CITY OF BELLEVUE
TRANSPORTATION DEPARTMENT

STATIONARY RADAR SIGN PROGRAM

2005 REPORT

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City of Bellevue
Stationary Radar Sign Program Report
2005

Stationary Radar Sign Overview

Over the past five years, the City of Bellevue has installed stationary radar signs, aimed at addressing excessive vehicle speeds in locations where other physical forms of traffic calming were not feasible. The signs dynamically display the speed of a passing vehicle, encouraging the driver to reduce their speed, if necessary. This report shares Bellevue's experience with these signs from installation techniques to effectiveness levels and considerations for future placement.

As of June 2005, the City has installed 20 stationary radar signs. The majority of the radar sign locations have experienced an overall reduction of vehicle speeds between 1 and 6 mph, even up to four years after the sign installations (see Appendix page 11).

With the success of the program, the City will continue to use stationary radar signs. Considerations for their installation will be determined by a variety of factors. As more experience is gained with the use of stationary radar signs, other opportunities for their use may be evaluated.

Background

In the Fall of 2000, new technologies were explored that addressed excessive vehicle speeds on streets that were unable to qualify for physical traffic calming measures. Primarily, these were locations which exceeded the 3500 vehicle per day threshold for speed humps and traffic circles, or had steep grades or curves. One of the technologies was the stationary radar sign. The basic function of the stationary radar sign is to provide a dynamic speed display (increasing and decreasing) to the driver of a passing vehicle to encourage the motorist to reduce vehicle speeds if necessary. Although the City had previously purchased and used successfully a radar trailer with similar characteristics, this was the first attempt at creating a permanent location.

How The Stationary Radar Sign Works

The stationary radar sign, sometimes referred to as a driver feedback sign, uses an internal radar unit that captures the speed of passing motorists and displays this onto a board. The dynamic speed display is most effective when the posted speed limit is mounted above the radar sign so that the motorist can compare the speed displayed if needed, and reduce their vehicle speed.

Dependent upon manufacturer, some radar signs have the capability to be programmed for a variety of traffic conditions (different speed limits, day and night operations, local streets, arterials, highways, etc.). Some of the basic programmed settings of radar signs are threshold speed (or flash speed), scheduling (timed operations), and recording of data from passing traffic (speed and volume data).

Threshold speed refers to a specific speed at which the radar sign is programmed to display an emphasized warning to the passing motorist that their vehicle's speed is too high. Depending on the sign, the emphasized warning can be a text message of "Hi", "Slow Down", or an illuminated flashing speed that stops flashing once the motorists reduce their speed. Setting the threshold speed is an important element of programming the radar sign. If the threshold speed is set too low, motorists may

become accustom to the emphasized warning and begin to ignore it, setting it too high may reduce radar sign effectiveness, and not setting it at all may encourage some motorist to try and register the highest speeds possible. Bellevue sets the threshold speed at 10 mph above the posted speed limit.

Other radar signs can be scheduled to operate in a variety of different settings dependent upon time of day, month or year. They can be programmed over a 24 hour period to a set schedule, and/or show a static speed limit or a text message at specific times. This technology lends itself well for use in school zones.

Some radar signs also have the capability of recording and storing traffic speeds and volumes. This information can be downloaded from the radar sign and uploaded to a computer to determine speed percentile calculations, average traffic volumes, etc. This is a valuable feature of these signs, as it can save man-hours for traffic studies in addition to assisting in determining the effectiveness of the sign.

Developing A Program And Guidelines

From 2000 to 2002, the stationary radar sign demonstration project installed ten radar sites at the following locations on an experimental basis.

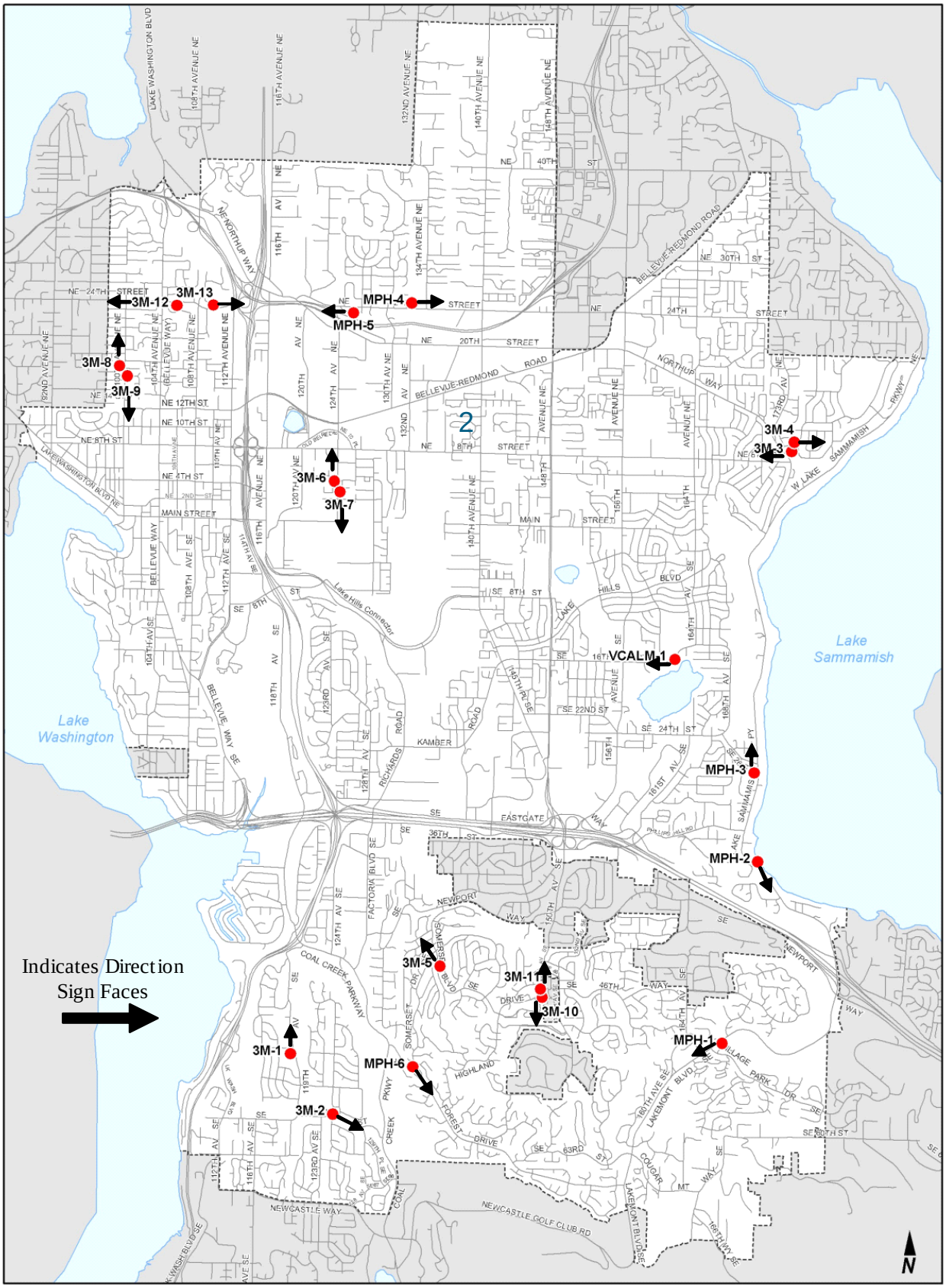
Equip. Make—Map #	Location
MPH-1	Lakemont Blvd e/o Village Park Drive
MPH-2	West Lake Sammamish s/o Vasa Park
MPH-3	West Lake Sammamish s/o SE 26th St
MPH-4	NE 24th St w/o 134th Ave NE
MPH-5	NE 24th St e/o 124th Ave NE
3M-1	119th Ave SE s/o SE 52nd St
3M-2	SE 60th St w/o 126th Ave SE
3M-3	NE 10th St e/o Northup Way
3M-4	176th Ave NE s/o NE 13th St
3M-5	Somerset Blvd s/o Somerset Dr

After installation, speed studies done near each radar sign showed that the signs reduced 85th percentile speeds at the majority of the radar sign sites. The demonstration project report recommended that the City continue to install radar signs at appropriate locations. Guidelines were established and a Stationary Radar Sign program was implemented. During 2003 through 2004 the additional locations listed below were added to the City's inventory of stationary radar sites. All sign locations listed by manufacturer can be found on the map on the following page.

Equip. Make—Map #	Location
MPH-6	Forest Dr w/o Somerset Dr SE
3M-6	124th Ave NE s/o NE 5th St
3M-7	124th Ave NE s/o NE 4th Pl
3M-8	100th Ave NE n/o NE 16th Pl
3M-9	100th Ave NE s/o NE 16th Pl
3M-10	Highland Dr e/o 147th Pl SE
3M-11	Highland Dr s/o SE 46th Pl
3M-12	NE 24th St e/o 105th Ave NE
3M-13	NE 24th St w/o 109th Ave NE
VCALM-1	SE Phantom Way e/o SE 16th St

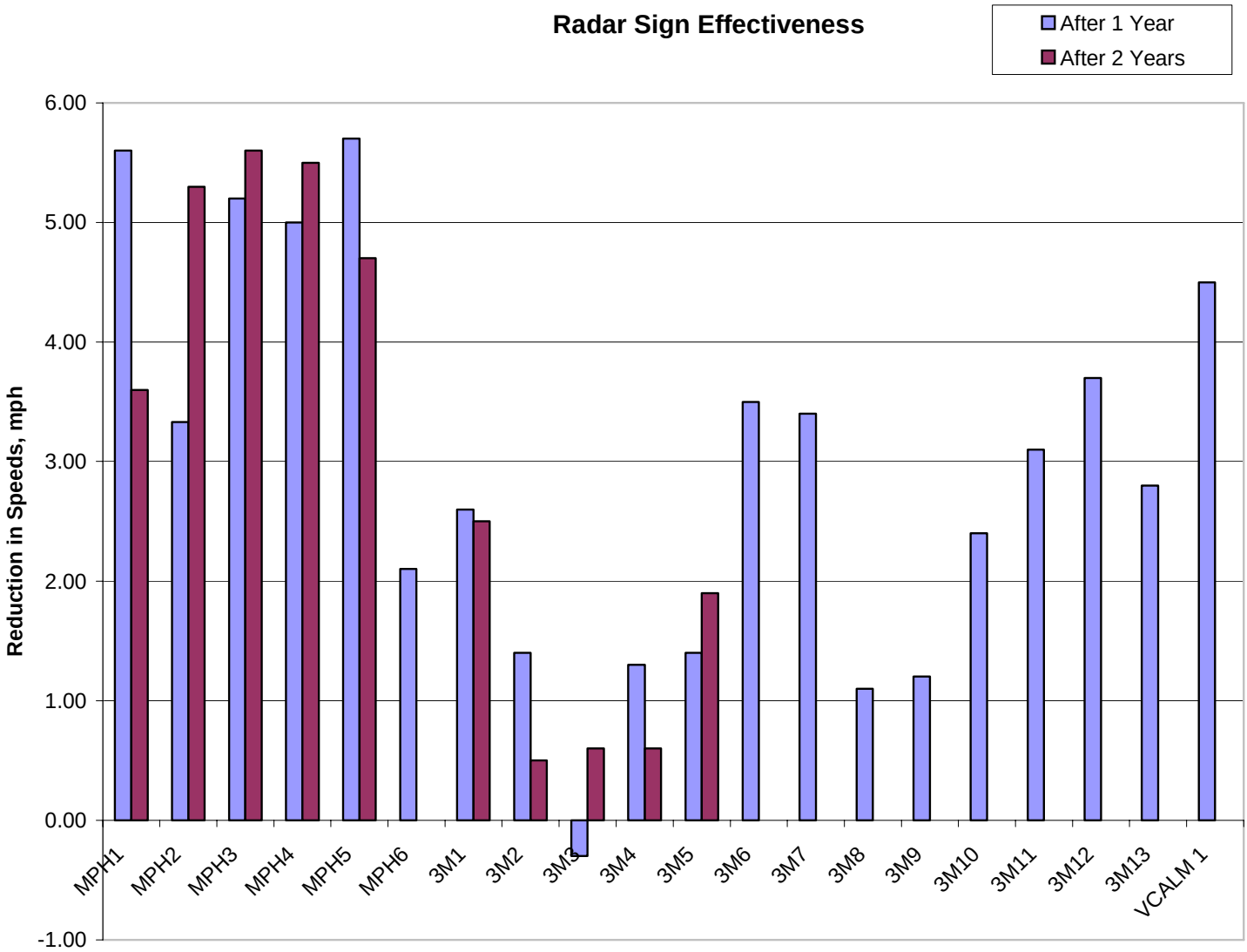
City of Bellevue

Radar Sign Locations by Type



Effectiveness Of The Radar Signs In Bellevue

Bellevue has experienced speed reductions between 1 and 5 mph at the majority of radar sign locations. In some cases, there have been higher speed reductions, upwards of 5.5 mph. Yet a few locations had limited or no speed reduction at all, as demonstrated in the following chart:



The limited effectiveness of some radar signs on speeds may be linked to several factors. The first factor is the location of the sign and the visibility for aproaching motorists. At the location where speeds went unchanged, there is limited sight-distance of the radar sign. Another factor appears to be the speed of the roadway before the signs were installed. The location mentioned above had 85th percentile speeds that were already near the posted speed limit (see Appendix pages 12-31 for site specific data for each location).

In order to determine how the radar signs performed several years after installation and if they lose their effectiveness over a period of time, speeds studies were done at all radar signs that had been in place for two years or more (see Appendix page 11). As shown above, the majority of signs continue to experience speed reductions of significant value up to four years after installation.

Considerations For Radar Sign Placement

The City contracts the installation of radar signs, with typical installation costs ranging from $3,500 to $6,500, depending on the location of power. Over the past five years, the City's experience with installing stationary radar signs has provided us with information which has been used to establish considerations for locating these signs. These include, but are not limited to:

- Each radar site should maximize speed display exposure between the motorist and the radar sign (driver feedback). Consideration should be given to existing road geometry, topography and roadside vegetation. A minimum distance of 300 feet of clear sight distance should be maintained.
- Power availability should be close by to ensure a more cost efficient installation.
- Radar sign light intrusion to nearby homes needs to be considered. Blinders can be used to minimize light intrusion; however, some residents object to the view of the radar sign itself. Bellevue's policy is to obtain agreement from each adjacent property owner prior to installation of the radar signs.
- Signs should face oncoming traffic at an appropriate angle for the radar to be picked up by passing motorists (specified by the manufacturer).
- Ensure that no metal objects (including parked cars) are or will be placed between the radar sign and oncoming traffic.
- Mount all radar signs with a concrete footing.
- Minimum height from bottom edge of sign to grade should be seven feet (to discourage vandalism).
- A posted speed limit sign needs to be installed above the radar sign.

Types Of Radar Signs Used In Bellevue

MPH

MPH signs have been installed on local collector streets (with speed limits of 30 mph) due to the sign's high visibility (red LED speed display) and larger size (30" x36"). The threshold speed is set at 10 mph above the posted speed limit, at which point the sign will flash repeatedly and will not register higher speeds. Overall, MPH radar sign sites have achieved and maintained good speed reduction rates. Maintenance and repair issues have been minimal. Technical assistance is readily available. One disadvantage to the MPH signs used in Bellevue is that they do not record or store traffic data (speeds, volumes, etc.). MPH speed study information can be found in the Appendix on page 32.

3M

3M signs have been primarily installed on residential streets with posted speed limits of 25 mph. This was due to the lower brightness level of the signs as well as the fact that the sign is available in a smaller size (24" x 30"). In a residential setting these features can make the radar signs less intrusive to nearby homeowners.

3M signs use flip-disk technology (florescent green) with illumination by LED at night and at threshold speed warning. The threshold warning can be set as a flashing static speed display or text message (programmed by the factory upon request). The City programs 3M signs to flash repeatedly at 35 mph. The 3M sign has the capability of recording and storing traffic data (speeds and volumes), as well as

operating on specified schedules. Communication with the sign is available by serial port or wireless modem. Initially the City tried the wireless modem feature for programming and communication. A total of six signs were ordered with this feature. After installation, communication via modem was intermittently achieved with only two of the signs. Eventually all six signs were modified for serial port communications. Since then, wireless modem technology has not been used in Bellevue for radar sign programming.

Overall speed reduction rates achieved by 3M radar signs vary by location. This may be due to the lower visibility of the 3M signs and the lower 85th percentile speeds prior to their installation. Speed display sighting (feedback time) was found to be limited at some 3M sites due to road geometry and grade, which also may be responsible for the mixed performance of the 3M radar signs. 3M speed study information can be found in the Appendix on page 33.

Vcalm

Since the City began purchasing radar signs in 2000, a number of new sign manufactures have emerged. After some investigating Fortel Traffic's Vcalm radar sign was purchased by the City in June 2004, for its variety of setting options, including a strobe. The sign has been installed on a local collector street (with a speed limit of 25 mph) and has been in operation since August 2004. There have been no resident complaints concerning the strobe though duct tape was found covering the strobe light during a monthly inspection of the sign location. The sign is programmed to display speeds up to 35 mph. Beyond this threshold speed the sign has been programmed to display a text message of "Slow Down", as well as to trigger the strobe.

The Vcalm radar sign displays speeds with yellow-orange LEDs against a black background. This combination seems to enhance sign visibility. Various combinations of text messages and speed displays come pre-programmed with the sign. Sign communication can be via wireless modem or serial port. Bellevue uses the serial port option.

The sign has traffic recording and storage capability, and downloading is made easy with a hand-held PC, which is included with the purchase of the radar sign. The accompanying software creates speed graphs and calculates speed percentiles. Vcalm speed study information can be found in the Appendix on page 32.

Maintenance And Vandalism

Over the past five years, there has been minimal maintenance needed with 98% of the signs. In the remaining 2%, there have been on-going programming and power issues, which have been worked out with the manufacturer by sending them the unit to be fixed or replaced. Regular maintenance of these units is provided by the City's in-house street lighting/signal technicians.

Vandalism has been a problem at several radar sign sites. The most common type of vandalism that occurs are objects (watermelons, pumpkins, eggs, bricks, rocks) being thrown at the display. At the extreme end, vandalism by firearms has also occurred. The City has had to replace two radar signs due to damage by vandalism.

Many radar manufacturers also recognize vandalism as a recurrent problem for radar signs and have started producing signs with shatter proof plexi-glass fronts and water tight seals. Access to the interior electronics is locked.

Conclusion

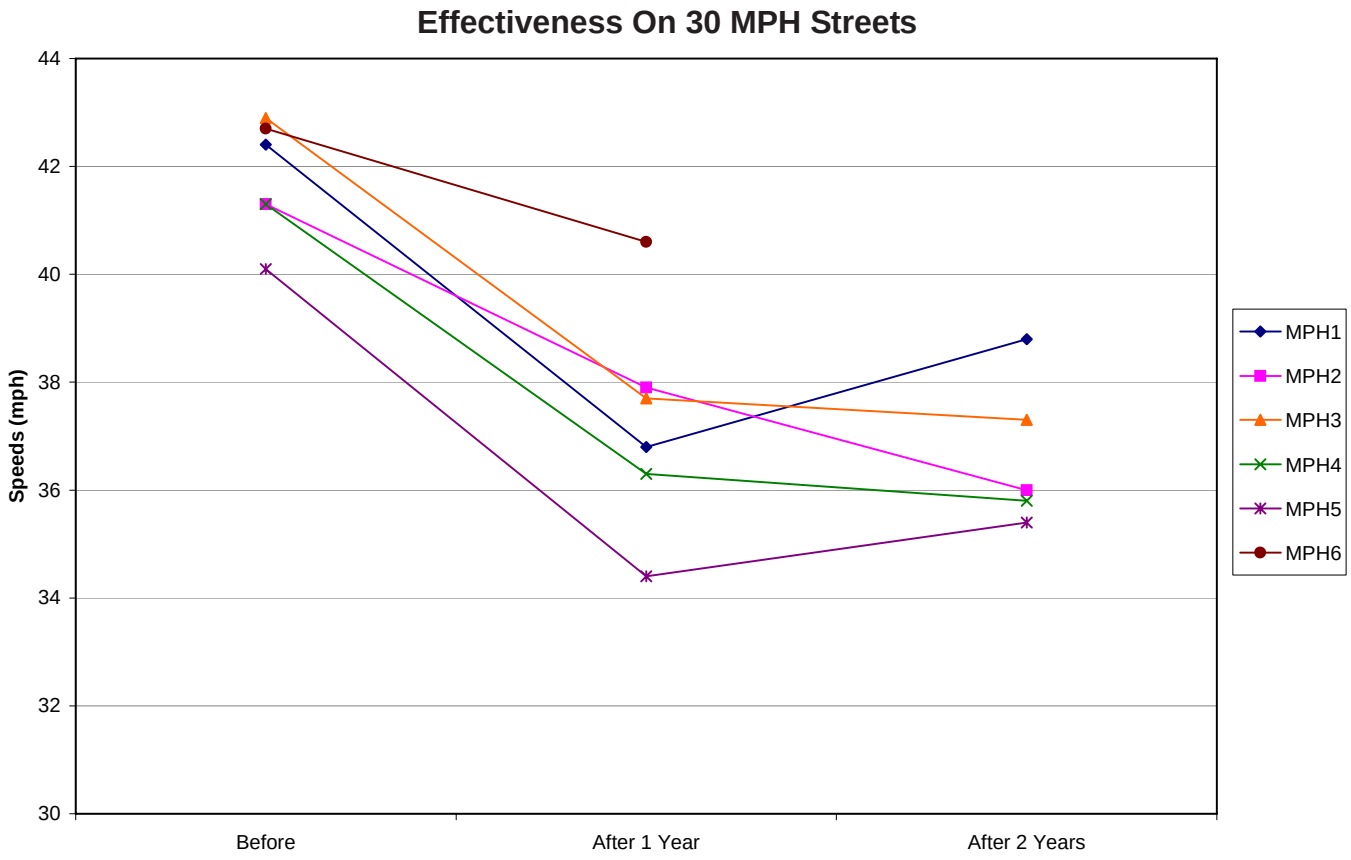
As shown previously, speed studies were done at all radar sites in 2004 and 2005. These studies show that the majority of the stationary radar signs continue to reduce 85th percentile speeds even though some have been installed for more than four years.

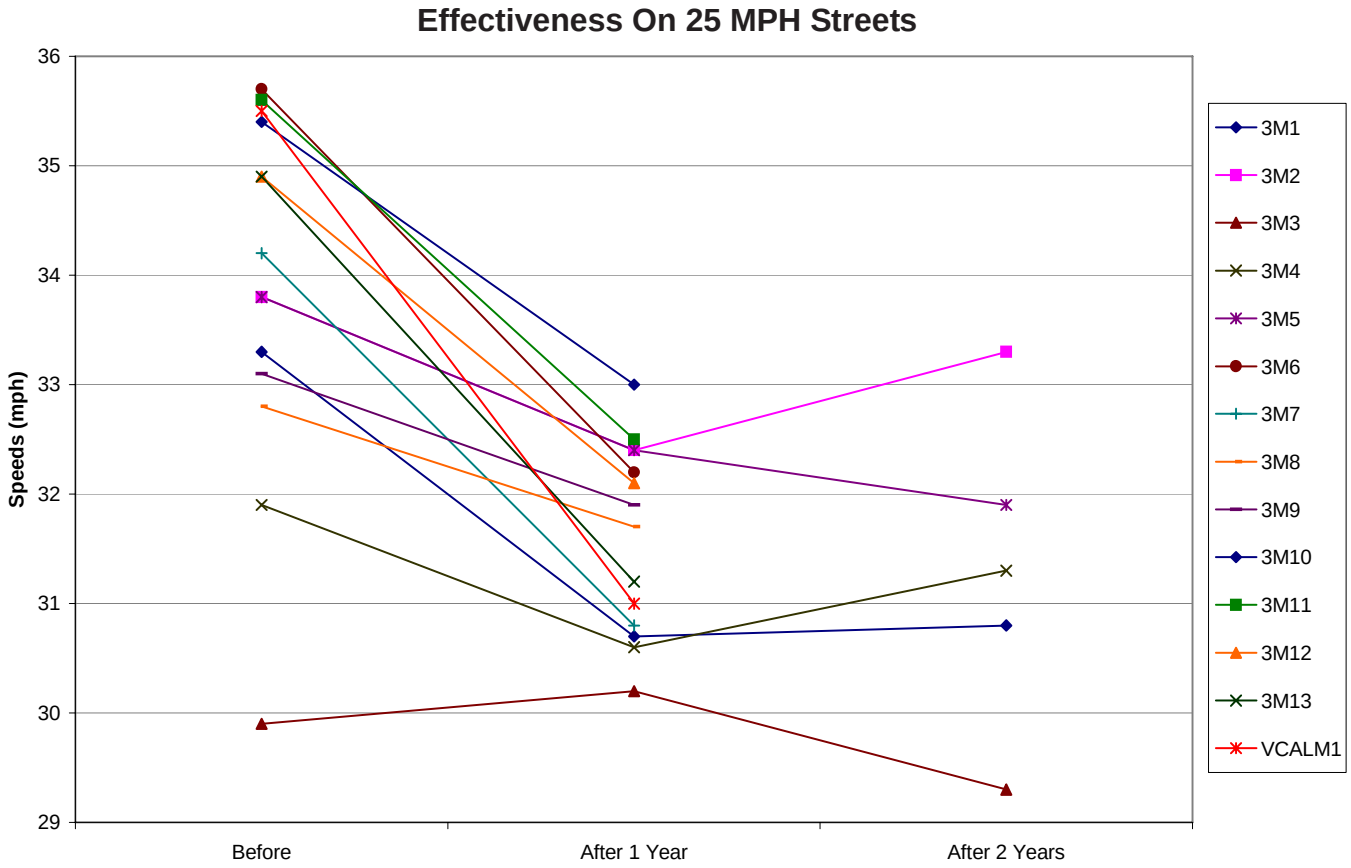
With the success to date of the stationary radar ssigns, it is recommended that the City continue to install the signs at appropriate locations. These signs provide a tool for those streets that cannot receive traditional traffic calming measures. However, as this report confirms, speed reductions are limited when 85th percentile speeds are below 10 mph over the posted speed limit. Therefore, the City's guidelines on radar sign placement has been updated to reflect the following:

- two-lane roadway
- does not qualify for typical physical traffic calming measures due to high traffic volumes and/or roadway characteristics, such as curves, or steep grades
- 85th percentile speeds 10 mph or higher than the posted speed limit

As additional uses for these signs are explored, the City's guidelines may be revisited.

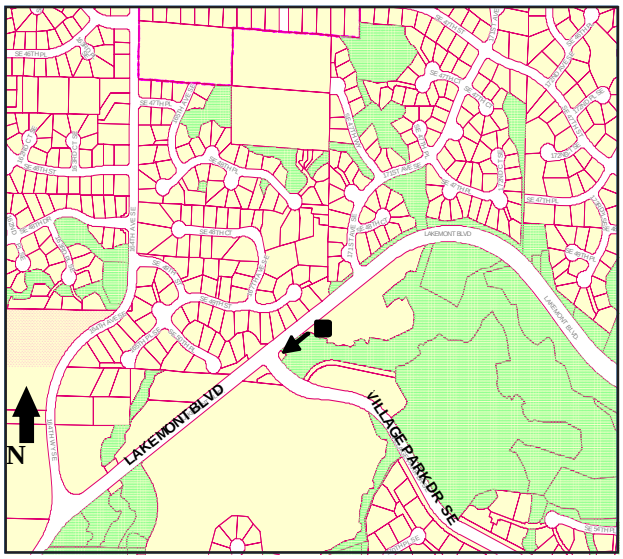
APPENDIX


Effectiveness On 30 MPH Streets
Speeds (mph)
44
42
40
38
36
34
32
30
Before
After 1 Year
After 2 Years
MPH1
MPH2
MPH3
MPH4
MPH5
MPH6


Effectiveness On 25 MPH Streets
Speeds (mph)
36
35
34
33
32
31
30
29
Before
After 1 Year
After 2 Years
3M1
3M2
3M3
3M4
3M5
3M6
3M7
3M8
3M9
3M10
3M11
3M12
3M13
VCALM1

MPH-1 Lakemont Blvd e/o Village Park Dr

(for eastbound motorists)



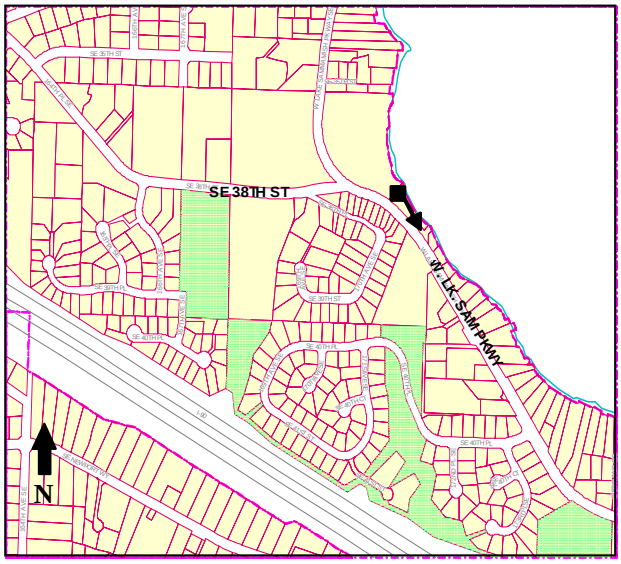
Radar Sign Info

Installation Date:	Sept 2000
MPH Sign	$5,700
Installation	$2,100
Total	$7,800
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) eastbound	Reduction (mph)
8/00	42.4	N/A
Installed September 2000		
10/01	36.8	-5.6
9/04	38.8	-3.6

85th percentile is defined as 85% of motorists recorded at or below this speed

MPH-2 West Lake Sammamish s/o Vasa Park
(for northbound motorists)

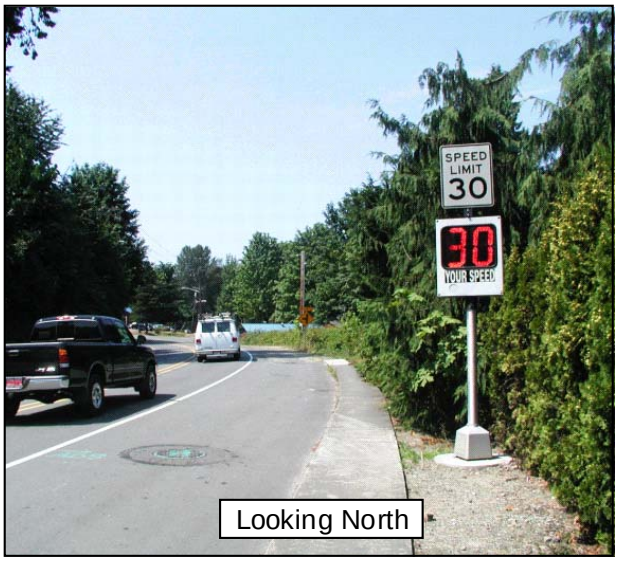


Radar Sign Info

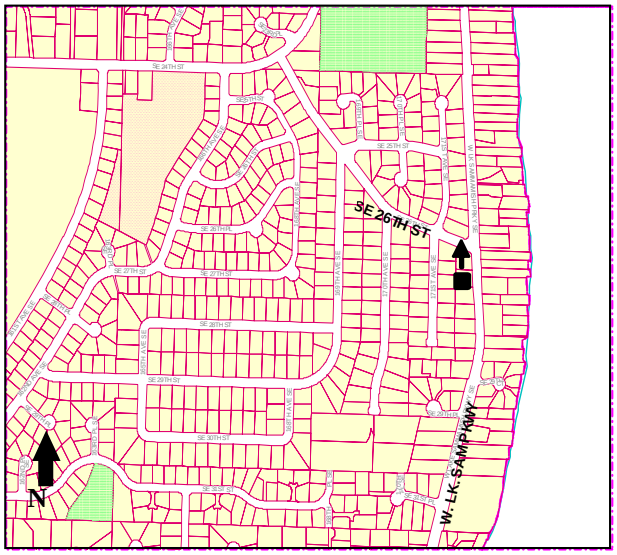
Installation Date:	June 2001
MPH Sign	$5,700
Installation	$4,700
Total	$10,400
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) northbound	Reduction (mph)
1/01	41.3	N/A
Installed June 2001		
10/01	38.0	-3.3
8/04	36.0	-5.3

85th percentile is defined as 85% of motorists recorded at or below this speed



MPH-3 West Lake Sammamish s/o SE 26th Street
(for southbound motorists)



Radar Sign Info

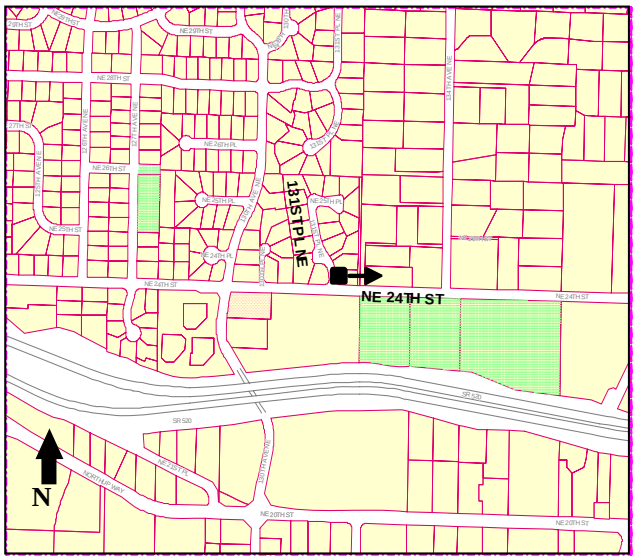
Installation Date:	June 2001
MPH Sign	$5,700
Installation	$4,700
Total	$10,400
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) southbound	Reduction (mph)
11/00	42.9	N/A
Installed June 2001		
10/01	37.7	-5.2
9/04	37.3	-5.6

85th percentile is defined as 85% of motorists recorded at or below this speed

Looking south

MPH-4 NE 24th Street w/o 134th Ave NE
(for westbound motorists)



Radar Sign Info

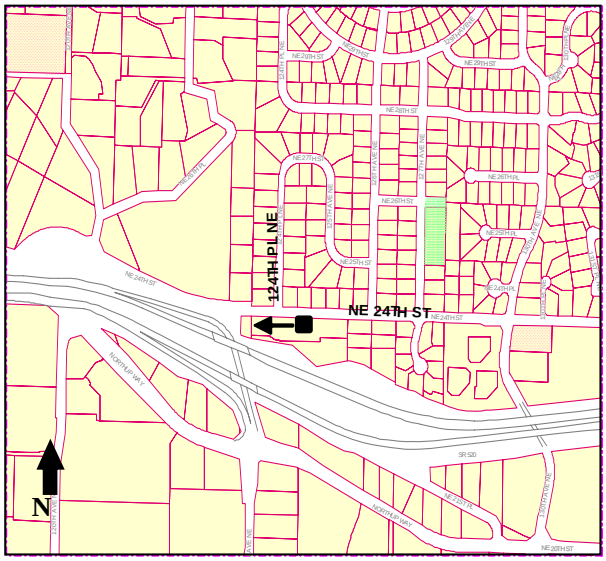
Installation Date:	April 2002
MPH Sign	$5,700
Installation	$5,000
Total	$10,700
Monthly Electricity:	$3
Maintenance/Repair:	*Moderate

*due to vandalism

Date	85th Percentile Speed (mph) westbound	Reduction (mph)
2/02	41.3	N/A
Installed April 2002		
7/02	36.3	-5.0
8/04	35.8	-5.5

85th percentile is defined as 85% of motorists recorded at or below this speed

MPH-5 NE 24th Street e/o 124th Ave NE
(for eastbound motorists)

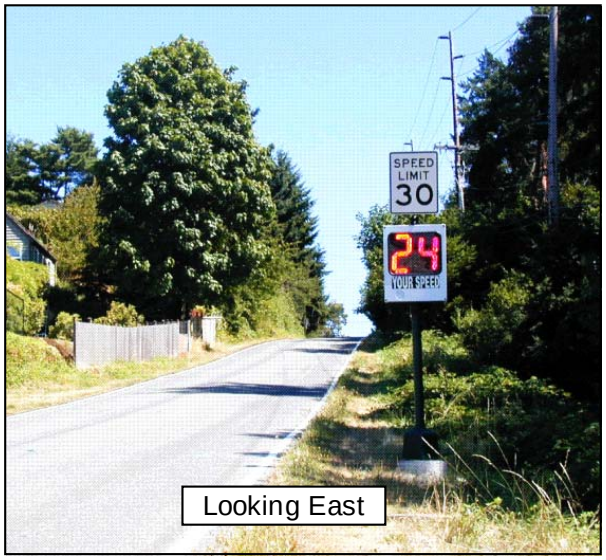


Radar Sign Info

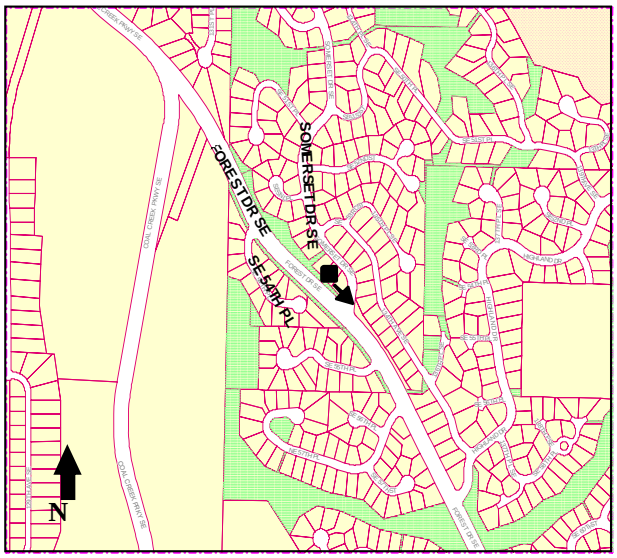
Installation Date:	May 2002
MPH Sign	$5,700
Installation	$4,700
Total	$10,400
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) eastbound	Reduction (mph)
2/02	40.1	N/A
Installed April 2002		
7/02	34.4	-5.7
8/04	35.4	-4.7

85th percentile is defined as 85% of motorists recorded at or below this speed



MPH-6 Forest Drive w/o Somerset Dr SE
(for northwestbound motorists)

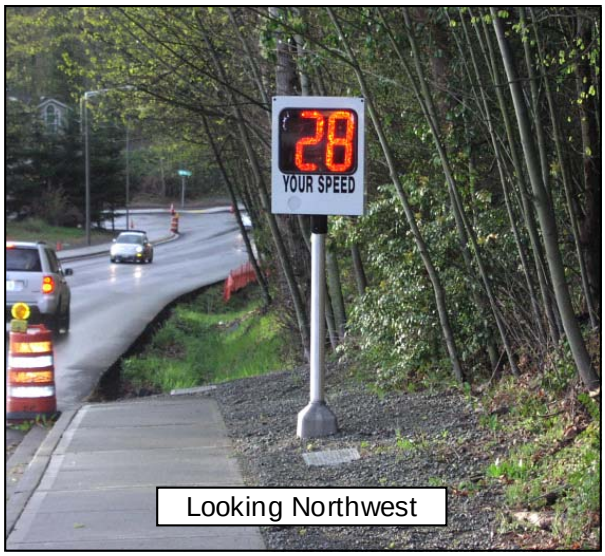


Radar Sign Info

Installation Date:	Feb. 2005
MPH Sign	$5,700
Installation	$4,700
Total	$10,400
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

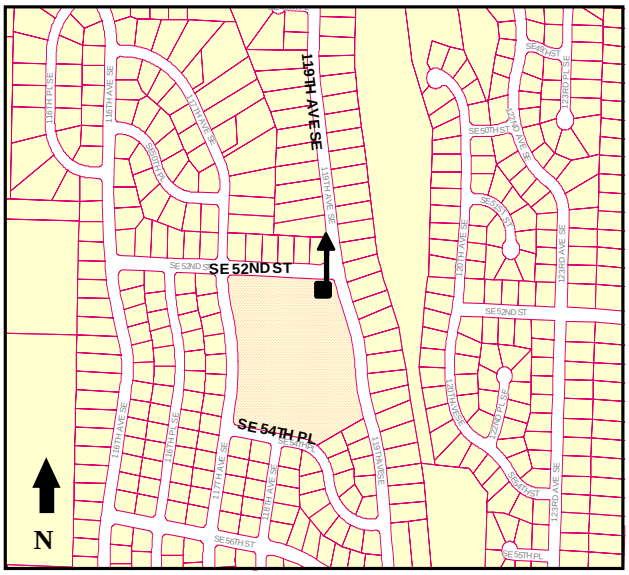
Date	85th Percentile Speed (mph) nwbound	Reduction (mph)
1/05	42.7	N/A
Installed April 2002		
3/05	40.6	-2.1

85th percentile is defined as 85% of motorists recorded at or below this speed



Looking Northwest

3M-1 119th Avenue SE
s/o SE 52nd Street
(for southbound motorists)



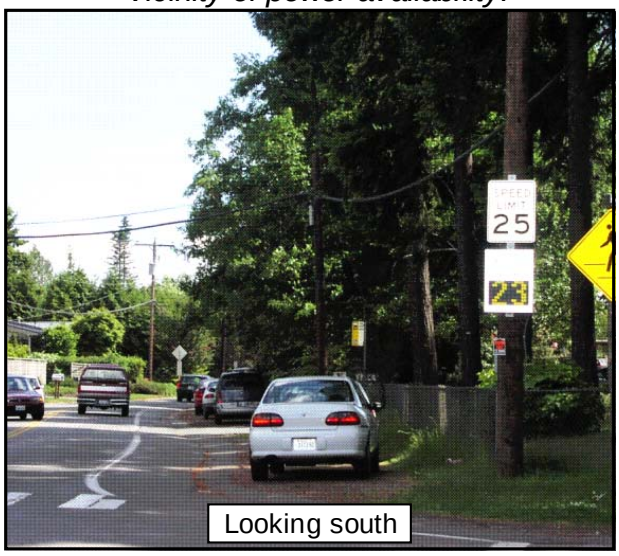
Radar Sign Info

Installation Date:	Sept. 2001
3M Sign	$5,000
Installation	*$3,400
Total	$8,400
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

**Low Install costs due to close vicinity of power availability.*

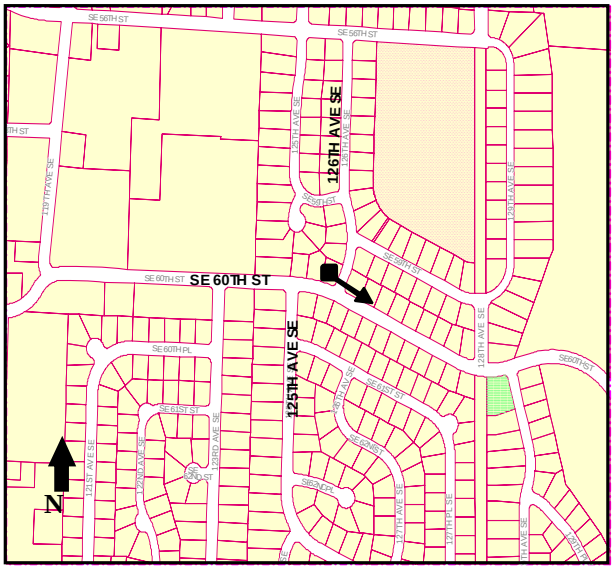
Date	85th Percentile Speed (mph) southbound	Reduction (mph)
2/01	33.3	N/A
Installed September 2001		
7/02	30.7	-2.6
8/04	30.8	-2.5

85th percentile is defined as 85% of motorists recorded at or below this speed



Looking south

3M-2 SE 60th Street w/o 126th Avenue SE
(for westbound motorists)



Radar Sign Info

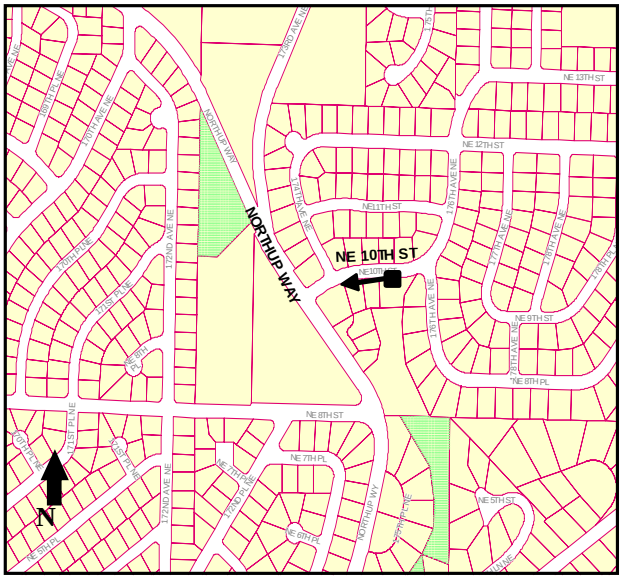
Installation Date:	Sept. 2001
3M Sign	$8,600
Installation	*$15,900
Total	$24,500
Monthly Electricity:	$3
Maintenance/Repair:	Moderate

**High install costs due to several modifications from solar power to electrical service.*

Date	85th Percentile Speed (mph) westbound	Reduction (mph)
2/01	33.8	N/A
Installed September 2001		
6/02	32.4	-1.4
8/04	33.3	-0.5

85th percentile is defined as 85% of motorists recorded at or below this speed

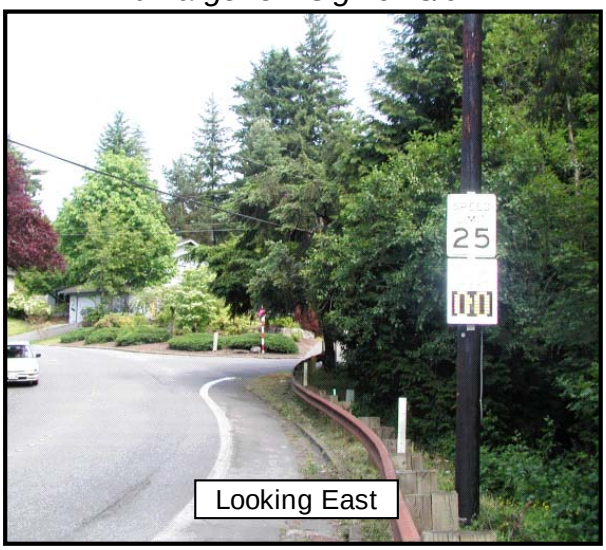
3M-3 NE 10th Street
e/o Northup Way
(for eastbound motorists)



Radar Sign Info

Installation Date:	Feb. 2002
3M Sign	$5,000
Installation	$2,600
Total	$7,600
Monthly Electricity:	$3
Maintenance/Repair:	*High

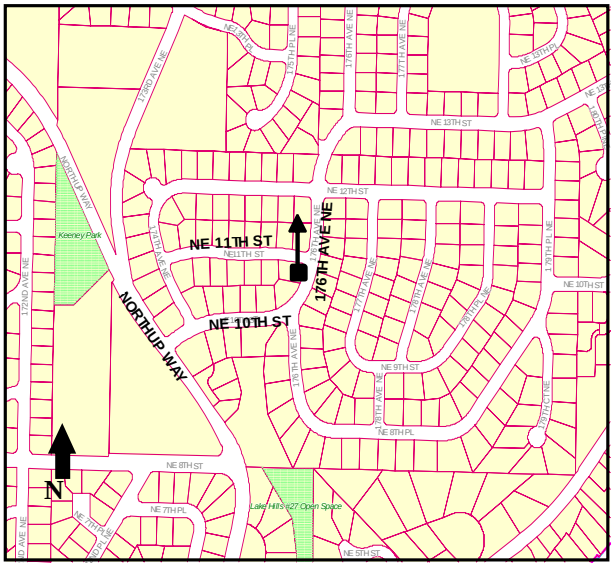
**Sign had to be replaced due to inconsistent readings. Replaced with larger 3M sign on 8/04.*



Date	85th Percentile Speed (mph) eastbound	Reduction (mph)
6/97	29.9	N/A
Installed February 2002		
7/02	30.2	+0.3
9/04	29.3	-0.6

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-4 176th Avenue NE
s/o NE 13th Street
(for southbound motorists)



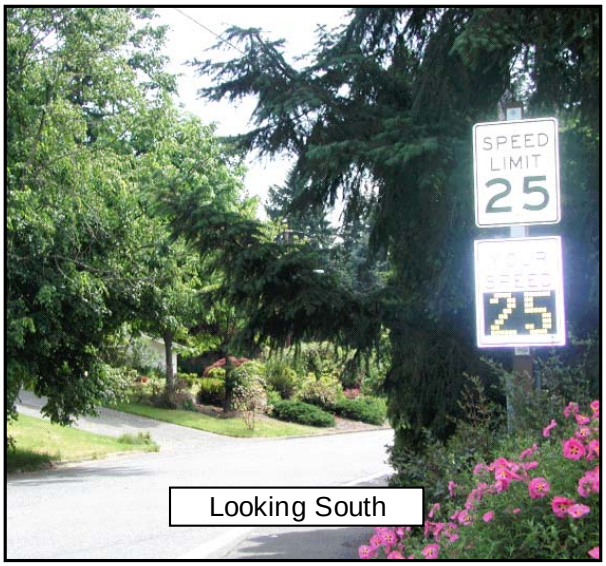
Radar Sign Info

Installation Date:	Sept. 2001
3M Sign	$5,000
Installation	$3,100
Total	$8,100
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) southbound	Reduction (mph)
8/01	31.9	N/A
Installed February 2002		
7/02	30.6	-1.3*
8/04	31.3	-0.6*

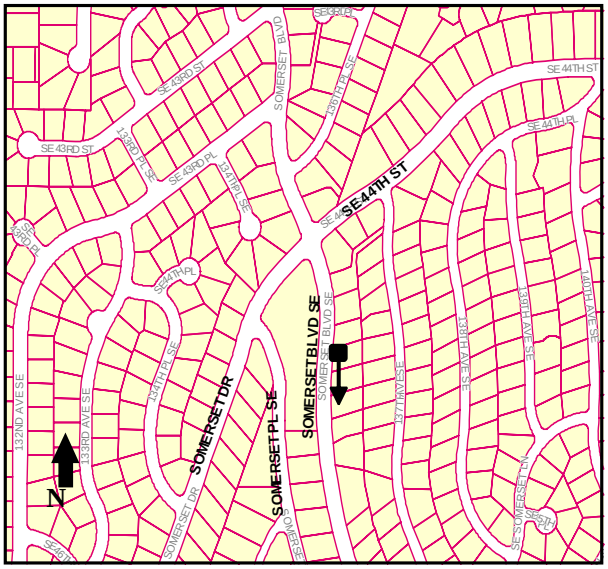
85th percentile is defined as 85% of motorists recorded at or below this speed

**Sign Location has limited driver feedback distance. Looking into revising location*



Looking South

3M-5 Somerset Boulevard SE s/o Somerset Drive
(for northbound motorists)



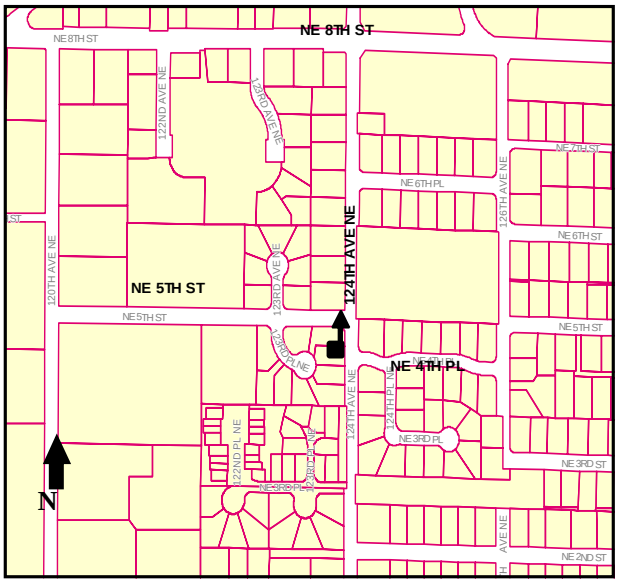
Radar Sign Info

Installation Date:	April 2002
3M Sign	$5,000
Installation	$2,400
Total	$7,400
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) northbound	Reduction (mph)
1/02	33.8	N/A
Installed February 2002		
6/02	32.4	-1.4
8/04	31.9	-1.9

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-6 124th Avenue NE
s/o NE 5th Street
(for southbound motorists)



Radar Sign Info

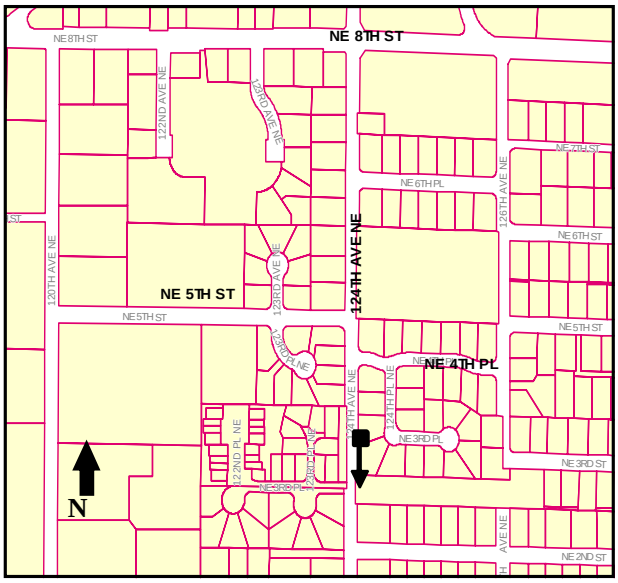
Installation Date:	July 2003
3M Sign	$6,000
Installation	$3,500
Total	$9,500
Monthly Electricity:	$3
Maintenance/Repair:	*Moderate

**Concrete footing installed due to vandalism 9/04.*

Date	85th Percentile Speed (mph) southbound	Reduction (mph)
3/03	35.7	N/A
Installed July 2003		
9/04	32.2	-3.5

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-7 124th Avenue NE
s/o NE 4th Place
(for northbound motorists)



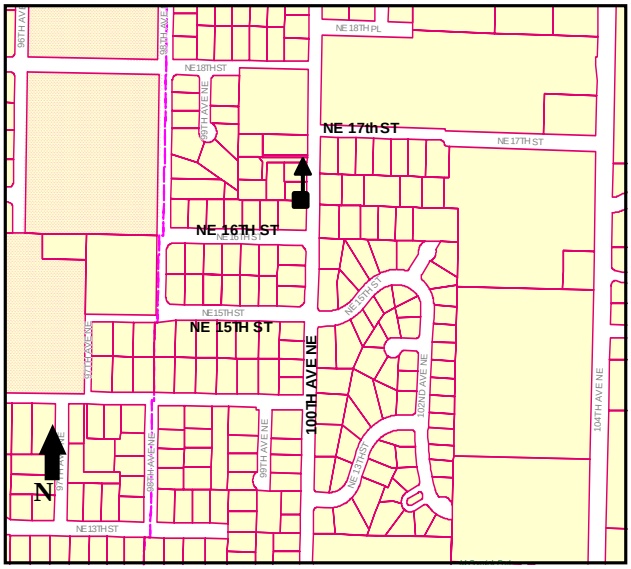
Radar Sign nfo

Installation Date:	July 2003
3M Sign	$6,000
Installation	$3,500
Total	$9,500
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) northbound	Reduction (mph)
3/03	34.2	N/A
Installed July 2003		
9/04	30.8	-3.4

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-8 100th Avenue NE
n/o NE 16th Place
(for southbound motorists)



Radar Sign Info

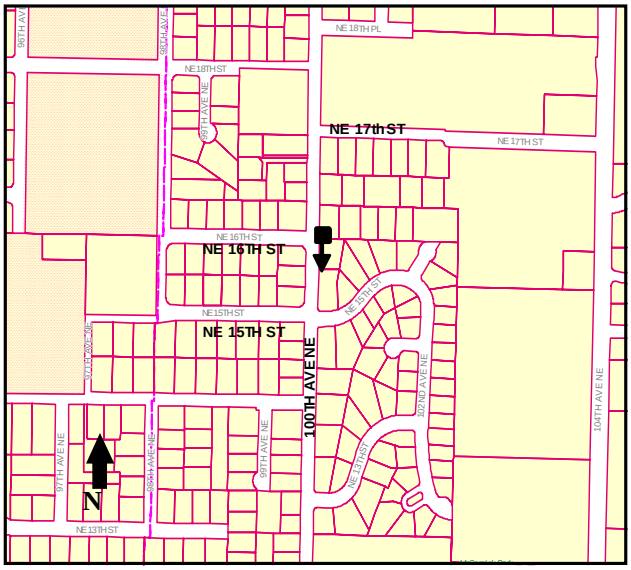
Installation Date:	Aug. 2004
3M Sign	$6,000
Installation	$4,500
Total	$10,500
Monthly Electricity:	$3
Maintenance/Repair:	*Moderate

**Wireless modem failed in the field. Serial port installed by 3M tech.*

Date	85th Percentile Speed (mph) southbound	Reduction (mph)
8/02	32.8	N/A
Installed August 2004		
3/05	31.7	-1.1

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-9 100th Avenue NE
s/o NE 16th Place
(for northbound motorists)



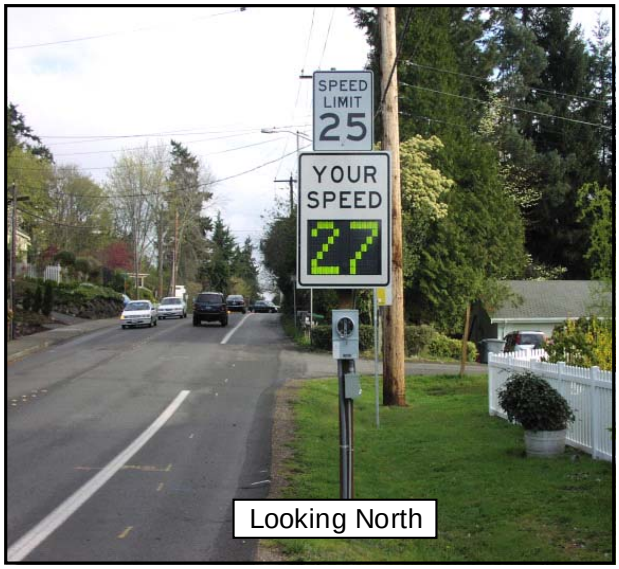
Radar Sign Info

Installation Date:	Aug. 2004
3M Sign	$6,000
Installation	$4,500
Total	$10,5000
Monthly Electricity:	$3
Maintenance/Repair:	*Moderate

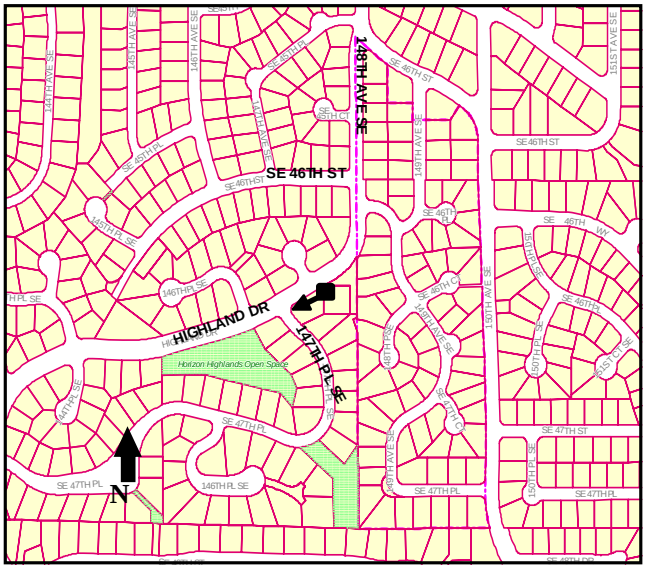
**Wireless modem failed in the field. Serial port installed by 3M tech.*

Date	85th Percentile Speed (mph) northbound	Reduction (mph)
8/02	33.1	N/A
Installed August 2004		
3/05	31.9	-1.2

85th percentile is defined as 85% of motorists recorded at or below this speed



3M-10 Highland Drive
n/e of 147th Place SE
(for eastbound motorists)



Radar Sign Info

Installation Date:	April 2004
3M Sign	$6,000
Installation	$4,500
Total	$10,500
Monthly Electricity:	$3
Maintenance/Repair:	*Moderate

**Wireless modem failed in the field. Serial port installed by 3M tech.*

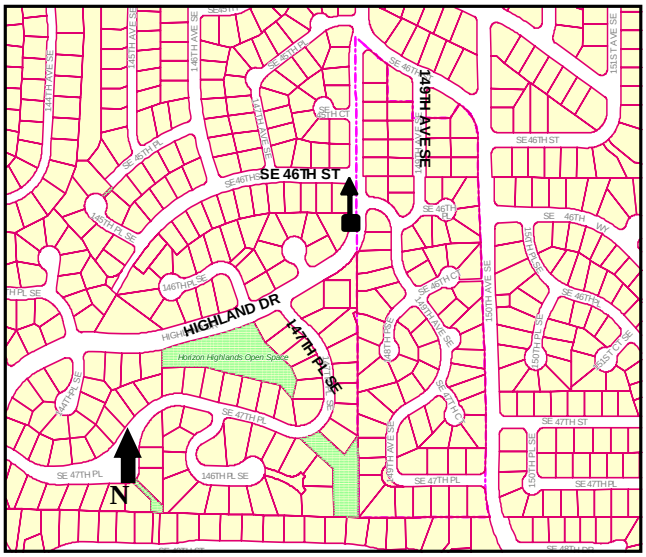
Date	85th Percentile Speed (mph) eastbound	Reduction (mph)
3/03	35.4	N/A
Installed August 2004		
3/05	33.0	-2.4

85th percentile is defined as 85% of motorists recorded at or below this speed

Looking East

3M-11 Highland Drive s/o SE 46th Place

(for southbound motorists)



Radar Sign Info

Installation Date:	Aug. 2004
MPH Sign	$6,000
Installation	$4,500
Total	$10,500
Monthly Electricity:	$3
Maintenance/Repair:	*Moderate

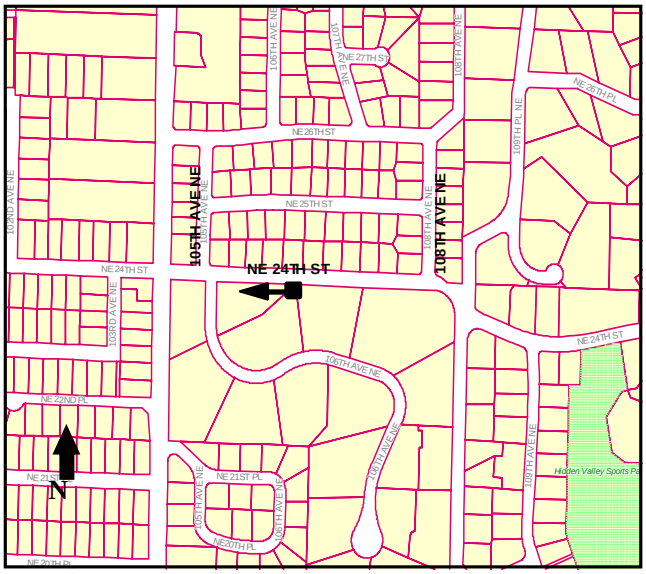
**Wireless modem failed in the field. Serial port installed by 3M tech.*

Date	85th Percentile Speed (mph) southbound	Reduction (mph)
3/03	35.6	N/A
Installed August 2004		
3/05	32.5	-3.1

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-12 NE 24th Street e/o 105th Avenue NE

(for eastbound motorists)



Radar Sign Info

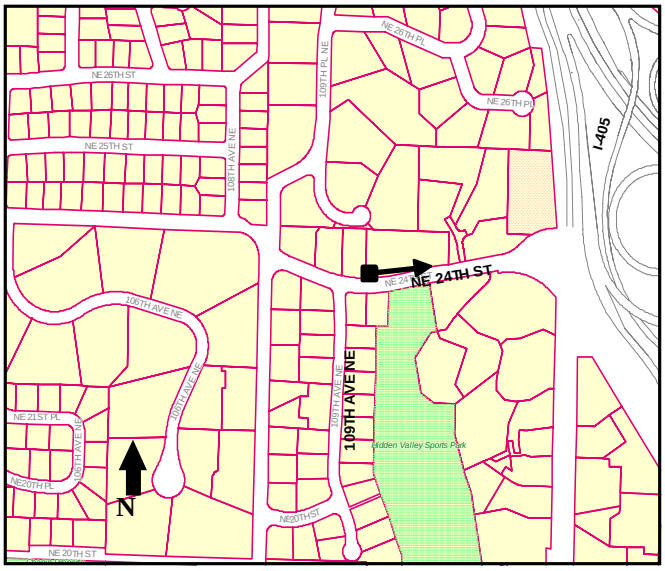
Installation Date:	Dec. 2002
MPH Sign	$4,600
Installation	$4,000
Total	$8,600
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) eastbound	Reduction (mph)
6/01	34.9	N/A
Installed December 2002		
3/05	31.2	-3.7

85th percentile is defined as 85% of motorists recorded at or below this speed

3M-13 NE 24th Street w/o 109th Avenue NE

(for westbound motorists)



Radar Sign Info

Installation Date:	Dec. 2002
MPH Sign	$4,600
Installation	$4,000
Total	$8,600
Monthly Electricity:	$3
Maintenance/Repair:	*High

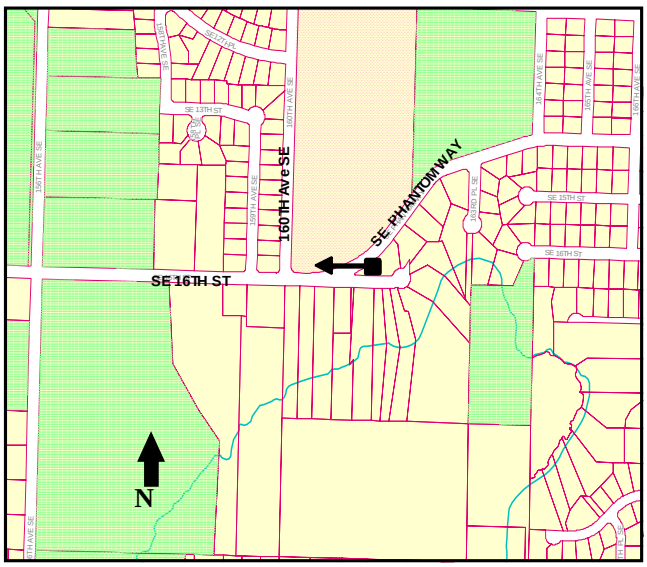
**Sign had to be replaced due to vandalism 10/03.*

Date	85th Percentile Speed (mph) westbound	Reduction (mph)
6/01	34.9	N/A
Installed December 2002		
3/05	32.1	-2.8

85th percentile is defined as 85% of motorists recorded at or below this speed

VCALM-1 SE Phantom Way e/o 160th Ave SE

(for eastbound motorists)



Installation Info

Installation Date:	Aug. 2004
VCALM Sign	$7,600
Installation	$4,500
Total	$12,100
Monthly Electricity:	$3
Maintenance/Repair:	Minimal

Date	85th Percentile Speed (mph) eastbound	Reduction (mph)
7/03	35.5	N/A
Installed August 2004		
2/05	31.0	-4.5

85th percentile is defined as 85% of motorists recorded at or below this speed

Speed Study Data By Manufacturer

MPH

Location	Posted Speed Limit (direction)	Before Speed (date)	After Speed (date)	After Speed (date)	Speed Reduction (date)	Speed Reduction (date)
(MPH-1) Lakemont Blvd e/o Village Park Dr	30 (EB)	42.4 (8/00)	36.8 (10/01)	38.8 (9/04)	-5.6 (10/01)	-3.6 (9/04)
(MPH-2) W Lk Sm Pkwy s/o Vasa Park	30 (NB)	41.3 (1/01)	38.0 (10/01)	36.0 (8/04)	-3.3 (10/01)	-5.3 (8/04)
(MPH-3) W Lk Sm Pkwy s/o SE 26th St	30 (SB)	42.9 (11/00)	37.7 (10/01)	37.3 (9/04)	-5.2 (10/01)	-5.6 (9/04)
(MPH-4) NE 24th St w/o 134th Ave NE	30 (WB)	41.3 (2/02)	36.3 (7/02)	35.8 (8/04)	-5.0 (7/02)	-5.5 (8/04)
(MPH-5) NE 24th St e/o 124th Ave NE	30 (EB)	40.1 (2/02)	34.4 (7/02)	35.4 8/04)	-5.7 (7/02)	-4.7 (8/04)
(MPH-6) Forest Dr w/o Somerset Dr	30 (WB)	42.7 (1/05)	40.6 (3/05)	N/A	-2.1 (3/05)	N/A

VCALM

Location	Posted Speed Limit (direction)	Before Speed (date)	After Speed (date)	Speed Reduction
SE Phantom Way & e/o 160th Ave SE	25 (EB)	35.5 (7/03)	31.0 (2/05)	-4.5 (2/05)

Speed Study Data By Manufacturer

3M

Location	Posted Speed Limit (direction)	Before Speed (date)	After Speed (date)	After Speed (date)	Speed Reduction (date)	Speed Reduction (date)
(3M-1) (Small Sign) 119th SE s/o 52nd St	25 (SB)	33.3 (2/01)	30.7 (7/02)	30.8 (8/04)	-2.6 (7/02)	-2.5 (8/04)
(3M-2) (Small Sign) SE 60th St w/o 126th Ave SE	25 (WB)	33.8 (2/01)	32.4 (6/02)	33.3 (8/04)	-1.4 (6/02)	-0.5 (8/04)
(3M-3) (Large Sign) NE 10th St e/o Northup Way	25 (EB)	29.9 (6/98)	30.2 (7/02)	29.3 (8/04)	+0.3 (7/02)	-0.6 (8/04)
(3M-4) (Small Sign) 176th Ave NE s/o NE 13th St	25 (SB)	31.9 (8/01)	30.6 (7/02)	31.3 (8/04)	-1.3 (7/02)	-0.6 (8/04)
(3M-5) (Small Sign) Somerset Blvd se/o Somerset Dr	25 (NB)	33.8 (1/02)	32.4 (6/02)	31.9 (8/04)	-1.4 (6/02)	-1.9 (8/04)
(3M-6) (Large Sign) 124th Ave NE s/o NE 5th St	25 (SB)	35.7 (3/03)	32.2 (9/04)	N/A	-3.5 (9/04)	N/A
(3M-7) (Large Sign) 124th Ave NE s/o NE 4th Pl	25 (NB)	34.2 (3/03)	30.8 (9/04)	N/A	-3.4 (9/04)	N/A
(3M-8) (Large Sign) 100th Ave NE n/o NE 16th Pl	25 (SB)	32.8 (8/02)	31.7 (3/05)	N/A	-1.1 (3/05)	N/A
(3M-9) (Large Sign) 100th Ave NE s/o NE 16th Pl	25 (NB)	33.1 (8/02)	31.9 (3/05)	N/A	-1.2 (3/05)	N/A
(3M-10) (Small Sign) Highland Dr n/o 147th Pl SE	25 (EB)	35.4 (3/03)	33.0 (3/05)	N/A	-2.4 (3/05)	N/A
(3M-11) (Small Sign) Highland Dr s/o SE 46th St	25 (SB)	35.6 (3/03)	32.5 (3/05)	N/A	-3.1 (3/05)	N/A
(3M-12) (Small Sign) NE 24th St e/o 105th Ave NE	25 (EB)	34.9 (6/01)	31.2 (3/05)	N/A	-3.7 (3/05)	N/A
(3M-13) (Small Sign) NE 24th St w/o 109th Ave NE	25 (WB)	34.9 (6/01)	32.1 (3/05)	N/A	-2.8 (3/05)	N/A