

CHAPTER 11. System Performance

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Chapter 11. System Performance with Recommended Improvements

This chapter indicates how well the overall transportation system would perform upon completion of all the recommended projects in the study area by 2010.

MOBILITY

One of the study goals is to enhance the mobility of the people who live, work, study, shop and conduct other activities in the study area. In this study, mobility is said to increase when the following conditions occur:

- Convenient facilities for pedestrians, bicyclists, transit riders and carpool users are provided.
- Pedestrians and bicyclists are well protected from vehicular movements.
- Travel time for pedestrians and bicyclists is shortened.
- Transit vehicle speeds are increased and schedule reliability is maintained.
- The use of the transportation alternatives to single occupant driving (non-motorized, public transportation and ridesharing modes) is increased.

This study recommends that over 70 projects or programs be implemented in the next 10 years (in the Early Action, High Priority, and Medium Priority categories). Based on the evaluation criteria used in Chapter 10, none will negatively impact mobility. Thirteen projects are “neutral” or do not directly enhance mobility but offer other benefits, such as safety or environmental improvements. There are over 60 projects that have positive impacts on mobility. Thus, more than 80 percent of the recommended projects will result in increasing the mobility of those traveling in the study area.

When all projects are completed, the transportation system will perform in a more balanced way. While this study did not attempt to estimate mode split shifts from single occupant driving (SOV) to alternative transportation modes, implementation of these projects will most likely reduce the percent use of the SOV mode and, as a result, will have positive impacts on reducing traffic congestion. More quantitative measures were beyond the scope of this study.

SAFETY

This study made a concerted effort to identify improvements to areas where high numbers of accidents have occurred. Three types of traffic accidents were investigated:

- Traffic accidents that involve pedestrians,
- Traffic accidents that involve bicycles, and
- All other types of traffic accidents that involve vehicles.

Table 11-1 shows high pedestrian and bicycle accident locations where the recommended projects would have positive impacts to reduce accidents. Upon completion of all the recommended projects, it is expected that the number of pedestrian and bicycle accidents in the study area will be reduced.

Table 11-1. Project Impacts on High Pedestrian and Bicycle Accident Locations

Intersections (High Bicycle Accident Locations)			Recommended Project Corresponding to Problem Area
15th Ave NE	NE Pacific St		Already Improved
Roosevelt Way NE	NE 45th St		5-b (Medium Priority)
			2-b (Medium Priority)
			2-c (Early Action)
NE Pacific Pl	NE Pacific St		2-h (High Priority)
			6-i (High Priority)
15th Ave NE	NE Ravenna Blvd		7-g (Medium Priority)
25th Ave NE	NE Blakely St		6-b (Early Action)
University Way NE	NE 45th St		5-b (Medium Priority)
University Way NE	NE 50th St		5-b (Medium Priority)
Mid-Block Sections			
30th Ave NE	NE Union Bay Pl	NE Blakely St	6-e (High Priority)
Roosevelt Way NE	NE 42nd St	NE 43rd St	4-b (Early Action)
NE 45th St	Montlake Blvd NE	Union Bay Pl NE	6-f (Early Action)

Table 11-1. Project Impacts on High Pedestrian and Bicycle Accident Locations (con't)

Intersections (High Pedestrian Accident Locations)			Recommended Project Corresponding to Problem Area
Roosevelt Way NE	NE 45th St		5-b (Medium Priority) 9-a (Early Action)
University Way NE	NE 45th St		5-b (Medium Priority) 9-a (Early Action)
7th Ave NE	NE 45th St		5-b (Medium Priority)
University Way NE	NE 50th St		5-b (Medium Priority)
NE Pacific Pl	NE Pacific St		2-a (Medium Priority) 6-b (Early Action) 6-h (Medium Priority)
15th Ave NE	NE 50th St		5-b (Medium Priority)
17th Ave NE	NE 45th St		No project
Brooklyn Ave NE	NE 45th St		5-b (Medium Priority)
11th Ave NE	NE 50th St		5-b (Medium Priority)
35th Ave NE	NE 65th St		3-a (Early Action)
Brooklyn Ave NE	NE 47th St		No project
Roosevelt Way NE	NE 65th St		3-a (Early Action)
University Way NE	NE 47th St		No project
Mid-Block Sections			
University Way NE	NE 43rd St	NE 45th St	9-c (Early Action)
NE 45th St	Montlake Blvd NE	Union Bay Pl NE	6-f (Early Action)
NE Pacific Pl	NE Pacific St	Montlake Blvd NE	2-b (High Priority) 2-h (High Priority)

Table 11-2 shows high vehicle accident locations and indicates whether the recommended improvements would have positive impacts to reduce traffic accidents. The recommended projects in this study will address about half of the locations where a high number of accidents occurred.

The highest number of traffic accidents on mid-block sections in the study area occur on and in the vicinity of the Montlake Bridge. While it would be impossible to eliminate traffic accidents in the area entirely, the recommended projects do address this problem.

A high number of accidents appear to have occurred along NE 50th Street in the University’s commercial district. However, the accident data available from the State for this study is several years old. The City has since reconstructed and made some traffic improvements to the high accident segments of NE 50th Street. Although this study did not separately analyze the NE 50th Street corridor, it is possible that the accident problems in this corridor may have been addressed through these improvements.

Table 11-2. Project Impacts on High Vehicle Accident Locations

Intersections (High Traffic Accident Locations)			Recommended Project Corresponding to Problem Area
15th Ave NE	NE 50th St		No Project
Roosevelt Way NE	NE 50th St		No Project
Brooklyn Ave NE	NE 50th St		No Project
Roosevelt Way NE	NE 45th St		3-b (Early Action)
11th Ave NE	NE 50th St		No Project
15th Ave NE	NE Ravenna Blvd		7-g (High Priority)
5th Ave NE	NE 45th St		3-b (Early Action)
11th Ave NE	NE 42nd St		Already Improved
University Way NE	NE 45th St		No Project
15th Ave NE	NE 65th St		3-a (Early Action)
25th Ave NE	NE 55th St		7-j (Early Action)
7th Ave NE	NE 45th St		3-b (Early Action)
Mid-Block Sections			
Montlake Br	Point A	NE Pacific St	2-a (Medium Priority)
Montlake Blvd NE	NE Pacific St	25th Ave NE	2-a (Medium Priority)
NE 45th St	Montlake Blvd	Union Bay PI NE	No Project
NE 45th St	5th Ave NE	7th Ave NE	3-b (Early Action)
NE 45th St	8th Ave NE	9th Ave NE	3-b (Early Action)
University Br	Point A	Point B	No Project
NE 45th St	University Way NE	15th Ave NE	No Project
Montlake Blvd NE	NE Pacific St	NE Pacific PI	2-a (Medium Priority)
NE 45th St	21st Ave NE	Montlake Blvd	No Project
NE 45th St	9th Ave NE	Roosevelt Way NE	3-b (Early Action)
25th Ave NE	NE 49th St	NE Blakely St	No Project
NE 45th St	12th Ave NE	Brooklyn Ave NE	No Project
University Way NE	NE 45th St	NE 47th St	No Project
NE 50th St	9th Ave NE	Roosevelt Way NE	No Project
15th Ave NE	NE Pacific St	NE 40th St	No Project
25th Ave NE	NE 60th St	NE 65th St	3-a (Early Action)
NE 45th St	7th Ave NE	8th Ave NE	3-b (Early Action)

TRAFFIC CONGESTION

One of the key tasks of this study is to identify improvements that will reduce traffic congestion. The study adopted two sets of performance benchmarks to quantitatively measure changes in traffic congestion. This study used two performance benchmarks:

Roadway Corridor Level of Service Benchmark.

LOS E measured in average speed for major corridors during PM peak hour.

Intersection Level of Service Benchmark.

LOS E measured in average delay in seconds for intersections on major arterials (better than 80 seconds of delay) during PM peak hour.

A decision was made early in the study process not to use the City's concurrency standards adopted in the Transportation Element of the Comprehensive Plan to measure the performance of the roadway system. The use of the above performance benchmarks does not imply that the City has changed the adopted concurrency standards for the study area.

Roadway Corridor Level of Service

A corridor level of service is based on average through-vehicle travel for the segment or for the entire street under consideration. Travel speed is the basic service measure for urban streets.

This analysis selected four major corridors:

- NE 45th Street from I-5 southbound ramps to 15th Avenue NE
- NE 65th Street from 11th Avenue NE to 25th Avenue NE
- Montlake Boulevard from 25th Avenue NE (NE 45th Street) to SR 520 eastbound ramps
- NE Pacific Street from NE Boat Street to Montlake Boulevard NE

A corridor level of service analysis was not performed on other corridors such as Roosevelt Way and 11th Avenue NE because they currently operate at a reasonable corridor level of service.

The LOS E benchmarks during the PM peak hour for the analyzed corridors are defined as follows:

- NE 45th Street: faster than 7 miles per hour
- NE 65th Street: faster than 10 miles per hour
- Montlake Boulevard: faster than 13 miles per hour
- NE Pacific Street: faster than 10 miles per hour

Existing Roadway Corridor Level of Service

A micro-simulation model estimated changes in corridor travel speeds if the recommended projects were implemented today. **Table 11-3** shows the results of this analysis for the two sets of projects; the first set is a combination of the Early Action and High Priority projects. The second set includes all recommended projects. Key findings are as follows:

- The NE 45th Street corridor would operate at LOS E where it currently operates at LOS F.
- The average speed of the vehicles in the NE 65th Street corridor would increase slightly and remain at LOS D.
- The average vehicle speed in the Montlake Boulevard corridor would increase to eight miles per hour from six, but the corridor operation would remain at LOS F. The increased speed is not enough to meet the performance benchmark.
- The NE Pacific Street corridor would operate at LOS E where it operates at LOS F today.

Table 11-3. Corridor Travel Speed (Two-Way Average Miles per Hour) for Existing Conditions (1999) and with Recommended Projects

Corridor	Limits	Existing Conditions	Early Action & High Priority Projects	Recommended Projects*
NE 45th Street	I-5 SB Ramps to 15th Avenue NE	6 (mph)	8 (mph)	9 (mph)
NE 65th Street	11th Avenue NE to 25th Avenue NE	15 (mph)	16 (mph)	16 (mph)
Montlake Blvd NE	25th Avenue NE to SR-520 EB Ramps	6 (mph)	7 (mph)	8 (mph)
NE Pacific Street	NE Boat Street to Montlake Blvd NE	7 (mph)	7 (mph)	11 (mph)

* Recommended projects are all improvements in the Early Action, High Priority and Medium Priority categories.

Source: Mirai Associates, 2001.

2010 Roadway Corridor Level of Service

The corridor levels of service for 2010 were projected based on the travel forecast model described in Chapter 7 and the micro-simulation model. **Table 11-4** shows the projected average speeds for *No Action* and *Recommended Action* in each of the four corridors analyzed for this study. The 2010 No Action scenario refers to the condition where none of the recommended transportation improvements would be implemented.

- Despite some increase in traffic volumes in the next 10 years, the average vehicle speeds in the four corridors will essentially remain the same as today under No Action scenario.
- The recommended projects would increase speeds by two to three miles per hour, compared with No Action.

Table 11-4. 2010 Corridor Travel Speed (Two Way Average Miles per Hour) with No Action and Recommended Projects

Corridor	Limits	2010 No Action	Early Action & High Priority Projects	2010 Recommended Projects*
NE 45th Street	I-5 SB Ramps to 15th Avenue NE	6 (mph)	8 (mph)	8 (mph)
NE 65th Street	11th Avenue NE to 25th Avenue NE	13 (mph)	13 (mph)	13 (mph)
Montlake Blvd NE	25th Avenue NE to SR-520 EB Ramps	6 (mph)	7 (mph)	8 (mph)
NE Pacific Street	NE Boat Street to Montlake Blvd NE	7 (mph)	7 (mph)	10 (mph)

* Recommended projects are all improvements in the Early Action, High Priority and Medium Priority categories.

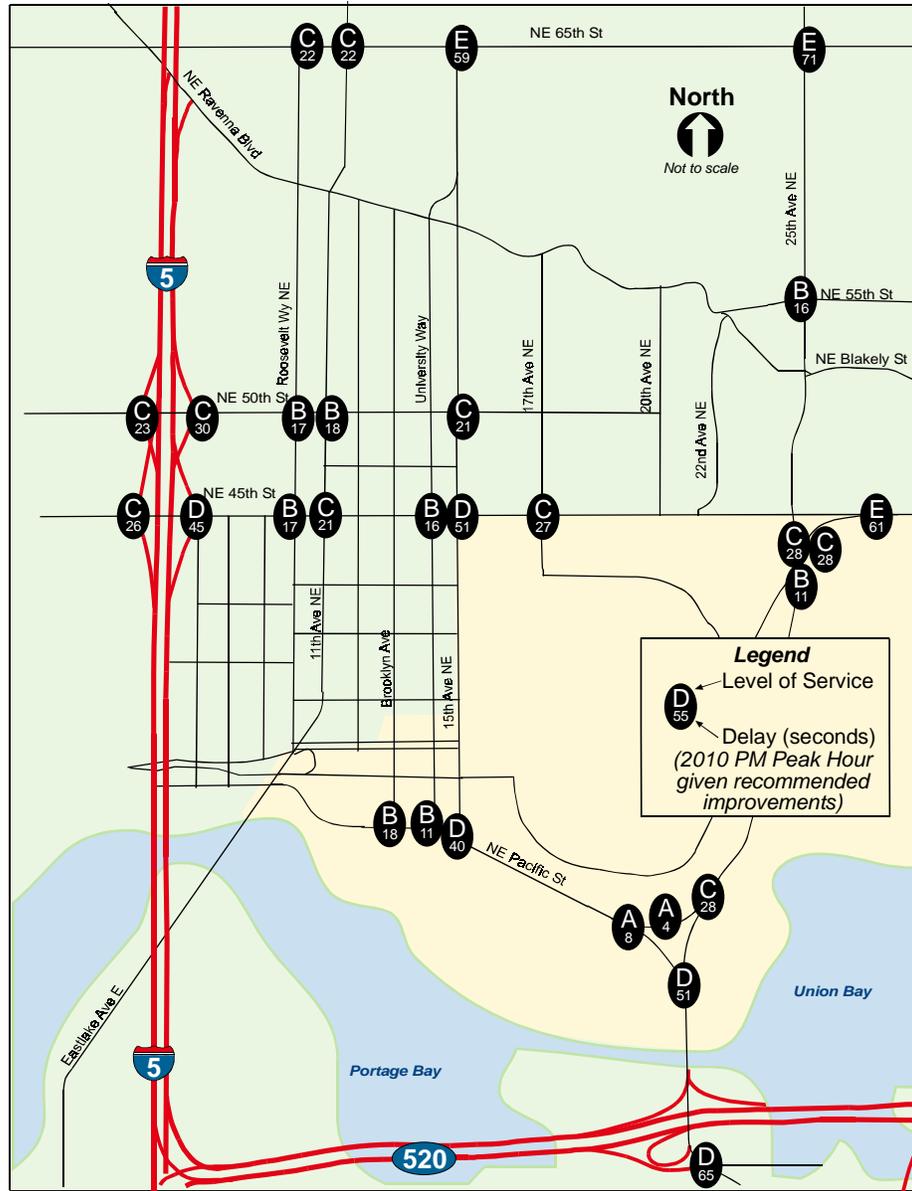
Source: Mirai Associates, 2001.

2010 Intersection Level of Service

The 2010 intersection levels of service for major signalized intersections for No Action and recommended improvements are shown in **Figures 11-1 and 11-2**. As described in Chapter 5, at locations where traffic backs up from one intersection, or freeway ramp queues interfere with intersections, this intersection level of service analysis will not give an accurate level of service reading.

- Under No Action, one signalized intersection would operate at LOS F in 2010. All other signalized intersections would operate at LOS E or better.
- If all recommended projects are implemented by 2010, there will be no intersection operating at LOS F. However, a few intersections in the NE 65th Street corridor would operate with lower speeds.
- Significant improvements in terms of level of service can be made at the two I-5 ramp intersections with NE 45th Street. The intersection with the southbound ramp and NE 45th Street would improve to LOS C (26 seconds of delay) from LOS E (69 seconds of delay). The intersection with the I-5 northbound ramps would operate LOS D (45 seconds of delay) from LOS E (73 seconds of delay).

Figure 11-1. 2010 Intersection Level of Service with Recommended Improvements



Source: Mirai Associates, 2001.

Figure 11-2. 2010 Intersection Level of Service with No Action



Source: Mirai Associates, 2001.