NE is an arterial street, such permanent fixtures may be opposed by Metro Transit and the Fire Department.

H. 47th Avenue NE at NE 54th Street

Recommendation: Install curb median and pavement markings similar to those at 47th Avenue NE/NE 50th Street

47th Avenue NE has very long blocks, and there is neither traffic control nor calming devices located between NE 50th Street and Sand Point Way. Center medians (described above) are used at the intersections of NE 50th Street and NE 47th Street. One additional median located just east of NE 54th Street may help calm traffic on this long block. This location will require further evaluation by SDOT to evaluate the crest vertical curve at this location and make sure that there would be adequate sight lines to a median.

J. NE 45th Street

Recommendation 1: Add curb bulbs or median islands, if possible.

NE 45th Street is an arterial street. Although no speed data were collected for this street, the perception of neighborhood residents is that speeding is prevalent. In addition, there are several institutions on NE 45th Street (Laurelhurst Elementary, St. Stephen’s Church, and Seattle Community Church) that utilize on street parking. When parking demand is high, vehicles park too close to intersections and block sight lines. The limited sight lines combined with higher speeds can result in unsafe conditions for both motorists and pedestrians.

Measures such a curb bulbs could be used to prevent parking near the corners of intersections. Curb bulbs also visually narrow the driving width of a street, which can help slow traffic. The narrow width of NE 45th Street may prevent the use of curb bulbs (and other traffic measures). SDOT requires that a curb bulb be a minimum of 6-feet wide so that it is visible to approaching motorists. The driving lanes must be at least 12-feet wide to accommodate buses and turning maneuvers. Thus, the minimum street width for curb bulbs on an arterial street is 36-feet. NE 45th Street is only 33-feet wide curb to curb, which may not allow for curb bulbs.

Median islands, such as those that exist on 47th Avenue NE, are another option. These devices have been used on narrow streets such as 3rd Avenue NW in Greenwood.

Because NE 45th Street is an arterial street, any device that slows or impedes traffic will need to be approved by the City's Traffic Engineer with input from Metro Transit and the Fire Department.

Recommendation 2: Increase speed limit enforcement.

Periodic police presence on NE 45th Street would likely help reduce speeds on this street. In addition, SDOT has a portable message sign that reports motorist's speeds. The Laurelhurst Community Club should request that this sign be located along NE 45th Street periodically to remind motorists that they are speeding.

Recommendation 3: Evaluate all-way stop control at NE 45th Street/47th Avenue NE intersection.

The warrants for all-way stop-controlled intersections were presented previously in the *Regulatory Traffic Control* section of this report. Traffic volume and traffic speed data collected for other locations along 47th Avenue NE and NE 4th Street suggest that this intersection may exceed the minimum traffic and pedestrian volume thresholds to warrant this type of traffic control. It is also likely that the approach volumes are relatively balanced which would provide good traffic operations. The MUTCD states that an all-way stop would improve the traffic operating characteristics of an intersection of two residential neighborhood collector streets of similar design and operating characteristics. Both 47th Avenue NE and NE 45th Street are arterials and do have similar characteristics. In addition, an all-way stop would likely improve both vehicular and pedestrian safety at this location, which is located near the southeast corner of Laurelhurst Elementary School.

Further traffic studies would be needed to confirm that all-way-stop warrants are met at this location. These studies should include 24-hour traffic volume counts on all approaches to the intersection, plus pedestrian and bicycle counts of crossing traffic. The counts on NE 45th Street should also be set to collect speed data since lower volume thresholds are required when the 85th-percentile speed exceeds 40 mph. Any data collection should occur when school is in session.

K NE 45th Street at 48th Avenue NE

Recommendation: Work with St. Stephen's to move daycare drop-off/pick-up area, install curb bulb on east side of 48th Avenue NE.

St. Stephen's has an on-site daycare for which most of the drop-off/pick-up activity occurs on NE 45th Street adjacent to the church. This creates a potential safety concern associated with loading children from the driving-lane-side of the vehicle. The Laurelhurst Community Club should work with the church to relocate this drop-off/pick-up area to the west side of the Church on 48th Avenue NE. The church could request that a load zone be installed along its frontage on 48th Avenue to accommodate this function.

A curb bulb was evaluated for the southwest corner of the intersection. As mentioned for NE 45th Street above, SDOT's minimum size for a curb bulb is 6-feet wide. On non-arterial streets, the remaining driving lane must be 20-feet wide to accommodate emergency access (in the event part of the roadway is blocked by another vehicle), and to accommodate turning vehicles without crossing the centerline of the street. 48th Avenue NE is approximately 33 feet wide, which would provide enough width for the curb bulb. This bulb is recommended to prevent vehicles from parking too close to the intersection, which would impede sight lines and pedestrian access to the park. The curb bulb would also shorten the pedestrian crossing distance.

L. 48th Avenue between NE 47th Street and NE 45th Street

Recommendation: Work with SDOT to implement traffic control measure. As an interim solution, alternate existing parking on the street between the east and west sides of the street.

As described with Item A above, both speeds and traffic volumes on 48th Avenue NE increased as a result of the new speed humps on 49th Avenue NE. A traffic circle has already been recommended for 48th Avenue NE/NE 47th Street intersection (Item A).

Residents on 48th Avenue NE have requested speed humps for this street to help reduce these impacts. However, speed humps are SDOT's "last resort" for traffic calming because of their impact to emergency access, particularly of fire trucks. Because of this, SDOT does not usually install speed humps unless the 85th-percentile speed is greater than 35 mph, and the traffic volume is greater than 400 vehicles per day. Neither of these thresholds is exceeded for 48th Avenue NE.

Another measure could be chicanes, which also tend to divert through traffic. A chicane could create some congestion when traffic from St. Stephen's is present; however, if it were located near the center of the block, such congestion would be less than if the constraint were located near NE 45th Street. One disadvantage of a chicane is that it may eliminate parking.

Finally, new technologies have been developed, but are not yet used in the City of Seattle. One of these is a speed cushion, which is similar to a speed hump, but has openings sized for a fire truck so that they are not delayed by this device.

One non-structural option to calm traffic is allowing parking on both sides of the street. Residents are opposed to this option since when parking was allowed on both sides of the street, St. Stephen's parishioners caused congestion on this street when circulating for parking. However, parking could likely be alternated between the sides of the street to create a chicane with parked cars. This alternate parking pattern would not narrow the street's driving width, and therefore, would not increase congestion. However, drivers would likely slow down on the street because the alternating parking would visually narrow the street. This is a measure that could be implemented quickly and inexpensively, and could be tried as an interim measure while a more permanent solution is evaluated, designed, and constructed. One disadvantage of this alternate-parking scheme is that it would require many more signs to indicate where parking was legal and not-legal. Enforcement of the parking may also be an issue.

Further collaboration between SDOT and the residents on 48th Avenue NE is needed to agree to a permanent solution. In the meantime, it is recommended that the parking on the street be alternated so that some parking is located on the west side of the street, and some is located on the east side of the street. The best layout for this parking will depend on the location of existing driveways on the street.

M. NE 47th Street at 49th Avenue NE

Recommendation: Install right turn only sign for eastbound traffic

Villa Academy has proposed to locate a major access driveway on 49th Avenue NE opposite NE 47th Street. This would be a two-way driveway: inbound traffic would connect directly to a one-way drop-off/pick-up loop, while outbound traffic would be from the site's new parking lot. Because of the proposed site layout, it is likely that most of the traffic entering the site during peak school periods would use this driveway, and most of the traffic exiting the site would use the driveway to NE 50th Street.

To reduce the potential that entering traffic would short-cut to this new driveway on NE 47th Street, it is recommended that a right-turn-only sign be installed for eastbound traffic on NE 47th Street. While this would not physically prohibit a cut-through movement, peer pressure from other parents and school oversight would help enforce the restriction. This measure is recommended to reduce potential congestion at the 49th Avenue NE/NE 47th Street intersection, and to reduce the cumulative traffic impacts of Villa Academy and Laurelhurst

Elementary School at the intersection of 47th Avenue NE/NE 47th Street. The right-turn-only sign should only be installed if and when Villa Academy constructs its proposed new access.

N NE 50th Street/44th Avenue NE

Recommendation: Install traffic circle

High speeds were observed on NE 50th Street between 47th Avenue NE and Sand Point Way. This is a residential street that already has one traffic circle located at 46th Avenue NE. Speed-reduction would be more effective with a pair of traffic circles. Therefore, this additional traffic circle is recommended at the NE 50th Street/44th Avenue NE intersection.

P. Sand Point Way NE between 45th Avenue NE and 46th Avenue NE

Recommendation: Prohibit parking and add guardrail

Residents of Laurelhurst noted that walking along the northwest side of Sand Point Way between 45th and 46th Avenues NE is difficult because residents of adjacent housing park on the pedestrian walkway. This parking should be prohibited.

In addition, residents stated that several vehicles have driven off the roadway at this location because of the nearby curve. Guardrail could be located along the curve to protect pedestrians and adjacent property.

Q. Sand Point Way at NE 52nd Street

Recommendation: Trim landscaping in the center median to maximize sight lines

Residents expressed the desire for a pedestrian crossing improvement at this location. Many pedestrians cross Sand Point Way at this location to access the park, the daycare, or the bus stop located on the west side of the street. This location is somewhat distant from two signalized crossings—one at Children's Hospital and the other at Princeton Avenue—and pedestrians are not willing to walk to one of these signals to cross Sand Point Way.

The appropriateness of a marked crosswalk and/or a pedestrian traffic signal at this location was evaluated. Pedestrian and traffic volume thresholds for both of these devices were presented previously in the *Regulatory Traffic Control* section of this report. An unsignalized marked crosswalk would not be desirable at this location based on the volume and speed of traffic on Sand Point Way. A pedestrian signal would require about 100 pedestrians per hour for four hours of the day or 190 pedestrians during one hour of the day. Although no formal pedestrian counts were performed, observations of the crossing area find that the pedestrian volume is likely well below these thresholds. Therefore, it is unlikely that a pedestrian signal would be warranted.

Since new features are not warranted, the only improvement recommended for this location is to trim the landscaping in the center median to maximize sight lines between pedestrians who may cross at this location and oncoming motorists.

R. Sand Point Way/50th Avenue NE/ Ivanhoe Place NE

Recommendation: Install traffic signal (proposed by City). Modify intersection to prevent left turns across 50th Avenue to access Ivanhoe Place. Improve pedestrian crossing of Ivanhoe Place.

SDOT has proposed to install a traffic signal at the Sand Point Way/50th Avenue NE/Ivanhoe Place NE intersection. This signal is intended to reduce traffic congestion on the side street, and improve safety for both motorists and pedestrians. Currently, this intersection is unsignalized with a stop sign controlling traffic on 50th Avenue NE. There is also an unsignalized pedestrian crossing of Sand Point Way north of 50th Avenue NE that crosses five lanes near a horizontal curve. Residents in Laurelhurst reported several pedestrian-vehicle collisions and many more near misses at this intersection even though the City's records did not reveal any reported accidents.

A traffic signal at this location could increase traffic volumes on 50th Avenue NE as more residents and Villa Academy parents use this route to access Sand Point Way. It could also increase travel speeds on 50th Avenue NE if motorists perceive that they could speed up to make the green light. Because of this, it is recommended that any new signal at this intersection be installed after or in conjunction with the recommended traffic circles on 50th Avenue NE.

Additional design changes may be needed to accommodate a traffic signal. One of these is the prohibition of left turns from 50th Avenue to Ivanhoe Place. This would prevent motorists from trying to turn left through a queue of vehicles waiting for the light, which could be a dangerous condition. There are very few vehicles (about 10 during the PM peak hour) currently making this turn that would be diverted to other streets in the area. Some changes in access to the service station on the northeast corner of the intersection may also be needed. Finally, changes to Ivanhoe Place where it intersects 50th Avenue NE should be considered to make it easier for a pedestrian walking along the east side of 50th Avenue NE to cross Ivanhoe Place and reach the new traffic signal.

S. Sand Point Way/Children's Hospital Driveway/42nd Avenue NE

Recommendation: Retain temporary traffic signal for traffic on 42nd Avenue NE (which was installed for Princeton Bridge construction project), and restrict eastbound movements on NE 50th Street to right turn only.

A temporary traffic signal was installed at this intersection to facilitate detour traffic related to the Princeton Bridge Project. The new traffic signal serves southbound traffic from 42nd Avenue NE. This signal has improved safety and mobility for motorists crossing Sand Point Way between 40th Avenue NE and Laurelhurst.

If the signal remains permanently, eastbound movements on NE 50th Street west of Sand Point Way should be restricted to right-turn only. Signage should be improved to direct motorists to the signal to make left turns or crossing maneuvers of Sand Point Way.

T. Sand Point Way NE between NE 50th Street and 47th Avenue NE.

Recommendation: Add asphalt walkway on east side of street

There is no sidewalk or walkway along this section of Sand Point Way—a high speed and high volume principal arterial. A formal walkway should be added, and brush that impedes the walkway should be regularly trimmed. In addition, signage for parking restrictions should be enhanced to prevent vehicles from parking on the pedestrian walkways when there is no curb.

Summary of Recommendations

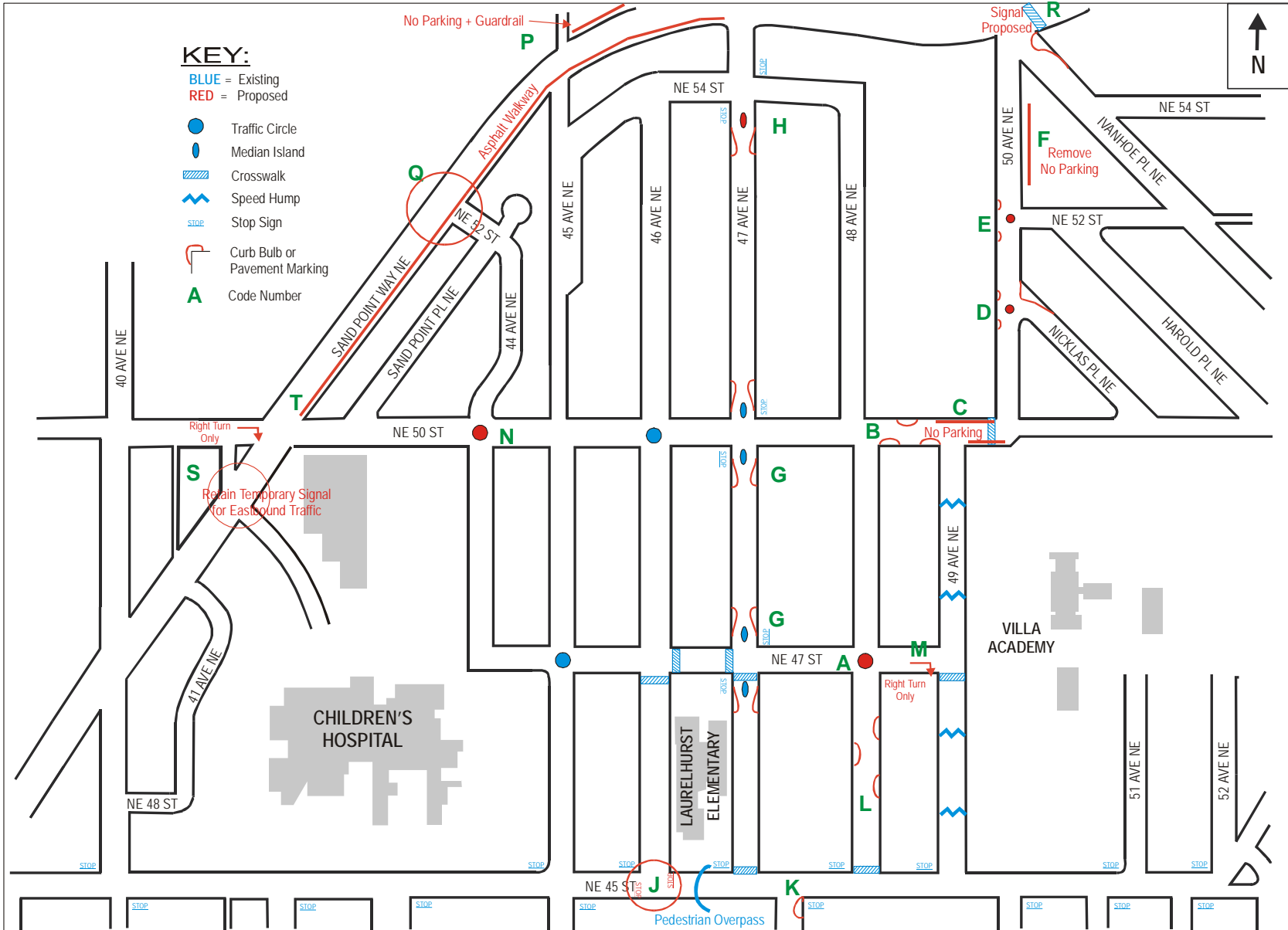
Table 6 and Figure 4 summarize all of the above recommendations.

Table 6. Summary of Recommendations

Location	Control Measure	Reason	Priority
A. NE 47th Street/48th Avenue NE	Install traffic circle	Slow traffic on both 48th Avenue and 47th Street. Needed because new speed humps on 49th Avenue have diverted some traffic to 48th Avenue, and proposed Villa Academy Driveway that will align with 47th Street may add traffic to this street.	High
B. NE 50th Street/48th Avenue NE	Install chicane	Slow traffic on 50th Street	High
C. NE 50th Street from 49th Avenue NE to 50th Avenue NE	Install signs for "No Parking Anytime" on both sides of the street	Relieve congestion during Villa Academy and Church peak periods, and improve safety for pedestrians crossing street at this intersection.	High
D. 50th Avenue NE/Nicklas Place NE	Install traffic circle (small circle with curb extensions on west side of street, if needed)	Reduce speeds on 50th Avenue NE	High
D2. 50th Avenue NE/Nicklas Place NE	Add curb extension on northeast corner of intersection	Reduce crossing distance for pedestrians. Narrows intersection, which will also help control speeds in downhill direction.	Medium (can be installed after traffic circle, if still needed.)
E. 50th Avenue NE/ NE 52nd Street	Install traffic circle (small circle with curb extensions on west side of street if needed).	Reduce speeds on 50th Avenue NE. Two traffic circles in tandem (Nicklas Place and 52nd Street) will be more effective at reducing speeds than one traffic circle.	High
F. 50th Avenue NE from NE 52nd Street to Ivanhoe Place NE	Remove "No Parking Zone" on east side of street	Reduce speeds on 50th Avenue NE.	High
G. 47th Avenue NE at NE 50th Street and NE 47th Street	Add pavement markings on each side of center medians. Consider more permanent extensions that don't need continual repair.	Slow speeds on 47th Avenue NE.	High
H. 47th Avenue NE at NE 54th Street	Install curb median and pavement markings similar to those at 47th Avenue NE/NE 50th Street	Slow speeds on 47th Avenue NE.	Medium
J1. NE 45th Street	Add curb bulbs or median islands, if possible.	Slow speeds on NE 45th Street. Prevent vehicles from parking near corner, which blocks sight distance. Improve crossing to Laurelhurst Park.	Must be approved by City since located on arterial street.
J2. NE 45th Street	Increase speed limit enforcement	Slow speeds on NE 45th Street.	High
J3. NE 45th Street/47th Avenue NE	Create an all-way stop	Improve traffic operations and safety at the intersection.	High
K. NE 45th Street/48th Avenue NE	Install curb bulb on east side of 48th	Prevent vehicles from parking near corner, which blocks sight	Medium

Location	Control Measure	Reason	Priority
	Avenue south of 45th Street. Create load zone on 48th Street for daycare drop-off/pick-up.	distance. Improve crossing to Laurelhurst Park. Improve safety for loading/unloading children at daycare.	
L. 48th Avenue between NE 47th Street and NE 45th Street	Work with SDOT to implement traffic control measure. As interim measure, alternate parking to east and west sides of street.	Slow traffic on 48th Avenue and prevent diversion from traffic humps on adjacent street.	Medium – monitor traffic after nearby traffic circle installed.
M. NE 47th Street at 49th Avenue NE	Install right turn only sign for eastbound traffic	Prevent traffic from arriving on NE 47th Street to access proposed Villa Academy Driveway.	Low – Install concurrently with new driveway to Villa Academy.
N NE 50th Street/44th Avenue NE	Install traffic circle	Slow speeds on NE 50th Street	High
P. Sand Point Way NE between 45th Avenue NE and 46th Avenue NE	Prohibit parking and add guardrail	Improve pedestrian safety, and prevent vehicles from driving off roadway when out of control.	Medium
Q. Sand Point Way at NE 52nd Street	Trim landscaping in median island to improve sight lines.	Facilitate pedestrian crossing to Metro Bus Stop, Park, and Daycare.	Medium
R. Sand Point Way/50th Avenue NE/ Ivanhoe Place NE	Install traffic signal (proposed by City). Will require some modification to intersection to prevent left turns across 50th Avenue to access Ivanhoe Place. May also have some curb modifications to improve pedestrian crossing of intersection	Reduce congestion at this unsignalized intersection, improve vehicular safety, and improve pedestrian crossing safety.	Medium
S. Sand Point Way/Children's Hospital Driveway/42nd Avenue NE	Retain temporary traffic signal for traffic on 42nd Avenue NE (which was installed for Princeton Bridge construction project), and restrict eastbound movements on NE 50th Street to right turn only.	Improve safety and mobility for traffic crossing Sand Point Way to access Laurelhurst neighborhood.	Medium
T. Sand Point Way NE between NE 50th Street and 47th Avenue NE.	Add asphalt walkway on east side of street	Improve pedestrian mobility along high-speed arterial where no formal walkway exists.	High

Note: Letters I and O were not used for codes to keep graphics legible.



BIBLIOGRAPHY

City of Seattle, *Making Streets that Work*, May 1996.

Ewing, Reid. Institute of Transportation Engineers and the US Department of Transportation, *Traffic Calming, State of the Practice*, August 1999.

City of Seattle, *Neighborhood Traffic Control Program, Traffic Calming Options Slide Show*, from City of Seattle web site: <http://www.ci.seattle.wa.us/td/tcw/index.htm>, February 28, 2002

City of Seattle, *Neighborhood Traffic Control Program, Typical Traffic Calming Measures*, from City of Seattle web site: <http://www.ci.seattle.wa.us/td/ntcpprog.asp>, February 28, 2002.

U.S. Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices – Millennium Edition*, June 2001.

Institute of Transportation Engineers, *Traffic Engineering Handbook, Fifth Edition*. 1999.

City of Seattle, **DRAFT** *Installation Criteria & Procedures for Responding to Requests for Safety Improvements*.