

University Area Transportation Action Strategy  
Appendices

**C. Future Conditions Memorandum**



# University Area Transportation Action Strategy

## Future Conditions Summary

Prepared for:

**Seattle Department of Transportation**

700 Fifth Avenue, Suite 3900  
Seattle, Washington



Prepared by:

**Mirai Transportation Planning and Engineering**

11410 NE 122nd Way, Suite 320  
Kirkland, Washington 98034-6927  
(425) 820-0100

**January 2008**

## REPORT SUMMARY

The Future Conditions analysis describes the 2030 operating conditions for vehicle traffic on the arterial roadways within the University Area, both without the implementation of the Action Strategy recommendations (“No Action”) and with the improvement projects in-place. The University Area is made up of the University District, Roosevelt, Montlake and Ravenna neighborhoods. The analysis identifies traffic and vehicle operating conditions with and without the proposed Action Strategy projects and identifies the important elements of the Action Strategy recommendations.

### ***Households and Employment Growth***

Growth is expected to continue within the University Area with a 28 percent increase in households, 33 percent increase in employment and a 19 percent increase in students. These increases will result in worse traffic conditions and the need to improve transit, bicycle, pedestrian and roadway facilities.

### ***Traffic Growth***

By 2030, peak direction traffic volumes will increase by 13% to 18% on Roosevelt Way NE, 47% to 69% on 11th Avenue NE, 14% to 53% on NE 50th Street and 10% to 40% on NE Pacific Street. Signalized intersection performance will decline and travel speeds will drop below 10 mph on many key corridors.

### ***Pedestrian Growth***

Pedestrian activity is expected to grow due to increases in housing and employment in the University Area.

### ***Bicycle Activity***

The implementation of the Bicycle Master Plan will increase the facilities for bicyclist throughout the University Area.

### ***Transit Activities***

The extension of light rail to the University Area will provide an important new service for the residents, students and employees. Light rail trains would operate at four-to-five minute intervals during the peak periods and eight-to-nine minute intervals during off-peak. Sound Transit projects as many as 27,000 daily boarding at the Husky Stadium station by 2030.

## FUTURE CONDITIONS

Forecasting future conditions within the University Area, allows us to anticipate changes in travel demand and to envision potential solutions. By combining the City of Seattle’s travel demand forecasting model with King County and Sound Transit information, we can predict the likely changes in traffic and travel patterns in the University area. For this study, we developed a forecast of the 2030 traffic volumes in order to identify the transportation needs of the University area.

### Household and Employment Assumptions

The City’s travel demand forecast model includes household and employment forecasts derived from the anticipated land uses for the study area. **Table 1** reflects the 2005 and 2030 household, employment and student growth assumptions for the University area. These growth assumptions, within the context of the city-wide model, form the foundation for projecting future travel demand. Details of the land use and employment forecasts and their assignment to the model’s traffic analysis zones are found in Appendix A.



Within the University area, an additional 4,400 households are expected by 2030. The greatest growth in households is anticipated within the University District core, with nearly 40 percent of the future households located in the area bounded by NE 65th Street, Roosevelt Way, 15th Avenue NE and NE 40th Street. The University of Washington will continue to be the major employer in the University area, accounting for nearly 60 percent of the area’s employment. The growth of employment will be larger than the household growth, meaning a greater share of the future trips to the University area will be related to employment activities.

**Table 1. 2005 and 2030 Household, Employment and Student Assumptions**

Year	Household	Employment	Students
2005	15,840	44,300	39,520
2030	20,240	58,910	47,210
Growth 2030-2005 (% growth)	4,400 27.8%	14,610 33.0%	7,690 19.5%

### Arterial and Transit Network Assumptions

The primary street system within the University area is assumed to remain unchanged for the foreseeable future. The major forces affecting the arterial system will include changes to

SR 520 bridge access and construction of three Sound Transit light rail stations. The following changes are assumed in the 2030 network assumptions:

- SR 520 Bridge will be replaced with a four-lane general traffic facility with two additional lanes for High Occupancy Vehicle (HOV) travel. The model used for this study includes an assumed bridge toll and direct access ramps for HOVs.
- Light rail service will be implemented by Sound Transit with stations at Husky Stadium (University of Washington), Brooklyn Avenue/NE 43<sup>rd</sup> Street and Roosevelt.

**Future Traffic Conditions**

The forecast traffic volumes for 2030 from the City of Seattle travel demand model were adjusted against existing traffic counts. **Figure 1** shows the directional 2030 PM peak hour traffic volumes on the study area arterials.



**Figure 2** shows the 2030 levels of service and delay for each of the study intersections. **Figures 3 and 4** identify the 2030 arterial corridor levels of service (LOS) and average speed. From the 2030 data, the analysis finds the following:

- Traffic volumes within the University area will continue to increase. For example, traffic volumes in the peak direction will increase by 13% to 18% on Roosevelt Way NE, 47% to 69% on 11th Avenue NE, 14% to 53% on NE 50th Street and 10% to 40% on NE Pacific Street.
- Signalized intersection performance will decline between 2007 and 2030, with the number of intersections operating at LOS E or LOS F increasing from 13 in 2007 to 28 in 2030.
- Of the unsignalized intersections included in the analysis, several will operate at LOS E or LOS F on one or more of the stop approaches, including: NE Ravenna Boulevard/15th Avenue NE, NE 40th Street/7th Avenue NE, I-5 off-ramps/7th Avenue NE, NE 43rd Street/Brooklyn Avenue NE and NE 40th Street/6th Avenue NE.
- Average speeds on most arterials will decrease from 2007 levels. The following corridors are forecast to have travel speeds below 10 mph (LOS F) in 2030 in at least one direction: NE Northlake Way, NE Pacific Street, Campus Parkway, NE 45th Street (I-5 to 15th Avenue NE), NE 50th Street, Montlake Boulevard NE, Roosevelt Avenue NE, 11th Avenue NE, University Way NE (south of NE 50th Street) and 15th Avenue NE (south of NE 45th Street).



Figure 2. 2030 PM Peak Hour Intersection Levels of Service Under “No Action”

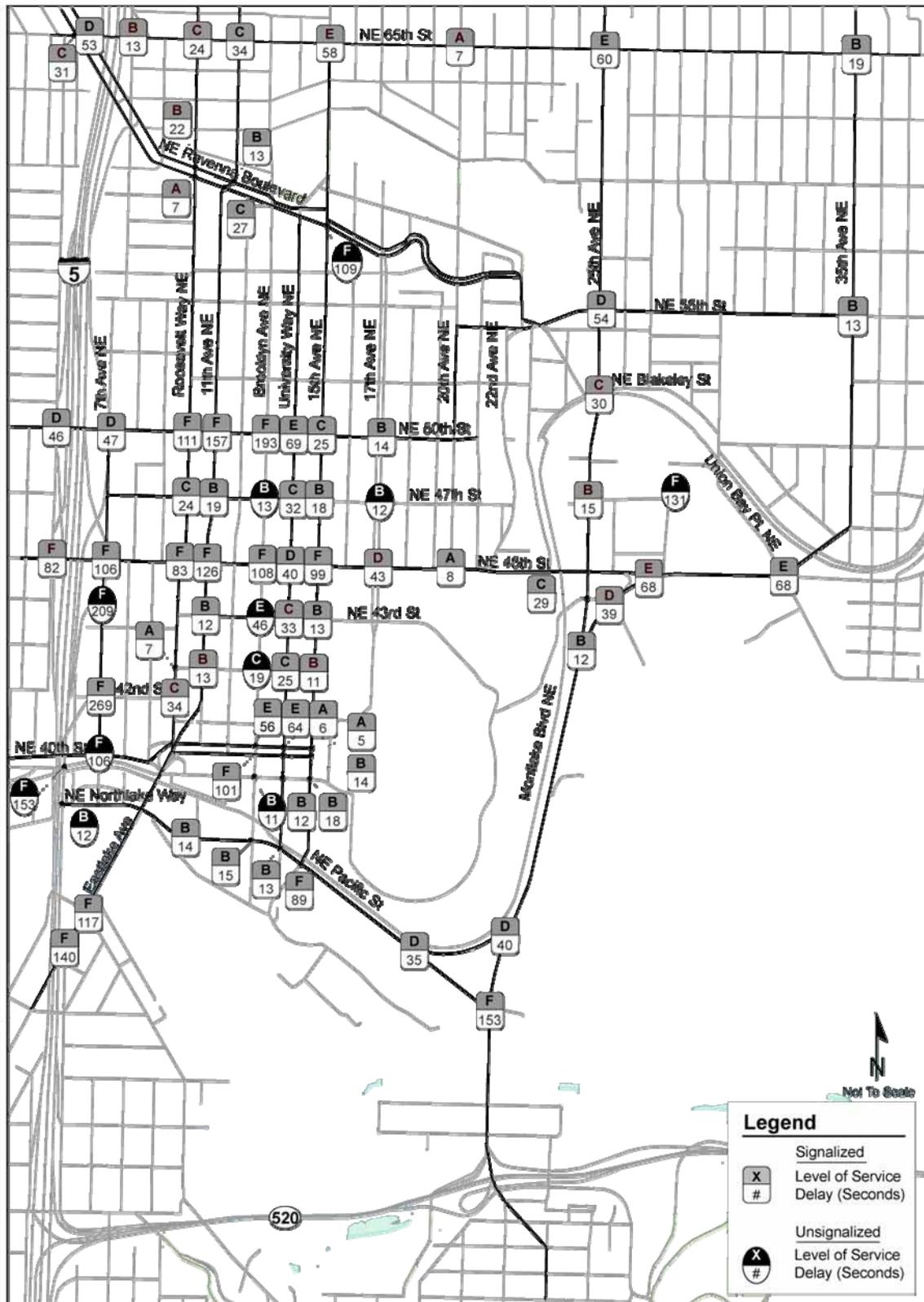


Figure 3. 2030 Arterial Levels of Service Under “No Action” – East-West Corridors

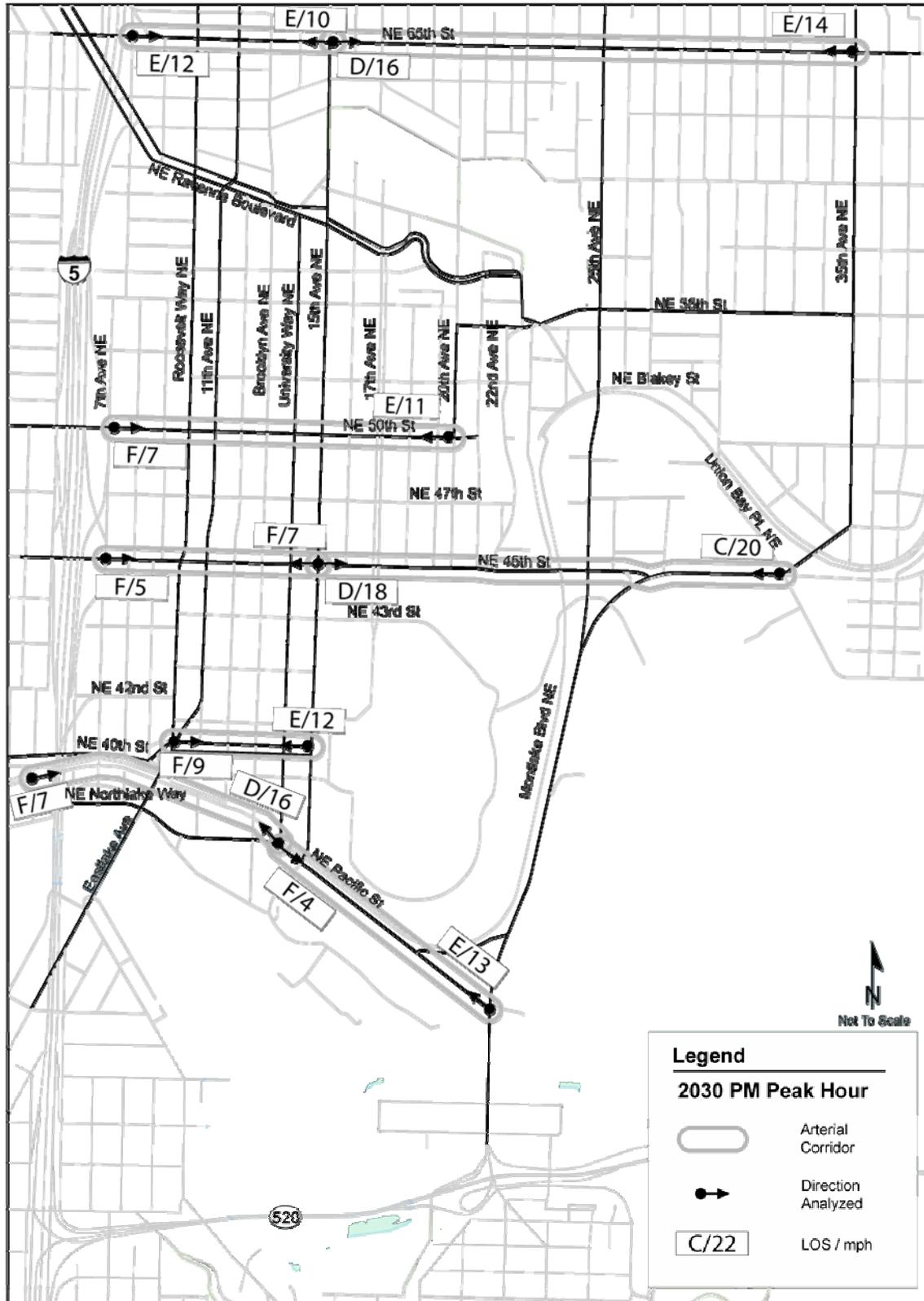
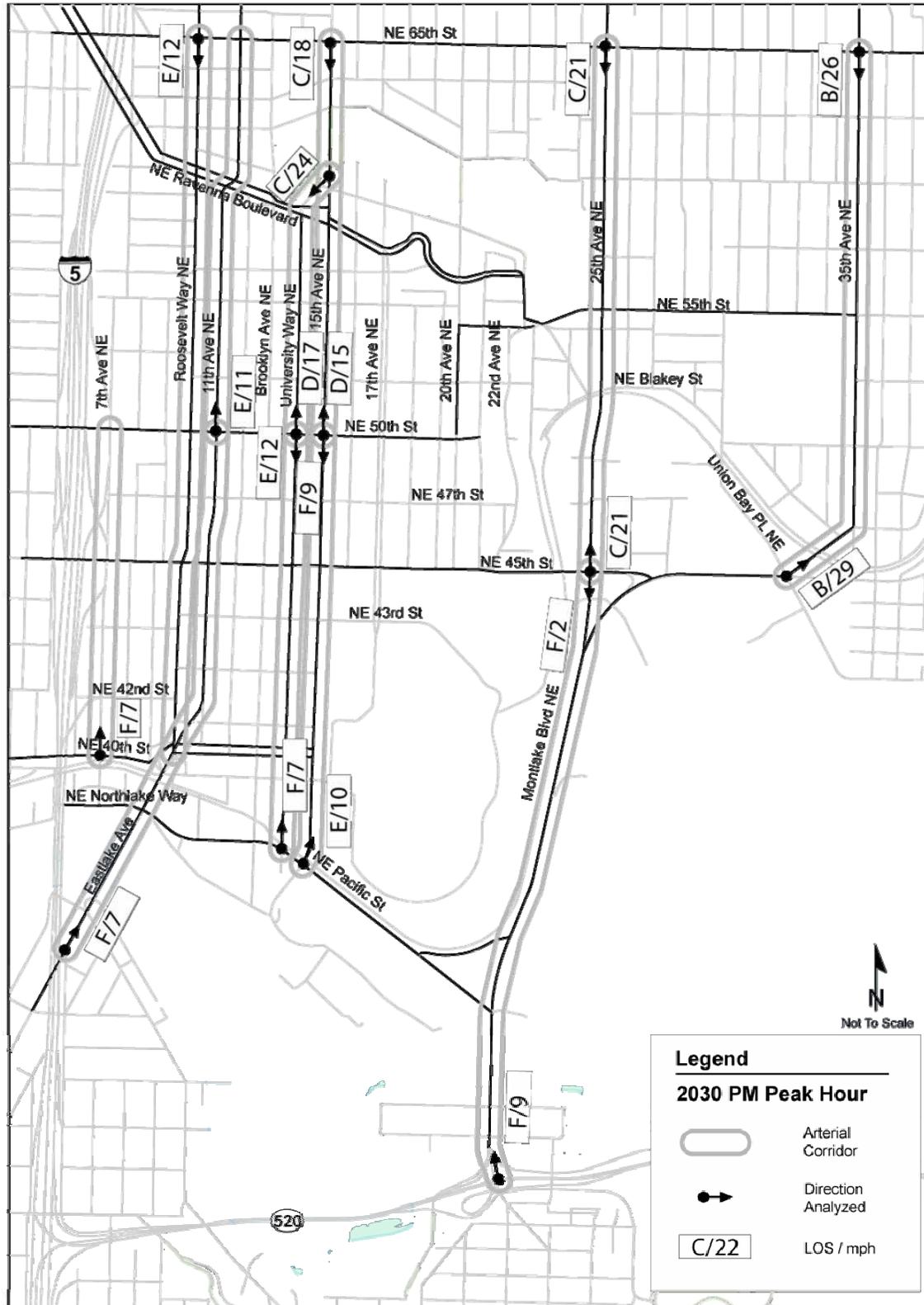


Figure 4. 2030 Arterial Levels of Service Under “No Action” – North-South Corridors



## Future Pedestrian Conditions

Pedestrian activity will continue to be an important travel mode within the University area, especially for trips within a one-half mile radius from primary pedestrian destinations such as the University of Washington campus, neighborhood commercial areas and primary transit facilities. New housing within 1,000 feet of the University of Washington campus and other major retail and employment destinations will maximize the level of pedestrian travel.

Pedestrian activity will also increase in areas near the proposed Sound Transit light rail stations. As shown in **Figure 5**, Sound Transit identified three station locations near the University area as part of its 2003 *North Link Final SEIS* preferred alternative:

- The University of Washington (Montlake) Station would provide access to the UW Medical Center and Husky Stadium as well as the main campus. Sound Transit estimates 23,000 daily boardings would occur at this station by 2030. The Sound Transit station development plan includes grade-separated pedestrian facilities to provide direct access to the main campus.
- The Brooklyn Station (NE 43rd Street) would provide access to the University retail district as well as service to north and western portions of the UW campus. Sound Transit estimates 12,000 daily boardings would occur at this station by 2030.
- The Roosevelt Station (NE 65th Street), located near Roosevelt High School, would serve the commercial areas of the Roosevelt area and the surrounding neighborhoods. The 2030 estimated daily boarding would be approximately 4,000 in 2030.

These transit stations would draw pedestrians from as much as one-third of a mile to the station entrances and the potential residential and commercial development would further increase pedestrian activity. To support the forecasted ridership, high-quality pedestrian facilities should be developed adjacent to the stations and along corridors that connect the stations to major area destinations.



Figure 5. Proposed Link Light Rail Stations



### Future Bicycle Conditions

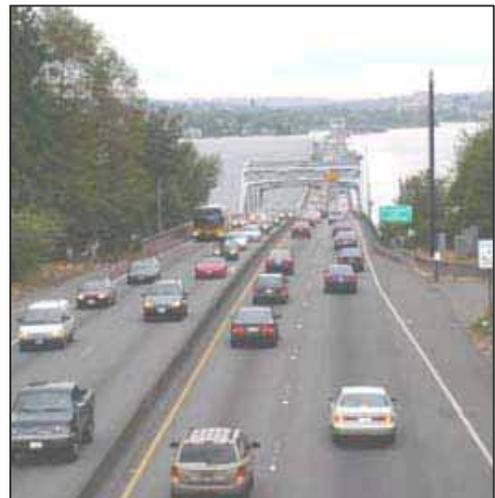
Bicycle use will be an important component to trips within the University area. The City of Seattle developed the *Bicycle Master Plan*, which specifies how to connect the University area to adjacent neighborhoods and enhance greater cycling opportunities throughout the city. Key components of the plan for the University area include:

- An elevated non-motorized crossing (NE 47th Street) of the I-5 freeway.
- Options for bicycle lanes on Roosevelt Avenue NE and 11th/12th Avenue NE and University Way (north of NE 50th Street).
- Shared roadway facilities (sharrows) including NE 45th Street, University Way NE, 20th Avenue NE and NE 65th Street.
- Climbing lanes on roadways with topographic challenges, such as NE 65th Street.
- Non-motorized improvements at intersections such as NE 47th Street/Roosevelt Avenue NE, NE 47th Street/11th Avenue NE and NE Ravenna Boulevard/20th Avenue NE.
- A bicycle/pedestrian facility connecting the University area to the eastside of Lake Washington as part of the SR 520 bridge replacement project.

### Future Transit Conditions

The University area has high levels of transit service and will continue to do so in the future. The completion of the Sound Transit light rail system and the completion of HOV lanes on the SR 520 bridge will provide high-quality transit service with frequent service and reduced transit travel times to eastside destinations. This new investment will change transit operations in the University area, including:

- Light rail trains would operate at four-to-five minute intervals during the peak periods and eight-to-nine minute intervals during off-peak.
- Bus routes that duplicate the light rail service, such as certain express services to downtown, may have hours reallocated to other routes.
- Bus routes that “feed” the light rail stations may see increased service frequency and extended hours.
- New bus routes may be developed that best utilize available transit hours and serve the light rail stations.
- The improved HOV facilities on SR 520 would potentially increase demand on cross-lake routes.



WSDOT

## ACTION STRATEGY IMPROVEMENTS

The Action Strategy promotes a variety of improvements to enhance the mobility of people throughout the area. Projects for the Action Strategy took a multimodal look at how the transportation systems of the University area work together and identified where future improvements would be needed.

### Project Selection

Each of the Action Strategy projects addresses a critical need or needs for the University Area. The recommended projects are more than a location-by-location response to the deficiencies identified by the performance measure analysis. They also represent the thoughts and ideas of the community expressed during this project, as well as from past and on-going planning efforts. In some cases, identified deficiencies may not be solved by the Action Strategy projects, either because of high costs or competing interests. The best of these projects - those that best reflect the goals of sustainability, safety, mobility and choice - were chosen for the Action Strategy.

The project team reviewed each proposed project based on four general criteria:

- *Level of community support.* Does the University Area community support the project?
- *Geographic equity.* Who does the project help and are overall project benefits weighted fairly across the University Area?
- *Emerging opportunities.* Does the project support a future opportunity such as the SR 520 bridge or North Link light rail?
- *Benefits vs. cost.* Is the project important to the mobility of the University Area and can it be accomplished at a reasonable cost?

The selected Action Strategies are those projects that best reflected the four review criteria. Projects that were not selected may have had costs, whether in dollars or the cost to the community, that were too high. Other projects were included to meet community needs and goals not necessarily reflected in performance measures. All in all, the Action Strategy proposes a set of projects to promote a transportation system that will best meet the needs of the University Area and its community.

### Prioritization

Many of the project recommendations are responses to detailed transportation needs identified by the Action Strategy's performance evaluation measures and the analysis prepared for each mode. Other recommendations include projects that were considered and recommended to address more complex issues not easily quantifiable, as well as projects that were generated from previous neighborhood plans and requests from community members. Faced with the reality of environmental and financial constraints, however, not every identified need is associated with a project. Ultimately, each recommendation had to withstand a generalized cost-benefit analysis and a "consistency" test with City and regional plans and policies.

The projects that remain – those that best reflect the goals of sustainability, safety, mobility and choice within reasonable and real constraints – are the ones presented in the Action Strategy report. SDOT’s standard project ranking criteria was used to assess the potential priority of each of the projects and to provide a comparison of the relative merits of each of the projects. The following criteria and weighting were used to prioritize the project list.

- Safety (20 points)
- Mobility Improvements (15 points)
- Preserving and Maintaining Infrastructure (15 points)
- Cost Effectiveness or Cost Avoidance (15 points)
- Comprehensive Plan/ Urban Village Land Use Strategy (15 points)
- Improving Environment (10 points)
- Economic Development (10 points)

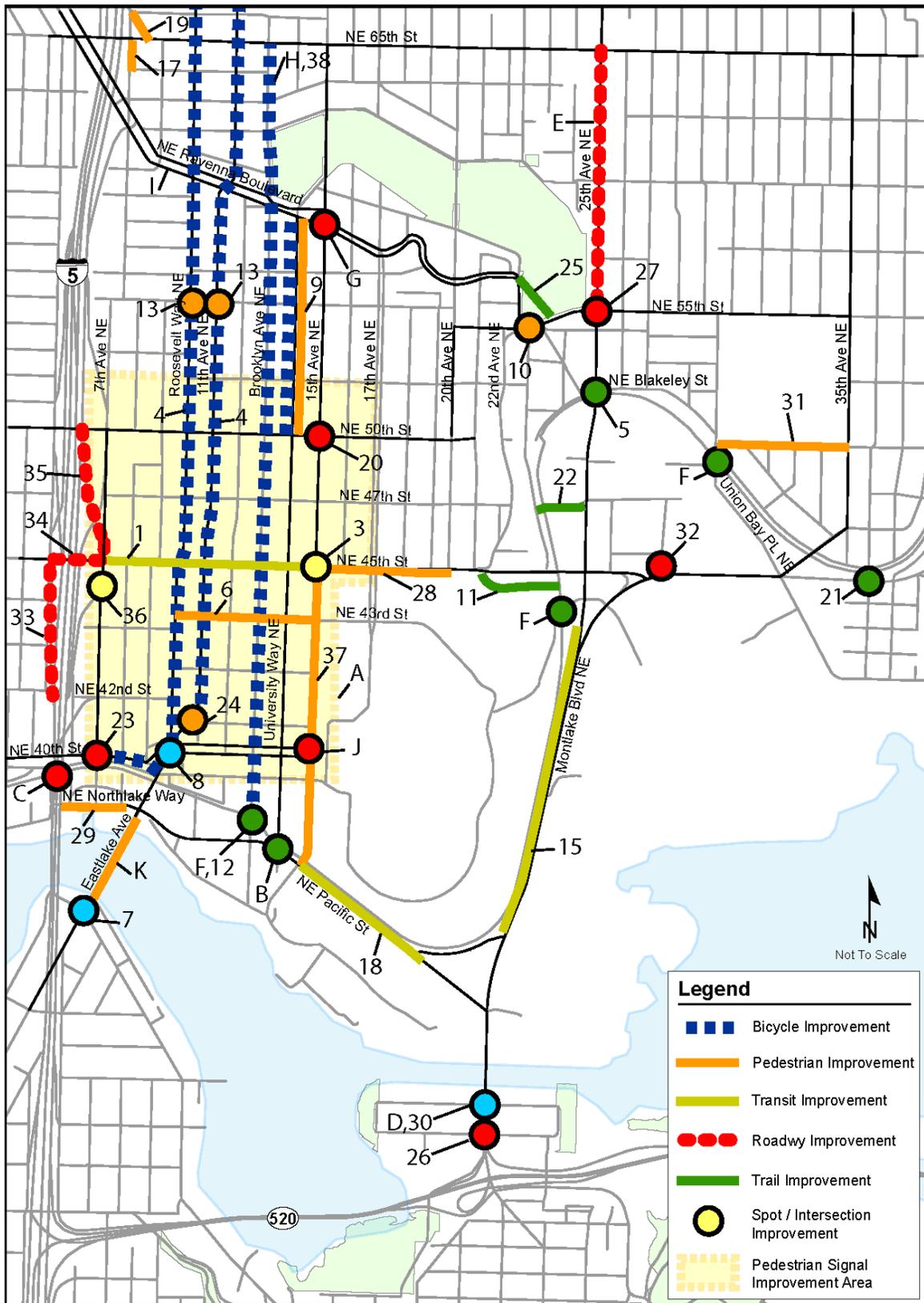
The analysis also considered other factors such as community stakeholder and partner agency feedback, and the potential to leverage existing or planned projects and opportunities in the final listing of the projects. In the end, projects were categorized into three priority levels, as defined below:

- Early Implementation – These are projects that can be implemented quickly and will provide a high level of benefits at a relatively low cost. Completion of these projects will act as a signal of positive progress towards implementing the Action Strategy.
- High Priority – These are projects that scored high on the City’s standard project ranking criteria. These projects represent the major trust of the Action Strategy.
- Medium Priority – These project recommendations will most likely occur at a later date, because the project has difficulty competing with citywide priorities or the impact addresses an anticipated future, rather than existing, transportation need.
- Partnership – These projects are those that must be designed, coordinated and funded in cooperation with another agency, such as the Washington State Department of Transportation (WSDOT), Sound Transit or other agency.

### Projects by Mode

**Figure 6** identifies the projects by transportation mode. The numbers and letters reference the project’s location. Projects identified with letters distinguish the Early Implementation projects. The Action Strategy includes 13 pedestrian projects, eight bicycle projects, six trail projects, six transit and 11 auto projects. **Table 2** lists the projects by transportation mode.

Figure 6. Action Strategy Projects by Mode



**Table 2. Recommended Actions by Transportation Mode**

**PEDESTRIAN**

- No. 6:** Widens the sidewalks and provides curb extensions along NE 43rd Street.
- No. 10:** Reconfigures NE 55th Street between 22nd Avenue NE and Ravenna Place NE.
- No. 13:** Installs curb extensions on the left side of Roosevelt and 11th at NE 55th Street.
- No. 17:** Widens the sidewalk along the east side of 8th Avenue NE between NE 64th Street and NE 65th Street and adds a curb extension.
- No. 19:** Closes off the north end of Weedin Place between NE 65th Street and NE 66th Street.
- No. 24:** Installs a pedestrian signal, new crosswalk, and widens sidewalks for people crossing 11th Avenue NE at NE 41st Street.
- No. 28:** Widens the sidewalks along the northern edge of the University of Washington campus adjacent to NE 45th Street.
- No. 29:** Reconstructs Northlake Way by adding sidewalks, a shared-use path and improved bicycle facilities.
- No. 31:** Completes the sidewalk along the south side of the NE 50th Street and introduces traffic calming devices.
- No. 37:** Completes a corridor study of 15th Avenue NE.
- No. 38:** Develops an urban design/streetscape plan for making Brooklyn Avenue NE.
- No. A:** Adds a pedestrian “WALK” phase at all intersections within the Urban Center.
- No. K:** Installs pedestrian lighting along the length of the University Bridge.

**AUTO**

- No. 20:** Adds northbound and southbound left turn pockets and protected left turn phases at 15th Avenue NE/NE 50th Street.
- No. 26:** Extends the northbound U-turn lane at E Hamlin Street to prevent vehicles from blocking through movements.
- No. 27:** Creates northbound and southbound left turn pockets and protected left turn phases for 25th Avenue NE/NE 55th
- No. 32:** Installs a variable message sign near the junction of Montlake Boulevard and NE 45th Street.
- No. 33:** Creates an additional southbound I-5 on-ramp lane at NE 45th Street.
- No. 34:** Expands the width of the I-5 overcrossing to allow full length turn lanes, bicycle lanes and improved sidewalks.
- No. 35:** Provides an additional northbound I-5 on-ramp to reduce traffic spillovers onto NE 45th Street.
- No. C:** Stripes northbound and westbound left turn lanes at the intersection of 6th Avenue NE/Lower NE 40th Street .
- No. E:** Expands the parking restrictions from peak period to all-day (except overnight hours) to improve transit and vehicle
- No. G:** Monitors the intersection of 15th Avenue NE/NE Ravenna Boulevard.
- No. J:** Modifies the intersection at 15th Avenue NE/Campus Parkway to include a protected northbound left-turn phase.

**BICYCLE**

- No. 4:** Creates bicycle lane and on-street parking on Roosevelt Way NE and 11th/12th Avenues.
- No. 7:** Adds a southbound bicycle signal at Furhman Avenue E to allow riders to safely cross to the left turn lanes at Harvard Avenue
- No. 8:** Reconfigures the lanes and vehicle exits at north end of the University Bridge.
- No. 9:** Improves the character of University Way for bicycles and pedestrians.
- No. 30:** Redesigns the intersection at NE Shelby Street for bicycles and pedestrians.
- No. D:** Creates a southbound bicycle lane on Montlake Boulevard from the Montlake Bridge to SR 520.
- No. H:** Adds bicycle sharrow signage to Brooklyn Avenue between Ravenna Blvd. and the Burke-Gilman Trail.
- No. I:** Prioritizes the repair and repaving of NE Ravenna Boulevard between NE 65th Street and Ravenna Avenue NE.

**TRAIL**

- No. 5:** Provides a bicycle and pedestrian “lead phase” and improve the visibility of the Burke-Gilman crossing.
- No. 11:** Develops a pedestrian and bicycle path from the UW campus to the Burke-Gilman Trail underneath the NE 45th Street Viaduct.
- No. 21:** Creates a new bicycle connection between 36th Avenue NE and the Burke-Gilman Trail.
- No. 22:** Develops a bicycle-pedestrian connection between the Burke-Gilman Trail and 25th Avenue NE at NE 47th Street.
- No. 25:** Improves the off-street trail that runs parallel to Ravenna Avenue NE to connect to the shared roadway corridor NE 58th Street.
- No. B:** Clears or trims trees and shrubs and adds a more visible crosswalk to better define where the Burke-Gilman Trail crosses University Way NE.
- No. F:** Apply trail crossing modifications at Pend Oreille Road and Brooklyn Avenue NE.

**TRANSIT**

- No. 1:** Adds a westbound transit lane by removing left turn lanes and movements.
- No. 3:** Extends the northbound left-turn pocket and modify the signal timing.
- No. 15:** Adds a southbound HOV lane from NE 45th Street to NE Pacific Place along the west side of Montlake Boulevard.
- No. 18:** Extends the existing eastbound HOV lane to provide a continuous lane from 15th Avenue NE to Montlake Boulevard.
- No. 36:** Creates a transit lane on 7th Avenue NE that improves the crossing of the I-5 northbound off-ramps for buses.

## Future Conditions With Recommended Action Strategy

The addition of the improvements identified in the Action Strategy will enhance travel throughout the University Area. Some of the projects “balance” a roadway, favoring non-motorized and transit use over auto-oriented improvements. The final result is a strategy which enhances key corridors and promotes mobility between modes.

### *Pedestrian*

The Action Strategy will improve pedestrian safety and mobility and identify new travel corridors to address missing connections. Projects include modification of traffic signals in the University District Urban Center to provide walk-phases (removal of pedestrian-buttons), adding a pedestrian crossing at NE 41st Street/11th Avenue NE and installing pedestrian lighting on the University Bridge.

### *Bicycle*

The Action Strategy, building upon the recommendations of the Bicycle Master Plan, will develop primary bicycle facilities on key bicycle corridors. Projects include development of bicycle lanes on Roosevelt Way and 11th/12th Avenues, a bicycle signal to facilitate bicycle movements from the University Bridge to Harvard Avenue and prioritizing the repair of pavement on Ravenna Boulevard.

### *Trail*

The Action Strategy will look to improve the safety and function of the Burke-Gilman Trail by improving trail crossing locations, creating a new connection at 36th Avenue NE and creating a new trail from the UW campus to the Burke-Gilman Trail below the NE 45th Street Viaduct.

### *Transit*

The Action Strategy will improve transit operations throughout the University Area. Improvements for transit operation include the creation of a westbound business access and transit lane on NE 45th Street, extending the NE Pacific HOV lane to 15th Avenue NE and creating an improved bus crossing of the I-5 northbound off-ramps at NE 45th Street.

### *Auto*

The Action Strategy will enhance auto mobility by adding capacity at key locations along the corridor. Projects include building left turn pockets at NE 55th Street/25th Avenue NE, adding a travel lane for the southbound I-5 on-ramps at NE 45th Street and creating a roundabout at NE 40th Street/7th Avenue NE. **Figure 7** shows the resulting intersection LOS at the study intersections with the Action Strategy projects. **Figures 8 and 9** show the corridor travel speeds with the Action Strategies in place.

While the intersection and corridor levels of service generally improve with the addition of the Action Strategy projects, some would continue to be congested such as NE 50th Street and Montlake Boulevard. Following the implementation of the Action Strategy recommendations, additional traffic analysis of intersections and corridors should be done to review the changes in travel patterns and to identify where additional improvements may be needed.

Figure 7. 2030 PM Peak Hour Intersection Levels of Service with the Action Strategy Projects.

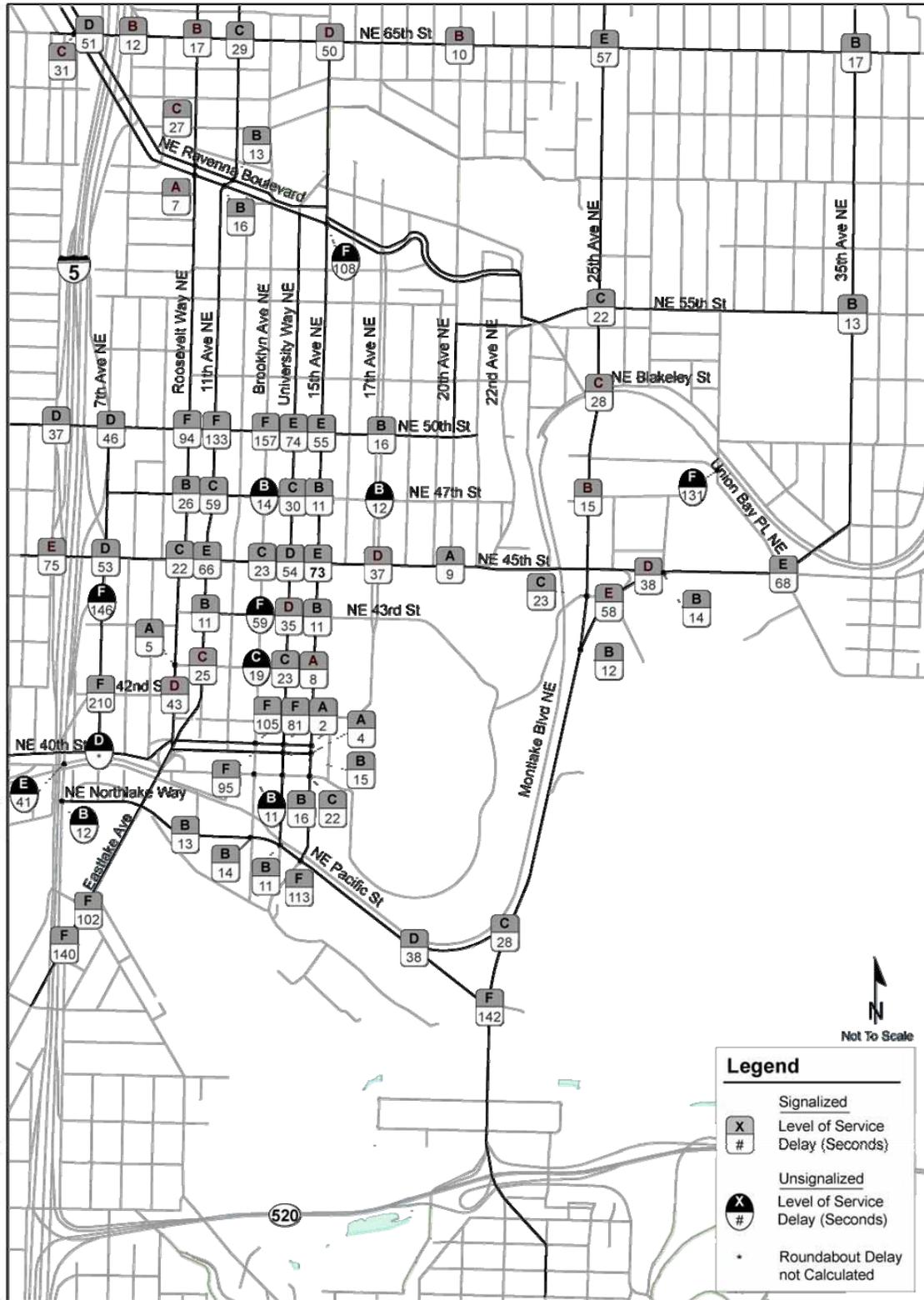




Figure 9. 2030 Arterial Levels of Service with Action Strategy Projects – North-South Corridors

