University Area Transportation Action Strategy
Appendices

A. Performances Measure Memorandum

University Area Transportation Action Strategies

Performance Measures and Thresholds

Prepared for

Seattle Department of Transportation

Prepared by

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University Area Transportation Action Strategies

Performance Measures and Thresholds

This report describes the transportation system performance measures and thresholds that will be applied to the University Area Transportation Action Strategy (UATAS). These performance measures and thresholds will be used to identify data needs, evaluate the existing deficiencies and identify the future transportation facility and service needs.

The performance measures and thresholds described in this report should be regarded as an initial set. As information is assembled throughout the duration of the UATAS study, these measures and thresholds may be adjusted.

Mirai will evaluate the University Area transportation system using the measures and benchmarks categorized by the following transportation modes:

- Transportation system for pedestrians
- Transportation system for bicyclists
- Transit system
- Transportation system for vehicles

Transportation System for Pedestrians

Mirai will evaluate the University area for pedestrian safety, the adequacy of space for pedestrians and the ease of pedestrians to cross streets. The level of service will be defined for each pedestrian corridor based on the pedestrian facilities and their relationship to the street and adjacent land uses. Specific thresholds will be set for each performance measure. Since it is not practical to evaluate pedestrian conditions on all streets in the study area, the study will focus on pedestrian corridors, most of which are classified arterials and/or the street types defined in Seattle's *Right-of-Way Improvement Manual*.

Pedestrian Corridors

The pedestrian corridors for the study area include:

North-south Corridors

- 25th Avenue NE from NE 45th Street to NE 65th Street (Principal Arterial - Regional Connector, Main Street)
- 22nd Avenue NE from NE 45th Street to Ravenna Boulevard (Collector Arterial - Local connector)

- 20th Avenue NE from NE 45th Street to Ravenna Boulevard
  (Collector Arterial - Local connector)
- 17th Avenue NE from NE 45th Street to Ravenna Boulevard
  (Collector Arterial - Local connector)
- 15th Avenue NE from NE Pacific Street to NE 50th Street
  (Principal Arterial - Regional connecter, Mixed Use Street, Main Street)
- 15th Avenue NE from NE 50th Street to NE 65th Street
  (Minor Arterial -Commercial connecter)
- University Way NE from NE Pacific Street to NE 50th Street
  (Collector Arterial - Main St, Local connecter from Pacific to Campus Parkway)
- University Way NE from NE 50th Street to Ravenna Boulevard
  (Collector Arterial - Main Street)
- Brooklyn Avenue NE from Pacific Street to NE 50th Street
  (Collector Arterial - Green Street)
- Brooklyn Avenue NE from NE 50th Street to Ravenna Boulevard
  (Collector Arterial - Green Street)
- Eastlake Avenue from Harvard Avenue E to Campus Parkway
  (Principal Arterial - Regional connecter)
- 11th Avenue NE from Campus Parkway to NE 50th Street
  (Principal Arterial - Regional Connector to 43rd, Mixed Use Street to 50th)
- 11th Avenue NE from NE 50th Street to Ravenna Boulevard
  (Principal Arterial - Regional Connector)
- 12th Ave NE from Ravenna Bouldevard to NE 65th St
  (Principal Arterial - Regional Connector, Main Street)
- Roosevelt Way NE from Campus Parkway to NE 45th Street
  (Principal Arterial - Regional Connector)
- Roosevelt Way NE from NE 45th Street to NE 65th Street
  (Principal Arterial - Mixed Use Street, Regional Connector, Main Street)
- 7th Avenue NE from NE 40th Street to NE 50th Street
  (Minor Arterial -Commercial Connector)
- 8th Avenue NE from NE Ravenna Boulevard to NE 65th Street
  (Principal Arterial – Regional Connector)
- Montlake Boulevard from SR-520 to NE 45th Street, or to Blakely

East-west Corridors

- NE Northlake Way/NE Pacific Street from 6th Avenue NE to University Way NE (Principal Arterial - Industrial Access St, Regional Connector)
- NE Pacific Street from University Way to Montlake Boulevard NE
  (Principal Arterial - Regional Connector)
- NE 40th Street/Campus Parkway from 7th Avenue NE to 15th Avenue NE
  (Minor Arterial - Commercial Connector)

- NE 42nd Street from 7th Avenue NE to Roosevelt Way NE
  (Principal Arterial - Green Street)
- NE 42nd Street from Roosevelt Way NE to 15th Avenue NE (Green Street)
- NE 43rd Street from Roosevelt Way NE to 15th Avenue NE
  (Collector Arterial - Green Street)
- NE 43rd from Roosevelt Way NE to 7th Avenue NE
  (Collector Arterial - Green Street)
- NE 45th Street from Southbound I-5 ramps to 15th Avenue NE
  (Principal Arterial - Mixed Use Street, Main Street)
- NE 45th Street from 15th Ave NE to 35th Ave NE
  (Principal Arterial - Regional Connector)
- NE 47th Street from Roosevelt Way NE to 15th Avenue NE
  (Collector Arterial - Mixed Use St, Main St)
- NE 50th Street from Southbound I-5 ramps to 15th Avenue NE
  (Principal Arterial - Regional Connector, Mixed Use Street)
- NE 50th Street from 15th Avenue NE to 20th Avenue NE
  (Collector Arterial - Local Connector)
- Ravenna Boulevard from 8th Avenue NE to 15th Avenue NE
  (Minor Arterial - Commercial Connector)
- Ravenna Boulevard from 15th Avenue NE to 25th Avenue NE
  (Collector Arterial - Local Connector)
- Blakeley/Union Bay Street from 25th Ave NE to NE 45th Street
  (Collector Arterial - Local Connector)
- NE 55th Street from 25th Avenue NE to 35th Avenue NE
  (Collector Arterial - Mixed Use Street)
- NE 65th Street from 8th Avenue NE to 15th Avenue NE
  (Minor Arterial - Mixed Use Street, Main St, partially Commercial Connector)
- NE 65th Street from NE 15th Avenue NE to 35th Avenue NE
  (Minor Arterial - Mixed Use Street, Commercial Connector)

The arterial street classification for the study area, adopted in the Transportation Element of the Seattle Comprehensive Plan, is shown in **Figure 1**. The street types in the *Right-of-Way Improvement Manual* are shown in **Figure 2**. Street types also include those designated as Green Streets. Where a street segment is designated as one of the street types, as well as a Green Street, the Green Street designation is shown in the map.

Figure 1. Street Classification Map

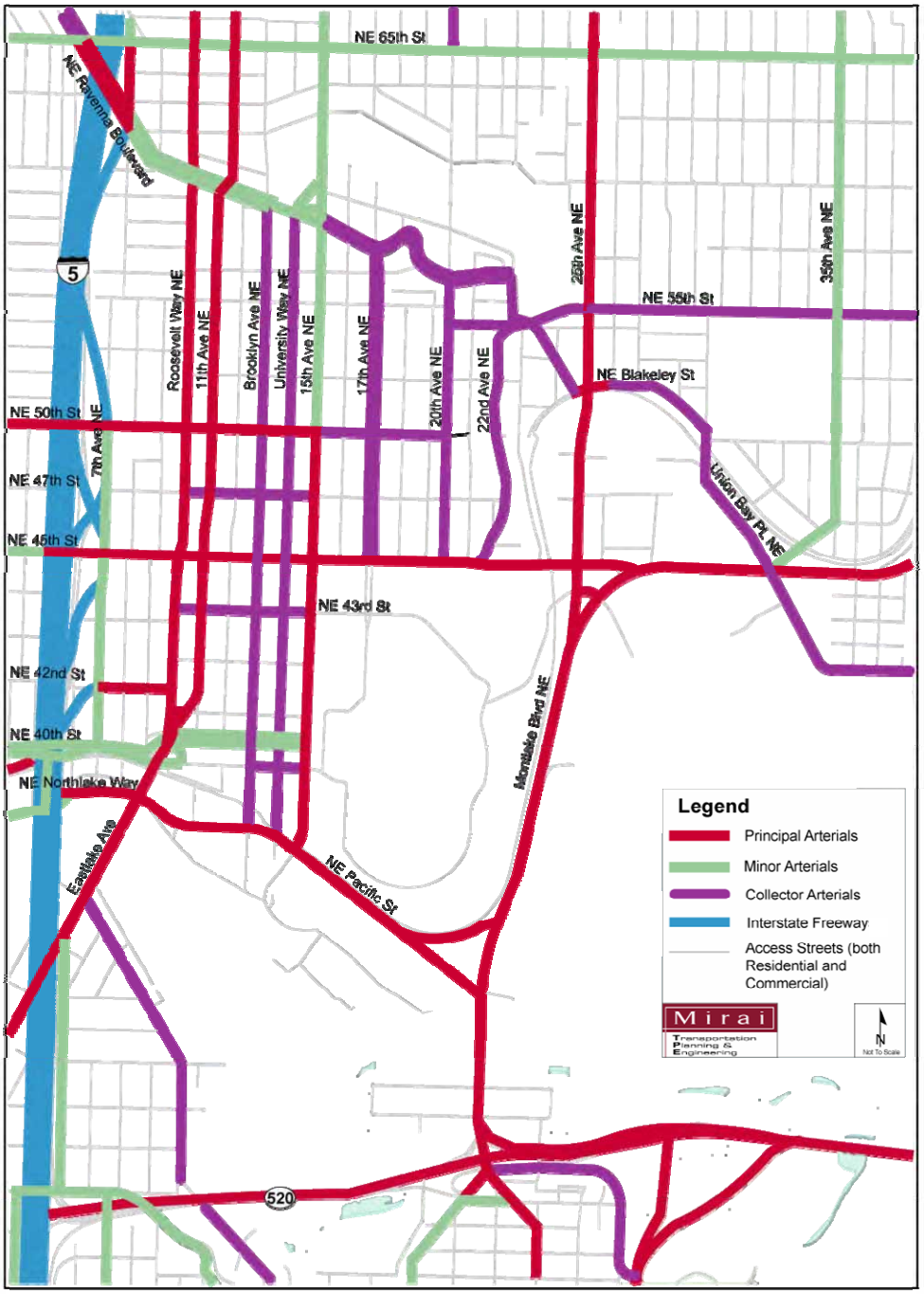
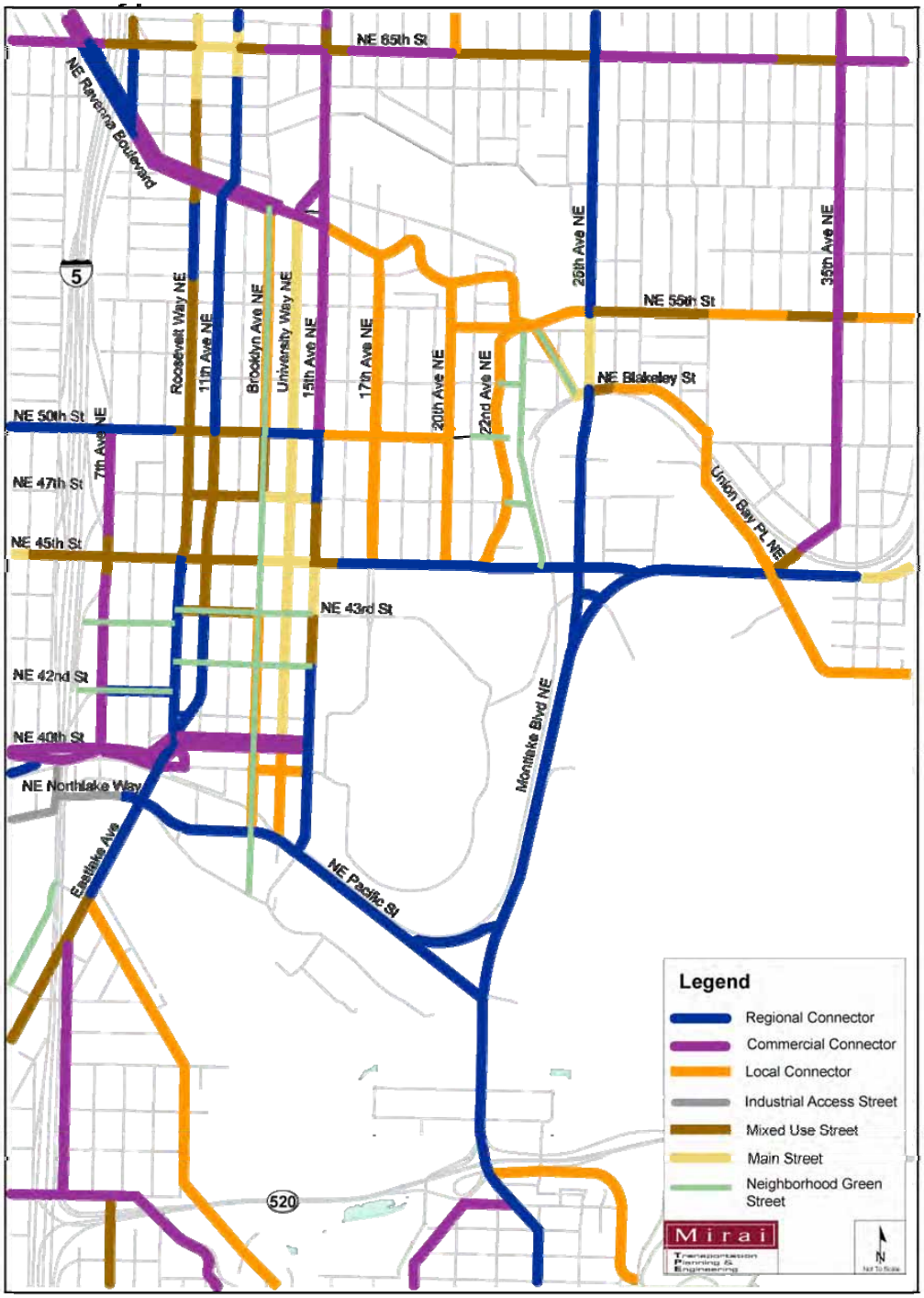


Figure 2. Street Types Defined by the Right-of-Way Improvement Manual



Performance Measures

To evaluate the pedestrian system, the following performance measures will be used:

- Pedestrian walking space: The percentage of pedestrian facilities (sidewalk only) along a designated pedestrian corridor that meets the minimum width as described by the Right-of-Way Improvement Manual.
- Pedestrian facilities: The percentage of pedestrian facilities along a pedestrian corridor that meets the Right-of-Way Improvement Manual guidelines for sidewalk, planting strip and spaces that separate moving vehicles and pedestrians such as on-street parking, and bike lanes.
- Ease of street crossings at intersections: Two measures will be used: 1) The number of vehicles conflicting with pedestrians, such as right-turning and left-turning vehicles in a permissible signal phase , and 2) the length of the traffic signal cycles.

Level of Service to Evaluate the Adequacy of the Walking Space

The minimum sidewalk width required by *Right–of-Way Improvement Manual* (Chapter 4.11 Sidewalks) is 6 feet. The performance measure will calculate the percentage of the pedestrian corridor having sidewalks greater than the minimum 6-foot sidewalk width. For each corridor, the following formula will be used to calculate the percentage of the adequacy of walking space:

Percent Adequate Walking Space = SUM (the length of the block face having average sidewalk width equal to or greater than 6 feet) / (the length of pedestrian corridor) X 100.

The following level of service definitions are proposed. As the proposed performance measure is unique for the UATAS, and no data has been collected, we will need to re-visit the level of service definitions and the threshold when we complete the sidewalk width inventory.

Proposed Definition of the Level of Service for Adequacy of Walking Space

AWS-LOS A: 95 to 100 percent

AWS -LOS B: 90 to 95 percent

AWS -LOS C: 85 to 90 percent

AWS -LOS D: 80 to 85 percent

AWS -LOS E: 70 to 60 percent

AWS -LOS F: less than 60 percent

Thresholds

- LOS B for Regional Connector, Commercial Connector, Main Street/Mixed Use and Green Street

- LOS C for Local Connector

Level of Service to Evaluate Adequacy of Pedestrian Facilities

The adequacy of the space between pedestrians and moving vehicles will be a performance measure. This measures the ease for the pedestrians to walk along the street and will be measured by the identifying the separation between the pedestrians and the traffic lane. The spatial separation in this report refers to the *pedestrian facilities*, which include sidewalks, planting strips, adjacent on-street parking, and bicycle lanes. To evaluate the percentage of compliance, the study will measure the widths of pedestrian facilities along a corridor and compare these to the described characteristics of the Street Type hierarchy as described by the *City's Right–of-Way Improvement Manual* (Chapter 4.2 Design Criteria). The following table (**Table 1**) shows the minimum widths needed to satisfy the Manual's guidelines for pedestrian facilities.

Table 1. Minimum Spaces for Pedestrian Facilities Recommended in the Right-of-Way Manual

Street Type	Sidewalk	Planting	Parking/Bike	Total (Minimum)
Regional Connector	6 feet	4 feet	0 feet	10 feet
Commercial Connector	6 feet	4 feet	8 feet	18 feet
Local Connector	6 feet	6 feet	6 feet	18 feet
Green Street	8 feet	10 feet	0 feet	18 feet
Main Street/ Mixed Use Street	8 feet	6 feet	8 feet	22 feet

The study will measure the length of the pedestrian corridor that meets the minimum pedestrian facilities for the street type. For example, the Regional Connector needs a minimum of 10 feet between the traffic lane and the face of a building. Mirai will measure the length of the corridor where adequate pedestrian facilities are provided. On-street parking will be measured based on midday availability, since the majority of peak pedestrian activity generally occurs during the traditional "off-peak" period for vehicles. The study assumes that the pedestrian activities in the University District are similar to the other typical activities areas. The following formula will be used to calculate the percentage of the pedestrian corridor having adequate pedestrian facilities:

Percent Adequate Pedestrian Facilities = SUM (the length of the block face having adequate pedestrian facilities based on the street types) / (the length of pedestrian corridor) X 100.

The following definitions are proposed for the level of service for this performance measure.

Proposed Level of Service for Adequacy of Pedestrian Facilities

PF -LOS A: 90 to 100 percent

PF -LOS B: 80 to 90 percent

PF -LOS C: 70 to 80 percent

PF -LOS D: 50 to 70 percent

PF -LOS E: 40 to 50 percent

PF -LOS F: less than 40 percent

Mirai will review the results of the inventory data before we set the threshold for this performance measure. At this time, we tentatively set one threshold level for all pedestrian corridors regardless of the street type. However, we may revise the threshold and set the threshold for each street type after reviewing the field data.

Threshold

PF-LOS D

Level of Service to Evaluate Ease of Pedestrian Street Crossings

Pedestrian crossings at intersections are hampered by conflicts with turning vehicles and pedestrians experience frustration when faced with long signal cycles. One way to measure this is to identify the total (left-turning and right-turning) volumes that conflict with the pedestrian movements at each intersection. Another measure is the length of the traffic signal cycle.

The level of service for vehicle-pedestrian conflicts is defined below. We will total the right-turning vehicles and left-turning vehicles that conflict with pedestrians crossing the streets during the PM peak hour. We will add all vehicles that conflict with pedestrians crossing the streets (the four legs) at each signalized intersection. We have tentatively set a level of service based on limited data. We will review this level of service definition and thresholds after more comprehensive field data is obtained.

A. Proposed Definition of Level of Service for Vehicle-Pedestrian Conflicts (PM Peak Hour)

VP-LOS A: fewer than 200 vehicles

VP-LOS B: 200 to 400 vehicles

VP-LOS C: 400 to 600 vehicles

VP-LOS D: 600 to 800 vehicles

VP-LOS E: 800 to 1000 vehicles

VP-LOS F: greater than 1000 vehicles

Thresholds

VP-LOS B for intersections on Green Streets, Main Streets and Local Connectors

VP-LOS C for intersections on Mixed Use Streets and Commercial Connectors

VP-LOS D for intersections on Regional Connectors

The performance measure related to traffic signal cycle length is straightforward. We will measure the length of a traffic signal cycle during the PM peak hour at each signalized intersection. The following defines the level of service and thresholds for the signal cycle length related to pedestrian street crossing experience.

Proposed Definition of Level of Service for Signal Cycle Length (PM Peak Hour)

SCL-LOS A: less than 60 seconds

SCL-LOS B: 60 to 75 seconds

SCL-LOS C: 75 to 100 seconds

SCL-LOS D: 100 to 120 seconds

SCL-LOS E: 120to 130 seconds

SCL-LOS F: greater than 130 seconds

Benchmarks

LOS C for intersections on Green Streets

LOS D for intersections on Main Streets, Mixed Use Streets, Local Connectors

LOS E for intersections on Commercial and Regional Connectors

Transportation System for Bicyclists

Level of Service for Bicycles

The adequacy of bicycle facilities on designated bicycle corridors in the UATAS study area will be evaluated using the concept of bike level of service (BLOS) as defined by the *Federal Highway Administration's Bicycle Compatibility Index and Updates.* It is a measure of on-road conditions and cannot be applied to multi-purpose trails or other off-road facilities. Therefore, Mirai will only apply the evaluation of bicycle facilities to bicycle lanes and shared-use lanes (wider curb lanes).

The bicycle level of service attempts to indicate the bicyclist's comfort level for specific roadway geometries and traffic conditions. Each of the indicators listed below are weighted according to a mathematical equation. From this computation, scores will be obtained.

The factors used to define the bicycle level of service are:

- Traffic conditions (average daily volumes, posted speed limits, percent of heavy vehicles, on-street parking)
- Roadway design (number of lanes, speed limits, width of outside lane, availability of shoulder)
- Roadway surface conditions

Bicycle Corridors

The UATAS study will evaluate all bicycle corridors identified on the City's *Bicycle Master Plan* (Draft – April 2007) as identified below:

North-south Corridors

- Ravenna Place NE from NE Blakely to NE 55th Street (Sharrow)
- 22nd Avenue NE from NE 45th Street to Ravenna Boulevard (Shared Roadway)
- 20th Avenue NE from NE 45th Street to Ravenna Boulevard (Sharrow, Bike Boulevard, Multi-use Trail)
- 17th Avenue NE from NE 45th Street to NE 47th Street (Shared Roadway)
- University Way NE from NE Pacific Street to NE 50th Street (Sharrow)
- University Way NE from NE 50th Street to Ravenna Boulevard (Bike Lane)
- Brooklyn Avenue NE from NE Boat Street to NE 40th Street (Bike Lane)
- Eastlake Avenue from Harvard Avenue E to Campus Parkway (Bike Lane)
- 11th Avenue NE from Campus Parkway to Ravenna Boulevard (Bike Lane)
- 12th Ave NE from Ravenna Bouldevard to NE 65th Street (Bike Lane)
- Roosevelt Way NE from Campus Parkway to NE 65th Street (Bike Lane)
- 7th Avenue NE from NE 45th Street to NE 50th Street (Bike Lane)

East-west Corridors

- NE Northlake Way/NE Pacific Street from University Bridge to Brooklyn Avenue NE (Bike Lane)
- NE 40th Street from University Bridge to 15th Avenue NE (Bike Lane, Shared Roadway)
- NE Campus Parkway from 11th Avenue NE to Brooklyn Avenue NE (Sharrow, Bike Lane)
- NE 41st Street from 11th Avenue NE to Brooklyn Avenue NE (Bike Lane)
- NE 45th Street from Southbound I-5 ramps to 17th Avenue NE (Bike Lane)
- NE 47th Street from I-5 Bridge to 22nd Avenue NE (Share Roadway)
- NE 50th Street from Southbound I-5 ramps to Northbound I-5 ramps (Shared Roadway)
- Ravenna Boulevard from NE 65th Street to Brooklyn Avenue NE (Bike Lane)

- Ravenna Boulevard from Brooklyn Avenue NE 55th Street (Sharrow, Climbing Lane)
- NE 65th Street from Ravenna Boulevard to 20th Avenue NE (Climbing Lane)
- NE 65th Street from NE 20th Avenue NE to 35th Avenue NE (Sharrow)

Figure 3 shows the bicycle corridors, with recommended improvements, that are identified in the Draft *Bicycle Master Plan* for the UATAS study area.

Definition of Bicycle Level of Service (BLOS)

Level of service for bicycles will be defined using a range of scores. The table below (**Table 2**) describes the relationship between the score and the general conditions. For example, a BLOS B is defined with a score between 1.51 and 2.50, and BLOS C is a score between 2.51 and 3.5. The LOS threshold is set as LOS C for the bicycle corridors.

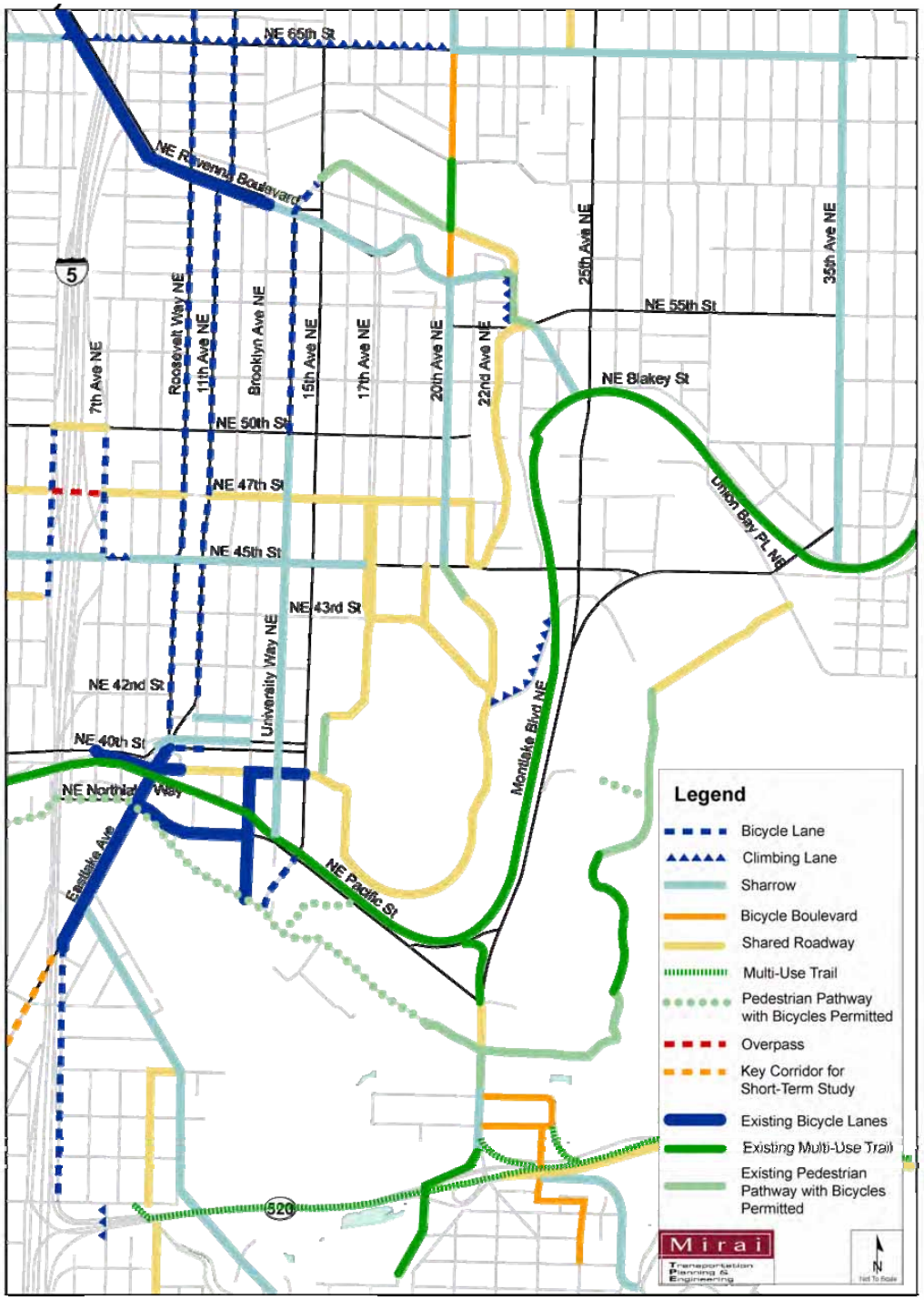
Table 2. Definition of Bicycle Level of Service and Descriptions of Operating Conditions

LOS	Score	Descriptions of Level of Service Operations
A	≤ 1.5	Highest cyclist comfort. Little or no vehicular conflicts. Supportive infrastructure in place and/or very low vehicular volumes.
B	< 1.5 – 2.5	High degree of cyclist comfort. Little vehicular conflict. Some form of supportive infrastructure and/or low vehicular volumes.
C	< 2.5 – 3.5	Acceptable level of cyclist comfort. Some vehicular conflict. Some form of supportive infrastructure and/or lower vehicular volumes.
D	< 3.5 – 4.5	Some cyclist discomfort. More vehicular conflicts. Some form of supportive infrastructure with higher vehicular volumes.
E	< 4.5 – 5.5	High level of cyclist discomfort. Notable vehicular conflicts. Little or no supportive infrastructure with high vehicular volumes.
F	> 5.5	Highest level of cyclist discomfort. No supportive infrastructure with high vehicular volumes and possible high percentage of heavy vehicles.

Thresholds

LOS B for all bicycle corridors in the study area

Figure 3. Bicycle Corridors Identified in the Bicycle Master Plan (Draft)



Transit System

For the UATAS we will use two kinds of transit performance measures: the Urban Village Transit Network (UVTN), and the adequacy of bus shelters. The UVTN is a series of performance measures developed for the *Seattle Transit Plan* in order to assess the adequacy of transit within the city-designated Urban Villages. The *Seattle Transit Plan* designates the city streets used by transit. **Figure 4** shows the transit corridors in the UATAS study area as designated by the *Seattle Transit Plan*. The transit streets are designated with the following definitions:

- Transit Way**:** Provides frequent, high speed, high capacity and intermediate capacity service
- Principal Transit Street: Provides for high-volume transit service, often for regional or citywide trips
- Major Transit Street: Provides concentrated transit service to connect and reinforce major activity centers and residential areas
- Minor Transit Street: Provides local and neighborhood transit service
- Local Transit Street: Provides local and neighborhood transit service (Not part of the UVTN)

The second performance standard will use King County Metro's measure for identifying locations for bus shelters and the County's boarding and alighting database to determine adequacy.

Level of Service Indicators and Thresholds for Urban Village Transit Network (UVTN)

The transit routes designated in the Urban Village Transit Network are evaluated based on the following indicators:

- Frequency
- Span of service (Operating Hours)
- Loading
- Reliability
- Transit vehicle speed

Table 3 shows the threshold that was identified in the *Seattle Transit Plan* for each indicator.

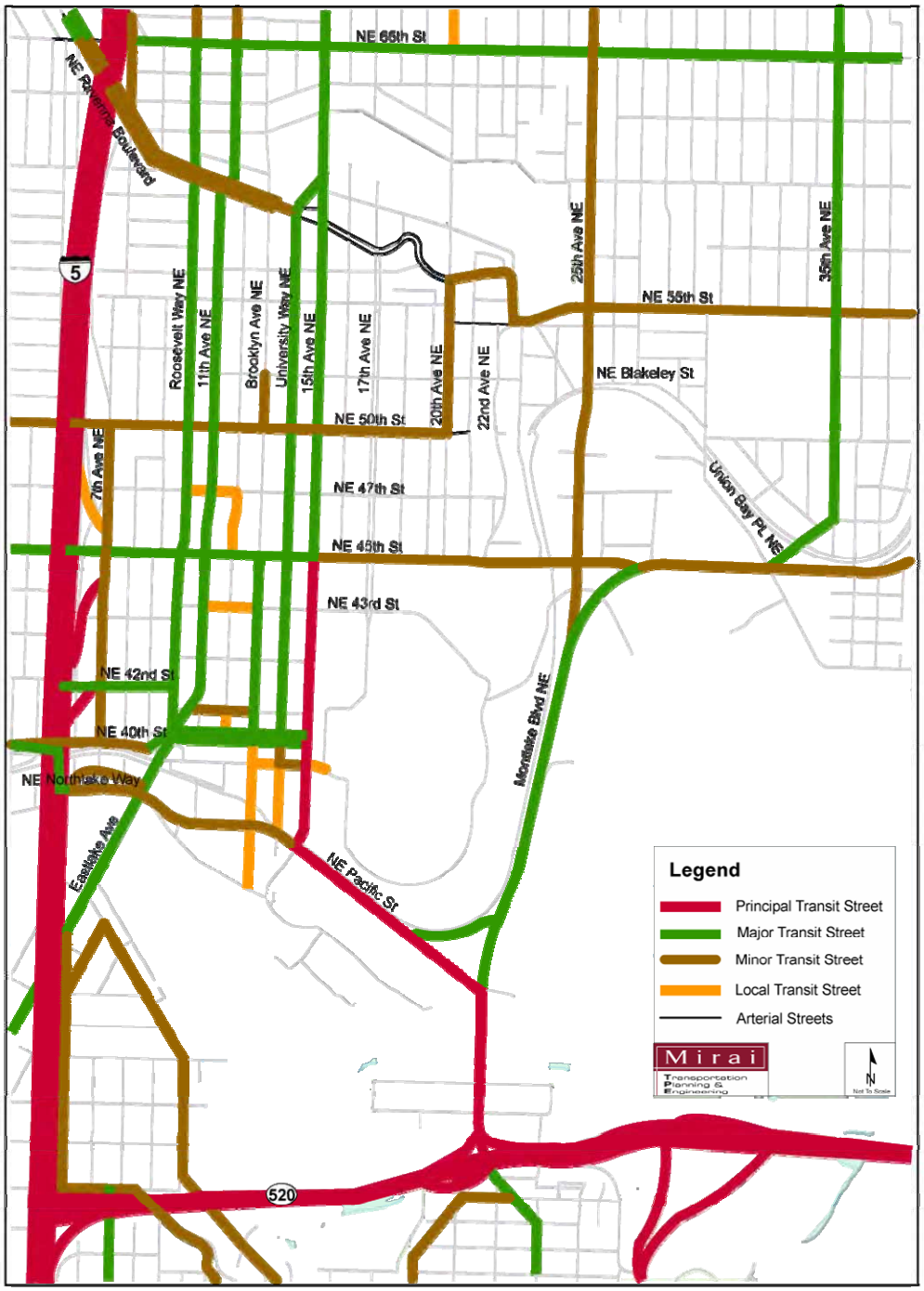
Table 3. Transit System Performance Indicators and Thresholds in the Urban Village Transit Network

Indicator	Threshold
Frequency (per UVTN Report)	15 minutes or less
Span of service (per UVTN Report)	18 hours or more
Loading	Less than 90% of seated capacity
Reliability (per UVTN Report)	Greater than 60% services running less than 1 minute late
Transit vehicle speed	Greater than 30% of the posted speed limit

Level of Service Adequacy of Bus Shelters

The UATAS will adopt King County Metro's bus shelter standard that is used to evaluate whether a bus shelter is needed at each bus stop location. The current standard is 50 or more passengers boarding per day.

Figure 5. Transit Street Classification Defined in the Seattle Transit Plan



Transportation System for Vehicles

The performance measures for vehicles will be traffic safety, arterial corridor level of service, and arterial intersection level of service.

Traffic Safety

Traffic safety will be measured by the number of collisions and traffic collision rates. The rates for intersections will be defined as the average annual collisions per million vehicles: mid-block locations will be derived from the last five years of traffic collision records maintained by the City.

Performance measures and thresholds:

- Average number of collisions for signalized intersections: 10 per year
- Average number of collisions for unsignalized intersections: 5 per year
- Average number of collisions for mid-block locations: 5 per year
- Collision rates for signalized intersections: 1.5 per million annual vehicles entering (The collision rate threshold is based on the experience for the Northgate CTIP)
- Collision severity (total economic cost per year): exceed $100,000 per year for two years out of a three-year available data.

Arterial Corridors

Mirai will measure the performance of the arterial corridors in terms of the average vehicle speeds during the PM peak period. The *Highway Capacity Manual (HCM) 2000* method will be applied. The following arterials (also shown in **Figure 1**) will be selected for this analysis:

North-south Corridors

- 25th Avenue NE from NE 45th Street to NE 65th Street (Principal)
- 15th Avenue NE from NE Pacific Street to NE 50th Street (Principal)
- 15th Avenue NE from NE 50th Street to NE 65th Street (Minor)
- University Way NE from NE Pacific Street to NE 50th Street (Collector)
- University Way NE from NE 50th Street to 15th Avenue NE (Collector)
- Eastlake Avenue/11th Avenue NE from Harvard Avenue E to NE 50th Street (Principal)
- 11th Avenue NE from NE 50th Street to NE 65th Street (Principal)
- Roosevelt Way NE from Campus Parkway to NE 65th Street (Principal)
- 7th Avenue NE from NE 40th Street to NE 50th Street (Minor)

East-west Corridors

- NE Northlake Way/NE Pacific Street from 6th Avenue NE to University Way NE (Principal)
- NE Pacific Street from University Way to Montlake Boulevard NE (Principal)
- NE 40th Street/Campus Parkway from 7th Avenue NE to 15th Avenue NE (Minor)
- NE 45th Street from Southbound I-5 ramps to 15th Avenue NE (Principal)
- NE 45th Street from 15th Avenue NE to 35th Avenue NE (Principal)
- NE 50th Street from Southbound I-5 ramps to 20th Avenue NE (Principal/Minor)
- NE 65th Street from 8th Avenue NE to 15th Avenue NE (Minor)
- NE 65th Street from NE 15th Avenue NE to 35th Avenue NE (Minor)

Level of Service for Arterials Corridors

For the UATAS we will use the arterial corridor level of service concept described in the *2000 Highway Capacity Manual*. The arterial corridor level of service is defined for each street class by average travel speeds. We will evaluate PM peak hour arterial corridor levels of service on the streets designated as the arterial corridors and identified previously. **Table 4** shows the definitions of arterial corridor level of service for each arterial class. (Please note that Class I is not shown because it is for state routes and they are not applicable to the streets in the UATAS study area.)

Table 4. Definitions of Arterial Corridor Levels of Service

Urban Street Class	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
	Average Speed (miles per hour)					
II (Principal Arterials)	more than 35	28-35	22-28	17-22	13-17	less than13
III (Minor Arterials)	more than 30	24-30	18-24	14-18	10-14	less than10
IV (Collector Arterials)	more than 25	19-25	13-19	9-13	7-9	less than7

Threshold

LOS F

Level of Service for Signalized Intersections

Mirai will evaluate the performance of signalized intersections on the arterials using the intersection delay method (HCM 2000). Average vehicle delay at each arterial intersection will be calculated with Synchro for the PM peak hour. Instead of focusing on the individual intersections, the performance of the intersections may be evaluated based on averaged intersection delay within key arterial corridors. **Table 5** shows the definition of intersection level of service.

Table 5. Definition of Level of Service for Signalized Intersections

	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Average Intersection Delay (seconds)	Less than 10	between 10 and 20	between 20 and 35	between 35 and 55	between 55 and 80	greater than 80

Threshold

LOS E

Level of Service for Unsignalized Intersections

The performance of stop-sign controlled intersections (two-ways) is measured for the worst movement of the intersection. Where the delay exceeds the threshold, we will conduct further investigation. At four-way stop controlled intersections, the approach vehicle delays will be averaged to determine the level of service. The threshold for either case is set the same. **Table 6** shows the definition of level of service for unsignalized intersections.

Table 6. Definition of Level of Service for Unsignalized Intersections

	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Stop Sign Control Delay (Seconds)	Less than 10	between 10 and 15	between 15 and 25	between 25 and 35	between 35 and 50	greater than 50

Threshold

LOS E