APPENDIX A
ACCESS MANAGEMENT CLASSIFICATIONS

Class 1

These highways carry high speed and/or high volume traffic movements safely and efficiently, and provide for interstate, interregional, and intercity travel needs and some intracity travel needs. Highways in this class are typically distinguished by a highly controlled, limited number of public and private connections, restrictive medians with limited median openings on multilane facilities, and infrequent signals.

Class 3

These highways carry moderate traffic volumes at moderate travel speeds for medium and short travel distances providing for intercity, intracity, and intercommunity travel needs. Highways in this class are typically distinguished by planned restrictive medians and minimum distances between public and private connections.

Class 4

These highways carry moderate traffic volumes at moderate travel speeds for medium and short travel distances providing for intercity, intracity, and intercommunity travel needs. Highways in this class are typically distinguished by existing or planned restrictive medians. Restrictive medians may be used as operational conditions warrant mitigating turning, weaving, and crossing conflict. Minimum connection spacing standards should be applied if adjoining properties are redeveloped.

APPENDIX B
LEVEL OF SERVICE (LOS) DEFINITIONS FOR UNSIGNALIZED INTERSECTIONS

Intersections in which the form of control is a stop-sign are also ranked with Level of Service values that correspond to the length of the delay. This approach however, is not limited to intersections in which all approaches are controlled by a stop-sign. It can also be applied to intersections of a major street and a minor street with a two-way stop sign control as is typical of the unsignalized section of Aurora.

Capacity analysis for two-way stop-sign controlled intersections is based on the assumption that the minor street movements do not affect major street traffic, and that left-turns from the major streets to the minor streets are influenced only by opposing major street through flow. Therefore, the level of service calculated for two-way stop intersections is based on delay experienced by only the minor street movements and the major street left-turn movement. **Table B-1** shows the level of service criteria for unsignalized intersections.

Table B-1
Level of Service Criteria for Unsignalized Intersections

Control Delay (d)[1]	**Level of Service**
$d \leq 10$	A
$10 < d \leq 15$	B
$15 < d \leq 25$	C
$25 < d \leq 35$	D
$35 < d \leq 50$	E
$d > 50$	F[2]

1. Control delay is measured in seconds per vehicle.
2. For level of service F, when demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing that may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvements to the intersection.

Source: "Highway Capacity Manual", Transportation Research Board, 1997.

As the table shows, the range of control delay associated with each level of service is different than those used for signalized intersections.

APPENDIX C
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

LOS A describes operations with low control delay, up to 10 seconds per vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

LOS B describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

LOS C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high vehicle to capacity (*v/c*) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay greater than 55 and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high *v/c* ratios. Individual cycle failures are frequent.

LOS F describes operations with control delay in excess of 80 seconds per vehicle. This level, considered unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high *v/c* ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

APPENDIX D
TRAFFIC ANALYSIS ASSUMPTIONS AND METHODOLOGY

For this project, the highest a.m. and p.m. peak-hour traffic volumes for each signalized intersection were used to analyze year 2030 traffic operation conditions. Adjustment to the base year (2000) traffic volumes to reflect a 30-year growth was based on the Puget Sound Regional Council's Traffic Model growth rates as shown below in Table D-1.

Table D-1
30-Year Traffic Growth Rates

Area	30-Year Traffic Growth Rate
A.M.	39%
P.M.	26%

The growth rates were then applied to the model and the level of service (LOS) for the 2030 a.m. and p.m. peak hour traffic volumes, with no-build conditions, were evaluated. Synchro uses signal-timing inputs, proposed traffic volume data, and geometric data and determines the optimal cycle and phase length for those inputs. The optimal cycle length is determined based on the ability of the critical percentile traffic to clear. The critical percentile traffic varies based on the range of the cycle length as shown in Table D-2.

Table D-2
Critical Percentile Traffic

Cycle Length	Critical Percentile Traffic
0-60	90th
61-90	70th
91+	50th (*v/c* >= 1)

The results of the Synchro modeling provided the LOS at each signalized intersection.

The Highway Capacity Manual (*HCM*), 2000 update, states that signalized intersection LOS are defined in terms of control delay, which is a measure of driver

discomfort, frustration, fuel consumption, and increased travel-time. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The calculation of delay for intersection movement is based on several variables, which include the quality of progression, the cycle length, the green ratio, and the volume to capacity ratio for the lane group in question. Levels of service as described in the *HCM* for signalized intersections are described in Appendix C.

Parking Utilization

On-Street Parking

The primary effect of on street parking to intersection LOS is due to parking maneuvers. Only those maneuvers that occur within 250 feet of an intersection were considered. With each space being approximately 25 feet this allows for 10 spaces near each intersection. As a result of the type of businesses in the area, it was noted that parking is not used significantly in the a.m. peak period. The estimated duration of time spent parked on street during the p.m. peak period was 30 minutes. This resulted in 20 parking maneuvers per hour for all approaches where parking is allowed.

Off-Street Parking

The SR 99 North corridor contains a large number of businesses with their own off-street parking. A study conducted by King County Metro observed the average lot volumes of each of these lots. These volumes are considered in the analysis of intersection LOS through mid-block maneuvers.

APPENDIX E
PUBLIC OUTREACH

Public outreach was a critical component of the SR 99 North Corridor Study. Over 50 community and business meetings took place throughout the corridor study. Input from public outreach activities helped shape every step of the study from identifying corridor needs, to developing viable improvement options, to determining final improvement recommendations.

The following is a detailed description of the public involvement activities and public comments received as a part of the SR 99 North Corridor Study.

Public Outreach Activities

Community Meetings

Public outreach focused on neighboring communities located near the study area. Table E-1 presents a summary of community meetings the study team attended to make presentations regarding the SR 99 North Corridor Study.

Business Meetings

This SR 99 North Corridor Study encompasses hundreds of businesses. Recommendations in this study will ultimately affect many of these businesses.

Therefore, an on-going dialogue took place with many businesses along the study area, including representation through the Aurora Avenue Merchants Association. Table E-2 presents a summary the meetings the SR 99 North Study Team held with local businesses.

Business Contacts

As noted in Chapter 7: Public Involvement, staff from the City of Seattle made over 50 additional contacts with individual businesses along the Study Area to solicit opinions regarding the study's preliminary recommendations. Table E-3 presents these contacts.

Table E-1 SR 99 North Corridor Study Meetings with Community Organizations	
Date	**Meeting**
7/17/01	King County Traffic Safety Coalition
2/6/02	Seattle Bicycle Advisory Board
11/19/01	Queen Anne/Magnolia Community Council
11/28/01	Queen Anne Community Council, Transportation Committee
12/6/02	Haller Lake Community Club
2/19/02	Green Lake North Community Club
2/20/02	Fremont Chamber of Commerce
3/6/02	SeaShore Technical Advisory Committee
3/28/02	Northwest Neighborhood Gathering/City of Seattle
4/10/02	Seattle Pedestrian Advisory Board
5/1/02	Queen Anne Community Council
7/22/02	Fremont Community Council
8/7/02	Wallingford Community Council
8/28/02	Queen Anne Community Council
9/11/02	Ballard District Council
9/14/02	Licton Springs Community Picnic
9/17/02	Greenwood Community Council
9/18/02	Licton Springs Community Council
9/25/02	Queen Anne/Uptown Alliance Transportation Committee
10/9/02	Seattle Pedestrian Advisory Board
10/16/02	Greater University, Fremont, and Wallingford Chambers
11/18/02	North District Council
11/19/02	King County Traffic Safety Coalition
12/4/02	Queen Anne Community Council
2/19/03	Northgate Chamber of Commerce

Table E-2 SR 99 North Corridor Study Meetings with Local Businesses	
Date	**Businesses/ Organizations represented**
11/13/01	Aurora Avenue Merchants Association (AAMA)
12/14/01	Seattle Chamber of Commerce
4/18/02	A.A.M.A. breakfast meeting
4/23/02	North Industrial Group
8/6/02	Blumenthal Uniforms and Equipment
8/8/02	D & D Brake Service and Rose Corner Florist
8/15/02	A.A.M.A, Seattle Fabrics, Acme Auto Electric, Precision Control, Aurora Family Restaurant, Traveling III Tavern, and Way West Motel
8/19/02	A.A.M.A., Taco Time, Stadium Coffee, Eyes Right, A.M./P.M., and others
8/22/02	A.A.M.A, Landowner (i.e., Rite Aide, etc.); Gourmet Latte and Aurora Donuts
8/26/02	AAMA, Appliance Service Station, Puetz Golf Range and Puetz Associations, Cochran, Inc., and Cars to Go
9/5/02	A.A.M.A., Crown Inn, Klose In Motel, Quiring Monuments, Inc., Northwest Metals and Salvage Services, and Quality Auto Glass
9/10/02	A.A.M.A. breakfast meeting
9/10/02	Hanson Storage
11/12/02	Al's Glass

Table E-3 Business Contacts Made by the City of Seattle	
Date	**Business**
Aug. 15, 2002	Aurora Flower Shop Aurora Motel Green Lake Motel Traveler's Tavern Aurora Store Sea Fair Inn Daimler Automobiles Speedy Auto Glass Aurora Veterinarian Motel Georgian Fraser's Auto Sun Hill Motel Emerald Inn
Aug. 19, 2002	Day & Nite Towing Seattle Fabrics Holiday Inn Express The Salvage Broker Town & Country Nissan Professional Collision Group/ Moores Body Shop Aurora Kitch and Bath Design Card Exchange Ideal Exercise Seattle Vacuum American Health Center Medical and Dental Clinic Webster Hobby Shop A&M Grocery JinMi Restaurant Emerald City Auto Sales Taco Time EZ Auto Body Kidd Valley Espresso Stadium Nelson Truck Equipment Parker Paint

Table E-3 (continued) Business Contacts Made by the City of Seattle	
Date	**Business**
Aug. 21, 2002	Tobacco Street Seattle Super Supplements Las Margaritas Hi Tech Erectors Aurora Plumbing America's Cash Express Game Player's Club Everyday Hair Fashion Episodes Bubble Tea Café Stereo Warehouse
Aug. 27, 2002	Cascade Frames Jim Honda Acura Subway Texaco 125th Street Grill Black Angus Motor Inn Les Schwab Tires Lincoln Towing Aurora Loans

Newspaper Display Paid Advertising

A limited number of local newspapers were used to purchase display advertising for promoting the two open houses. Because of budget limitations, advertising took place in the local neighborhood newspapers (see Table E-4).

Table E-4 Newspaper Advertising	
Date	**Paper**
April & October 2002 Issues	North Seattle Journal Northgate Journal Shoreline Journal University Journal
April, May, and September 2002 Issues	Seattle Sun
April 11 and April 25th Issues	Seattle Press (Note: WSDOT planned on advertising the 2nd Open House, but the publisher stopped printing the paper for the September/October issues)

Newsletters

The SR 99 North Corridor Study published three newsletters in order to communicate the progress of the Study to businesses, community members, and the public. Table E-5 presents a summary of each newsletter's purpose and distribution.

Table E-5
Newsletters

Edition	Purpose	Distribution Number	Distribution Area	Date
Newsletter #1	• Provide general information about the study	~1,200	• Bulk mailing to businesses, one courier route from study area. • 12 local libraries	11/01
Newsletter #2	• Provide information on what needs to be done on the corridor • Request public comments • Overview of accident statistics • Provide preliminary short-term, interim, and long-term options/solutions	~600	• Open House #1 • Local libraries • Handout at community and business presentations	Month of May and June 2002
Newsletter #3	• Provide information on final draft preferred recommendations • Overview of accident statistics	18,000+	• Bulk mailing to same group sent Newsletter #1 • Targeting mailing from study mailing list • Distribution to 12 local libraries	11/14/02

Postcards

Postcards were used to invite the general public to attend the two open houses. Table E-6 describes the purpose of each postcard distributed.

Table E-6
Postcards

Edition	Purpose	Distribution Number	Distribution Area	Date
Postcard #1	Advertise Open House #1 (March 20th)	15,000+ homes and businesses along the corridor.	• 1 courier route east and west of study area. • 12 local libraries • Mailing list	02/02
Postcard #2	Change the date for Open House #1	15,000+ homes and businesses along the corridor.	• 1 courier route east and west of study area. • 12 local libraries • Mailing list	4/02
Postcard #3	Advertise new date for Open House #1 (May 9th)	15,000+ homes and businesses along the corridor.	• 1 courier route east and west of study area. • 12 local libraries • Mailing list	7/02

Published Articles

The SR 99 North Corridor Study received media coverage from the major regional newspapers, the Seattle Times and Seattle Post-Intelligencer, and more extensive coverage from local/neighborhood newspapers and organization newsletters. See Table E-7 for a list of newspapers and newsletters that featured the SR 99 North Corridor Study.

Table E-7 Published Articles		
Date	**Newspaper/ Newsletter**	**Title**
June 1 -30, 1998	The Jet City Maven	"Aurora Avenue: A Highway and a Community Divided" By Matt Asher
July 1999	Aurora Avenue Merchants Association News	"Traffic and Aurora Avenue (SR 99 North)" What's Happening Around Our Area An editorial by Faye Garneau
August 1999	Aurora Avenue Merchants Association News	"What's Happening"
September 1999	Aurora Avenue Merchants Association News	"SR 99 North Project Update"
January/February 2000	Aurora Avenue Merchants Association News	"SR 99 Study On Hold"
September/October 2001	Aurora Avenue Merchants Association News	"Report on WSDOT Planning Group for Aurora (Highway 99)"
October 25, 2001	Seattle Press	"Aurora Avenue Business Endangered by State Traffic Planning?" By Tara Peattie
November 2001	Seattle Neighborhood News	"Traffic Congestion and accidents Prompt New Study of Aurora Avenue North" By Melissa Loomis
November 2001	Aurora Avenue Merchants Association News	"Position Paper in Regard to North Aurora (SR 99 North) Planning Study" Our Future is in Our Hands

Table E-7 (continued)		
Date	**Newspaper/ Newsletter**	**Title**
December 5, 2001	North Seattle Herald-Outlook	"State to Identify Possible Improvements for Aurora Avenue North Corridor" By Russ Zabel
January 2002	The North Seattle Sun	"Aurora Under the Microscope" By Leah Weathersby
January 2002	Aurora Avenue Merchants Association News	WSDOT Open Houses President's Message Report on WSDOT Study of Aurora Avenue
January 2002	The North Seattle Sun	"Aurora Under the Microscope" By Leah Weathersby
Spring 2002	Phinney Ridge Review	"Safety Makeover Under Consideration for Aurora Avenue" By Craig Blackmon
February/March 2002	Aurora Avenue Merchants Association News	President's Message Future Meetings, Mark the Dates
March 2002	The North Seattle Sun	"Aurora Study Focus on Safety"
April 1, 2002	Seattle Times	"What To Do about Aurora?", (editorial page)
May 15, 2002	North Seattle Herald-Outlook	"Changes Proposed for SR 99 North" By Sara Lorenzini

Table E-7 (continued)		
Date	**Newspaper/ Newsletter**	**Title**
July 2002	The Seattle Sun	"Bus-Only Lanes On Aurora? Bad Idea", page 2 and 3 Editorial by Faye Garneau
July 4-10, 2002	The Stranger	"Aurora Merchants Fight Street Makeover" By Amy Jenniges
August 2002	Aurora Avenue Merchants Association News	President's Message, page 1 SR 99 North Corridor Study
August 10, 2002	Seattle Post-Intelligencer (P-I)	"Plan for Aurora Not Good for Business", (Soapbox/Editorial Section) By Faye Garneau
September 2002	The North Seattle Sun	"Setting the Record Straight on Aurora Ave Traffic Study" By Charlie Howard, Grace Crunican, and Rick Walsh
October 2002	The North Seattle Sun	"Aurora Merchants Oppose Plans to Replace Parking With Driving Lanes" By Leah Weathersby
October 23, 2002	The Seattle Times	"New Dawn Coming for Aurora Avenue? Changes Eyed to cut Number of Accidents", (Editorial Section) By Susan Gilmore
October 2002	The Seattle PI	"Improving Route 99"
October 21, 2002	Seattle P-I	"Route 99 Study A Key to the Future of Busy Corridor", (Around the Sound section)
November 13-19, 2002	The Seattle Weekly	"Roar on Aurora" By George Howland, Jr.

Open Houses

The following is an overview of the format and location of the two SR 99 Corridor Study Open Houses.

Open House #1: May 9, 2002, 5-7 pm

Location: Phinney Ridge Lutheran Church

Number of People: approx. 100

Format: Display boards presenting improvement options with staff available to answer questions and display boards

Purpose: To present preliminary alternatives and solicit public input.

Open House #2: October 24, 2002, 5-7 pm

Location: Phinney Ridge Lutheran Church

Number of People: approx. 150

Format: Display boards presenting draft improvement recommendations with staff available to answer questions and display boards

Purpose: To present final draft alternative to the public.

Stakeholder Advisory Committee

The Stakeholder Advisory Committee consisted of representation from modal advocates, neighborhood groups, and businesses. This committee was pivotal in shaping the recommendations and influencing the decision-making process, which resulted in stronger proposed solutions.

Table E-8 summarizes when this committee met:

Table E-8 Stakeholder Advisory Committee Meetings	
Meeting Date	**Meeting Location/Time**
8/27/01	Phinney Ridge Neighborhood Center / 7-9 pm
9/29/01	Phinney Ridge Neighborhood Center / 7-9 pm
11/5/01	Phinney Ridge Neighborhood Center / 7-9 pm
2/11/02	Phinney Ridge Neighborhood Center / 7-9 pm
4/23/02	Phinney Ridge Neighborhood Center / 7-9 pm
8/19/02	Phinney Ridge Lutheran Church/ 7-9 pm
11/19/02	Phinney Ridge Neighborhood Center/ 7-9 pm

Members of the Stakeholder Advisory Committee

- Warren Aakervik, Jr., BINMIC
- Susie Burke, Friends of Fremont
- John Coney, Transportation Chair, Uptown/Queen Anne – Uptown Alliance
- Faye Garneau, Aurora Avenue Merchants Association
- Mrs. Jo Dawson, Broadview/Bitter Lake/Haller Lake Community Council
- Ref Lindmark, Green Lake Community Council
- Jerry Owens, Aurora – Licton Springs Planning Group
- Ron Sheck, Ph.D., Weaving Wallingford
- Marty Spiegel, Greenwood Neighborhood Council
- James Mueller, Vulcan Northwest/City Investors
- Paulette Gust, Pedestrian and Transit Advocate
- Barbara Van Defen, Seattle Bicycle Advisory Board

Website

A study website (***http://www.wsdot.wa.gov/projects/sr99***) provided the public with valuable information regarding the study, including background, committees, preliminary recommendations, public involvement activities, and downloadable files such as open house boards, press releases, and other pertinent documents.