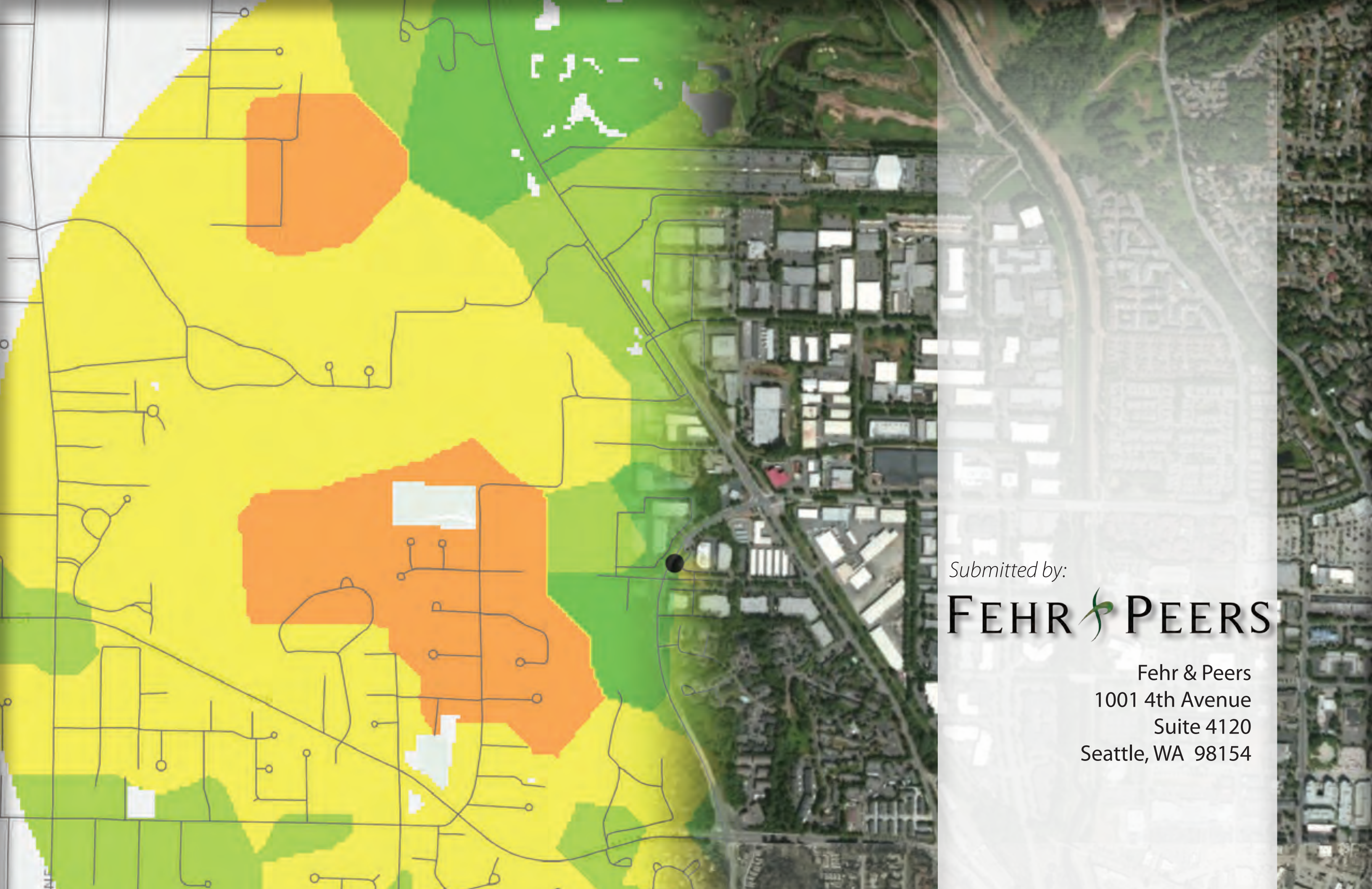

Submitted by:

FEHR & PEERS

Fehr & Peers
1001 4th Avenue
Suite 4120
Seattle, WA 98154

Prepared for: King County METRO

SOUNDTRANSIT

Non-Motorized Connectivity Study

September 2014

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1. INTRODUCTION

Increasing the availability of transportation options is a primary goal of *Transportation 2040*, the Puget Sound region's long-range transportation blueprint. Transit plays a key role in providing for local and regional mobility, but in many areas, transit access is limited by a lack of non-motorized infrastructure. There has been an increasing amount of research on how non-motorized access can improve walking/biking mode share, but research on non-motorized access to transit is still a relatively new field.

This study works to fill this gap in the research using data and modeling techniques developed specifically for the Puget Sound region. The timing for this work is right, with continued advancement in non-motorized connectivity research, improved non-motorized data from local jurisdictions, and better analysis techniques being incorporated into common GIS software. The intent of this study is to develop a suite of GIS tools to analyze and visualize non-motorized transit access and to develop a model to understand how non-motorized connectivity affects transit ridership. Using these tools, King County Metro (KC) and Sound Transit (ST) can assess non-motorized access projects, prioritize transit service and investments, and partner with local agencies on obtaining grant and other funds to support transit access projects. The tools and research described in this report are part of an ongoing evaluation of non-motorized transit access by both agencies. This report was informed by earlier access studies and may be incorporated into future evaluations.

The non-motorized transit access study involved a major collaboration with local jurisdictions to collect GIS pedestrian, bicycle, and roadway data from more than 20 local jurisdictions. Using this data, the model team developed a set of GIS analysis tools to summarize connectivity data such as route directness, bike stress, intersection/sidewalk density, and arterial crossing density at more than 500 transit stops across a three-county study area. These connectivity variables were then used to develop a model that can measure the potential change in transit ridership when non-motorized connectivity to transit stops improves.

Also included in this report are several examples of potential uses of the connectivity tools and ridership model. The applications described in the report include:

- A framework for transit agencies to prioritize non-motorized projects included in local jurisdiction active transportation plans

- An evaluation of "market areas" where areas with high/low non-motorized connectivity, transit supportive land use densities, and transit supportive demographics are presented
- A set of detailed case study applications where the model was used to evaluate existing and 2035 conditions at four transit stop areas in the region. Through these case studies, the team evaluated specific non-motorized access projects and identified some strategies to enhance the non-motorized evaluation with additional station area planning.

The project study area consists of approximately 400 square miles of KC and ST coverage area, shown in **Figure 1**.

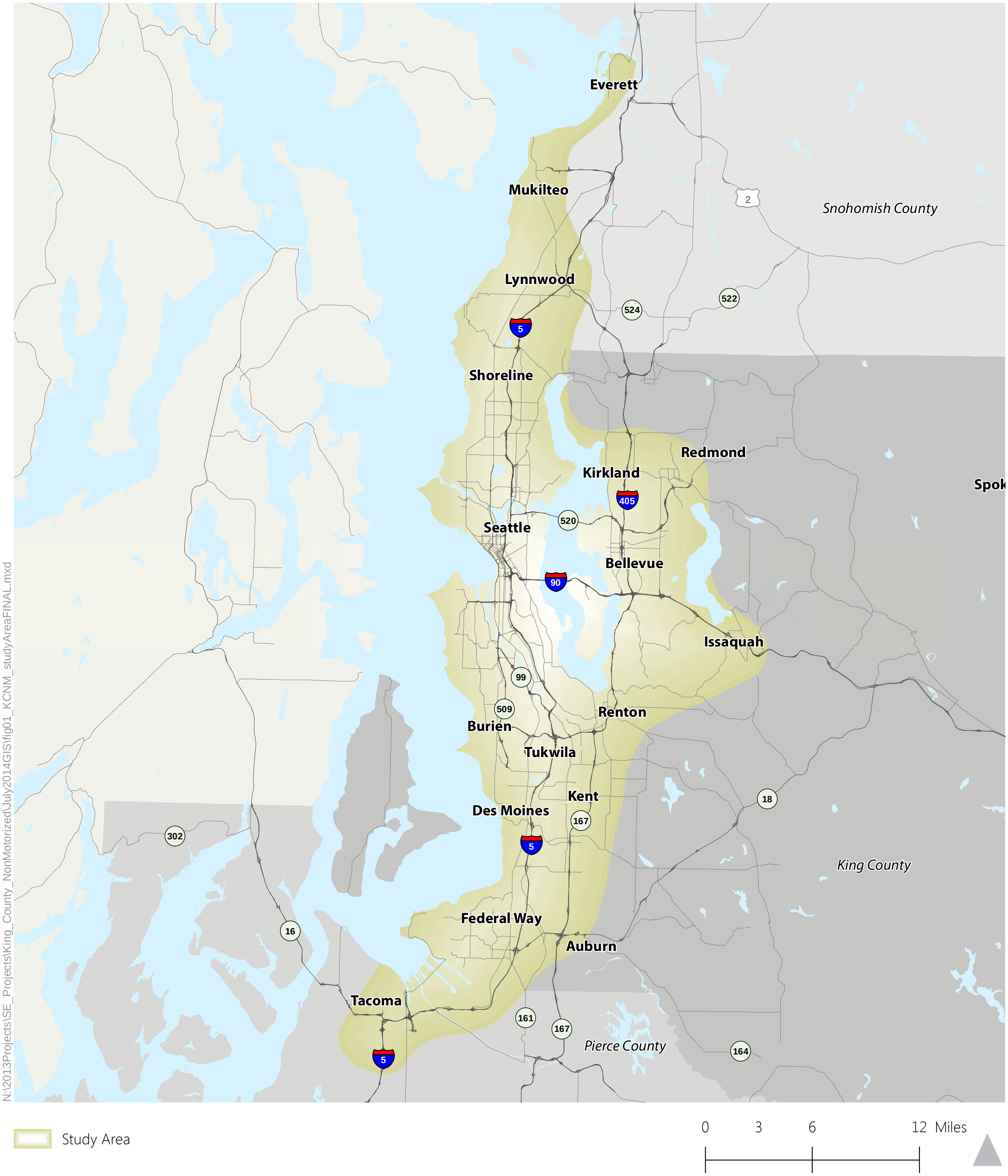


Figure 1

Study Area

2. LITERATURE REVIEW FINDINGS – NON-MOTORIZED ACCESS AND TRANSIT RIDERSHIP

This chapter outlines the results of a literature review that evaluated factors relating "access to transit" to "ridership increases." The project team conducted research to assess if, and how, bicycle and pedestrian improvements around transit stops/stations may be correlated with a change in transit ridership. The results of this research informed the data collection plan and regression modeling, which are described in subsequent chapters. In general, the literature review revealed a substantial amount of research on how the built environment and transportation infrastructure influences people's choice to walk and bicycle. However, there is less research on how pedestrian/bicycle infrastructure accessing transit affects ridership. That being said, the literature did indicate several important factors that are correlated with non-motorized access and transit ridership. The factors and some specific examples cited in the literature are summarized in **Table 1**. The sources of these findings and their applicability to this project are described in more detail below.

Table 1: Summary of Influential Access to Transit Factors

Factor	***Examples of Influential Factor***	***Citation***
Connectivity at transit destinations, lighting at transit origin stations	4-way intersections within one mile of workplace destinations, number of streetlights per 1,000 feet of shortest walking distance from residence to nearest stations	Cervero, 2007
Walkability index in station catchment areas	Land use density, land use mix, number of intersections per acre	Ryan and Frank, 2009
Route directness	Street network connectivity	Schlossberg, 2007
Increase in on- and off-site bicycle infrastructure	On- and off-street facilities within station bike shed, on-site amenities at transit stations, parking policies at stations	Cervero, 2012
On-board bicycle accommodations	Number of buses on applicable routes with bike racks or other facilities	FHWA, date unknown

Transit Oriented Development's Ridership Bonus: A Product of Self-Selection and Public Policies, *Robert Cervero, Environment and Planning Journal, 2007*

This study evaluated which factors influence work-trip transit ridership for residents living near rail lines in California. The analysis indicated that certain variables had "significant marginal influences" on mode choice. While, in general, workplace variables such as flextime schedules were the most influential, connectivity levels at the destination were also significant factors. The desire to live in an area close to transit was also an indicator of transit ridership. Streetscape improvements, parking provisions, and other physical design elements of station area housing apparently did not influence whether station area residents took transit for work trips. Housing density around station areas made the biggest difference in adding trips to the transit system. Among Californians living within one-half mile of rail stations, only one urban design variable had significant influence on whether people biked or walked to the station: street lighting density. This had "modest predictive powers." Statistics are available in the report, located at: http://www.transitwiki.org/TransitWiki/images/6/6d/Cervero_TOD.pdf.

Based on Cervero's research, two variables are of interest for this study:

- Proportion of intersections that are 4-way or more within 1 mile of a station or stop
- Number of street lights per 1,000 feet of shortest walking distance from residence to nearest station

Pedestrian Environments and Transit Ridership, *Sherry Ryan and Lawrence Frank, Journal of Public Transportation Vol 12 No 1, 2009*

This study utilized data from the San Diego region to assess relationships between transit ridership and the quality of pedestrian environments around bus stops. The study authors defined the station catchment area as a half-mile along the street network from each transit stop. The analysis showed a "significant and expected" relationship between bus ridership and walkability. However, although the walkability variable was deemed statistically significant, it explained only 0.5% of variation in ridership. Descriptive statistics for socioeconomic and built environment variables and walkability index equations are provided in the report at: http://reconnectingamerica.org/assets/Uploads/JPT12-1Ryan.pdf.

According to the authors, the walkability index (equation provided in the paper) is a combination of the following factors:

- Land use density, measured through net residential density in station area buffer, and average retail floor-to-area ratio (FAR) in station area buffer
- Land use mix, a factor of the number of different land uses in the station buffer and the proportion of acres of each land use within the station buffer area
- Street network pattern, number of intersections per station area buffer acre

Based on this research, several connectivity/land use variables are of interest for this study:

- Population and employment density around stops and stations
- Number of intersections around stops and stations

Source: How Far, By Which Route, and Why? A Spatial Analysis of Pedestrian Preference, *Marc Schlossberg et. al., Mineta Transportation Institute, 2007*

This study does not address relationships between the pedestrian environment and transit ridership but does identify key factors influencing why people choose certain routes and how far they are willing to walk to transit. Survey responses indicated that people walk on average 0.5 miles to access rail transit. Other data cited by the authors note that people in suburban areas are more willing to walk longer distances (average of 0.4 miles versus 0.2 miles) than similar people in urban areas to reach high-frequency transit. According to the survey, the most important factor in choosing a walking route is directness (minimizing time and distance). Secondary factors are safety, attractiveness of the route, sidewalk quality, and absence of long waits at traffic lights. The study authors equated “safety” to the presence of adequate traffic control devices at crossings, as well as slower traffic speeds. Geographic data were not collected as part of this study. The study can be found online at: http://transweb.sjsu.edu/MTIportal/research/publications/documents/06-06/MTI-06-06.pdf

Based on this research, three variables are of interest for this study:

- Route directness – the ratio between the straight line distance and the actual network distance between a transit stop and a parcel or point
- Presence of sidewalks on arterial streets
- Signalized crossings of arterial streets

Bike-and-Ride: Build It and They Will Come, *Cervero et al, working paper 2012*

This study analyzed multiple BART stations for bike access and how changes to the on- and off-site bicycle environments between 1998-2008 influenced access-to-transit mode split. The BART stations were characterized by typologies (urban, urban with parking, balanced intermodal, intermodal-auto reliant, or auto-dependent).

Several stations in the study experienced significant increases in bicycle mode share access to transit, attributed to infrastructure investments. For instance, Ashby Station in Berkeley increased its bicycle mode share from 7.4% in 1998 to 11.7% in 2008 and significantly expanded its bike access shed through multiple improvements such as:

- Doubling the amount of bike infrastructure surrounding the station
- Including the opening of the bike boulevard network in Berkeley
- Addition of ramps facilitating bike access to the station
- Including bike-rack parking spaces, secure/enclosed lockers, and a self-serve bike station
- Added parking fees for cars ($1/day in 2008, whereas previously there was no charge)

In addition, Fruitvale station increased its bike mode share from 4.3% to 9.9% from 1998-2008 and increased the bike shed traveled by commuters to/from the station. Built environment changes included:

- Increase in the mileage of bike paths, lanes, and routes surrounding the station
- Wayfinding guiding cyclists to the station entrance

- Provision of attended bike station, secure parking, repair services, and short-term rentals as well as bike racks and lockers.
- Added parking fees for cars

Relating these variables to the non-motorized connectivity analysis, we identified the following variables:

- Bicycle infrastructure (paths, lanes, and routes) within a three-mile buffer of stations/stops
- Bicycle parking at the station

The working paper may be found online at:
http://its.berkeley.edu/publications/UCB/2012/VWP/UCB-ITS-VWP-2012-5.pdf.

While the papers above help identify built environment and land use factors that link transit ridership with non-motorized access, each of the papers used different methodologies to explore relationships and the variables considered were not consistent. Because of this variability, it is not possible to determine the relative impact of each of the key variables identified above. For example, is a high intersection density more closely correlated to high walk/bike mode share than sidewalk coverage? To better understand these relationships, we evaluated several papers on factors that influence what modes people use to travel. The two most relevant papers are summarized below.

Source: NCHRP Project 08-78a Estimating Bicycling and Walking for Planning and Project Development: Practitioner Guidebook, *Renaissance Planning Group et. al., Transportation Research Board, August 2013*

This study provides guidance on how to estimate walking and bicycling trips for transportation planning applications. The study focuses on several factors that are important in predicting pedestrian and bicycle trips:

- Age, income, gender
- Trip purpose
- Land use and built environment

- Facilities and infrastructure
- Natural environment (climate, temperature variation, terrain)

Given the wide range of topics in this study, the project team focused on the land use/built environment and facilities/infrastructure sections, since those are most closely aligned with the non-motorized connectivity analysis. The results indicate that the following factors are most relevant for this study:

- Street/intersection density
- Direct routes to destinations
- Sidewalks on arterial streets
- Controlled arterial crossings
- Non-arterial bike routes

The NCHRP study also identified variables of lesser importance including presence of sidewalks on local roads, bike lanes on arterial roads, and pavement quality. Many of these variables were also highlighted in some of the earlier studies that are summarized above.

Source: INDEX 4D Method: A Quick Response Method of Estimating Travel Impacts from Land-Use Changes, *Criterion Planners and Fehr & Peers, US Environmental Protection Agency, October 2001*.

Most of the more recent studies have summarized the built environment related to non-motorized connectivity using very simple measures such as intersection density and street density. In reviewing these studies, intersection/street density is chosen because it correlates fairly well with walk/bike mode shares and, most importantly, it is easy to obtain and measure the data. While this study is older, it evaluated a more complete (yet more data-intensive) measure of non-motorized connectivity—the "design index." The design index is a combination of street network density, sidewalk completeness, and route directness. The authors performed regression analysis to determine which elements of the design index are most closely correlated with additional non-motorized travel. The results indicate that street network density has the strongest correlation, followed by route directness and sidewalk completeness.

While this study did not identify any additional pieces of data that would be helpful for this study, it did suggest a quantitative relationship between some key non-motorized connectivity variables. This research was helpful in setting up the initial regression models for this study, which are described later.

LITERATURE REVIEW SUMMARY FINDINGS

While many studies have addressed access to transit and walkability or bikeability in various forms, few have sought to directly link specific improvements to transit ridership changes. Of the available research, Cervero's 2012 working paper and Ryan's 2009 analysis for the Journal of Public Transportation may be the best resources for assessing how active transportation improvements could potentially affect ridership. Ryan's analysis may be more appropriate given its focus on bus transit rather than rail transit routes; however, it limits its focus to pedestrian access only and it does not account for bicycle infrastructure improvements.

Based on these findings, the project team identified the following variables that would be the focus of this study[1]:

- Intersection density
- Land use density (population and employment)
- Street/sidewalk density
- Route directness index
- Bicycle facility density/coverage
- Signalized arterial crossing density

The next chapter highlights the data collection process to obtain the information to calculate the connectivity variables above for the entire study area.

[1] Street lighting would have been ideal to include in the data set, but as described later in this document, the data were not available across the study area.

3. DATA COLLECTION

It is important to note that the studies identified above target key non-motorized infrastructure/built environment features that are correlated with increased transit usage. However, since both transit ridership and mode share are strongly influenced by other factors – including the area's demographics, household income, car ownership patterns, etc. – this type of non-transportation data were also collected. This chapter summarizes the data the project team collected from the US Census bureau, Puget Sound Regional Council (PSRC), King County, and local jurisdictions within the study area. These data are listed in **Table 2** below:

Table 2: Regression Model Variables

Data	***Scale***	***Source***
Households	Census block group	American Community Survey
Employment	Traffic analysis zone	PSRC
Household income	Census block group	American Community Survey
Household size	Census block group	American Community Survey
Auto ownership	Census block group	American Community Survey
Transit ridership	Transit stop; transit line	KC, ST
Slope	20 foot contour	King County Data Portal
Street centerline	Entire study area	King County Data Portal; Snohomish County, City of Tacoma
Street lights	Entire study area	Jurisdictions
Sidewalks – existing and planned	Entire study area	Jurisdictions
Bike lanes – existing and planned	Entire study area	Jurisdictions
Off-street trails and cycletracks – existing and planned	Entire study area	Jurisdictions
Bike routes and sharrows – existing and planned	Entire study area	Jurisdictions
Signalized arterial crossings – existing and planned	Entire study area	Jurisdictions

As noted above, much of the detailed data were collected from local jurisdictions within the study area. To ensure that the most recent and relevant data were collected, the project team contacted staff in each jurisdiction in November 2013 and requested the most recent non-motorized connectivity data. A list of the jurisdictions contacted by the project team is shown below.

- Everett
- Auburn
- Bellevue
- Burien
- Des Moines
- Edmonds
- Federal Way
- Issaquah
- Kent
- Kirkland
- Lynnwood
- Mountlake Terrace
- Mukilteo
- Redmond
- Renton
- SeaTac
- Seattle
- Shoreline
- Tacoma
- Tukwila

With the exception of street light data, the jurisdictions generally had all the data listed in **Table 2**. Street lights proved to be a difficult item to collect since street lights are owned by a variety of organizations including cities, power providers, and local improvement district organizations. The streetlight data were not consistently organized across the study area, and much of the data were missing. Therefore, street lighting as a connectivity variable was dropped from this study. In a handful of cases, other connectivity data were not available in GIS and the team entered the following information in by hand:

- Edmonds – Sidewalk and bike lane data
- Everett – Sidewalk data
- Renton – Sidewalk data
- Tacoma – Sidewalk data
- Snohomish County – Arterial classifications

4. DATA PREPARATION

After receiving the transportation network data from the local jurisdictions, an initial inspection indicated that the project team would have to prepare or "clean" the data for the GIS network analysis. As described in this chapter, the primary issues were as follows:

> <u>Coding and data management practices for sidewalks, paths, and bicycle facilities</u>
> Each jurisdiction tends to have a unique system for coding non-motorized facilities. In addition, jurisdictions vary on how much non-motorized facility information they collect and how they manage that information in GIS. The project team created a "uniform" data coding system for all study area variables to facilitate the analysis. This dataset was "snapped" to the street centerline network to facilitate connectivity analysis.
>
> <u>Gaps/discontinuities in the street and trail network</u>
> These gap errors prevent the connectivity analysis tools from working properly since they mistakenly appear as barriers to access. The project team developed a process to identify and fix these errors utilizing GIS topology editor scripts.
>
> <u>Bicycle Stress</u>
> Bicycle stress evaluation is an emerging practice that assesses the quality of bicycle facilities for different types of users. The jurisdictions' datasets do not tend to have the bike stress input data stored in a common manner. The project team developed a set of bike stress variables across the entire study area and appended this information to the centerline file to facilitate this analysis.

INITIAL CLEANING OF THE ROADWAY CENTERLINE NETWORK

The primary transportation network utilized for this study is the King County *trans_network* GIS dataset[2]. The Snohomish County TIGER centerline and Tacoma street network GIS shapefiles supplemented the King County network. The Snohomish County and Tacoma datasets were manually merged with the King County network. Our review of the King County network found that roadway functional classification and speed limits

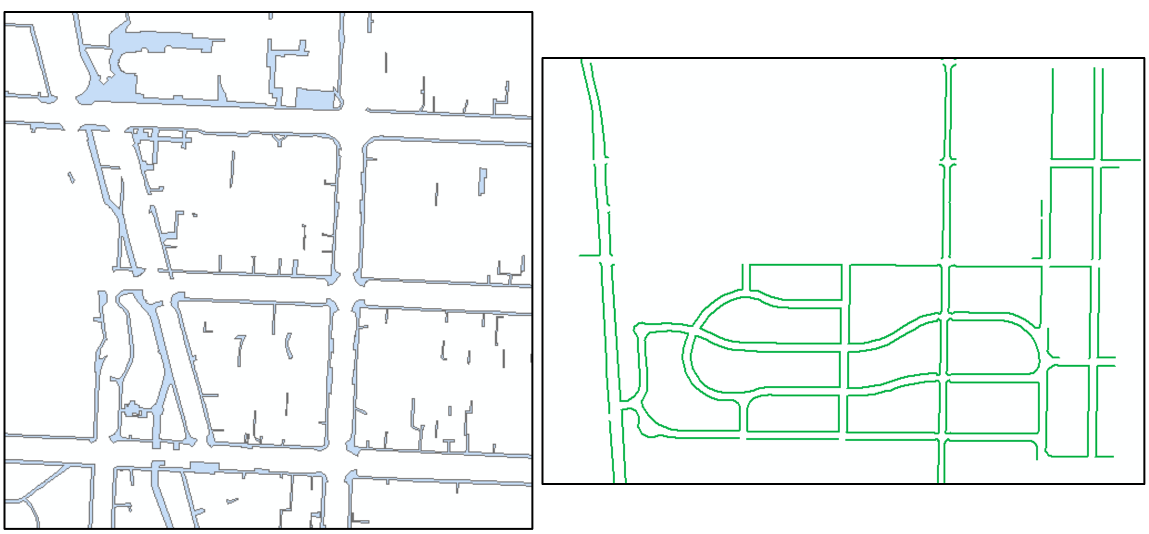
[2] KCGIS Center. *King County GIS Data Portal*. 2013. http://www5.kingcounty.gov/gisdataportal/Default.aspx

were coded accurately; however, these attributes were not consistent in the Snohomish County network, so we manually adjusted the segments within the study area. Additional filtering removed all network elements that were coded as freeways and other non-pedestrian/bicycle links such as private roads[3], railroads, alleys, and transit-only guideways.

NON-MOTORIZED ATTRIBUTE CODING

Each jurisdiction tends to gather and manage non-motorized network data in a unique way. For example, the City of Issaquah uses polygons to identify where sidewalks are, while Burien uses lines. See **Figure 2** below. Issaquah's data denote only the presence of the sidewalk, while Burien's dataset includes attributes such as sidewalk width and condition (e.g., new, broken/poor condition), although some segments are missing these data. Similar differences exist for the bicycle network data across the region.

Figure 2: Issaquah (left) and Burien (right) Sidewalk GIS Files



The lack of uniformity in how jurisdictions collect and organize information posed a problem for our analysis since we needed to ensure that all non-motorized facility data were consistently defined. Additionally, the connectivity analysis requires that network

[3] Private access roads typically do not provide consistent non-motorized access

analyst[4] be run on the non-motorized network, which means that the non-motorized data needs to be attached to a complete and connected network, like the street centerline file.

To create this standardized analysis file, the individual jurisdiction pedestrian and bicycle GIS files were first converted to GIS line formats containing standardized attribute data. The attribute data included length, facility type, and coverage (one or two sides of street if the data was available). An automated process was developed to "snap" the sidewalk and bicycle facility attributes to the street network. The bicycle network data was composed of simple lines while the sidewalk layers did not have a consistent format to allow for accurate snapping to local streets. Since the research indicated that sidewalks on local streets were not strongly correlated with access to transit (e.g., people will tend to walk along low-volume streets with or without sidewalks in order to access transit), we developed a sidewalk layer that included local streets as well as sidewalks along arterials and collectors[5].

After the automated snapping process was completed, the project team reviewed the results in detail and corrected errors manually. Off-street trails that were not included in the King County transportation network were also joined to the standardized network.

NETWORK GAPS AND DISCONTINUITIES

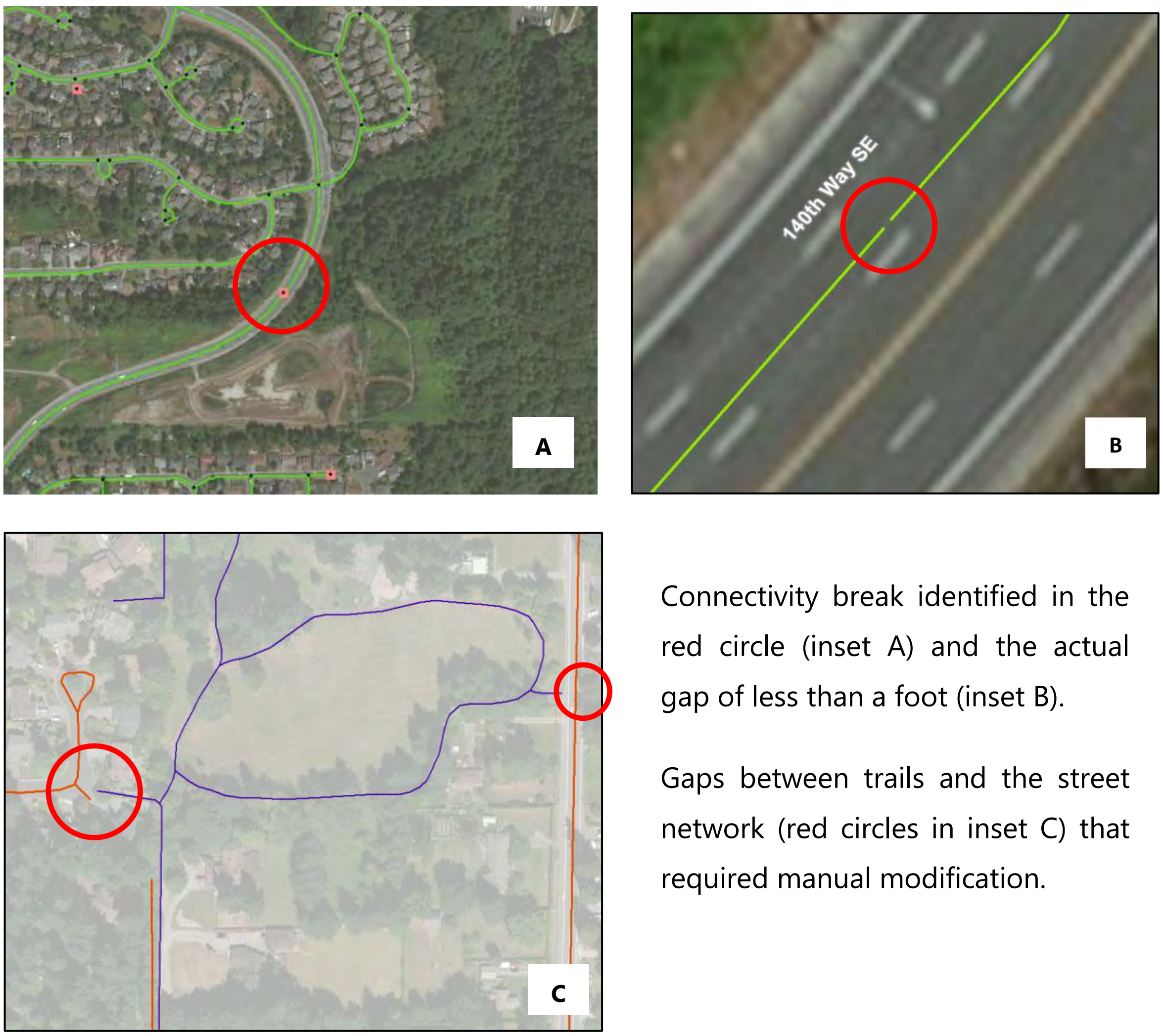
With the standardized network developed, we next evaluated the connectivity of the network to ensure the new GIS file accurately represented the connections between different links. For example, the project team looked to ensure that there were not connections between cul-de-sacs and nearby roads and there were accurate connections between trails and the street network. The testing included using GIS topology analysis to identify nodes and links that lacked a connection to the network, as shown in **Figure 3** below. Testing also involved sample routing analysis to confirm accurate connectivity with the links to the bus stop and transit station locations. This type of routing identified

[4] Network Analyst is a GIS tool that can evaluate distance travelled along a specified network between two points.

[5] See page 6. Source: NCHRP Project 08-78a Estimating Bicycling and Walking for Planning and Project Development: Practitioner Guidebook, *Renaissance Planning Group et. al., Transportation Research Board, August 2013.*

missing connections and erroneous connections in the network. Based on the results of the routing analysis, manual corrections were made to the standardized GIS network.

Figure 3: Examples of Network Gaps and Discontinuities



Connectivity break identified in the red circle (inset A) and the actual gap of less than a foot (inset B).

Gaps between trails and the street network (red circles in inset C) that required manual modification.

BICYCLE STRESS

Bicycle stress is a measure of how safe, secure, and comfortable cyclists feel when traveling along a given route or between different locations. The concept of bicycle stress was developed by the Mineta Transportation Institute, which leveraged previous work from the Florida DOT, the HCM 2010 Multimodal level-of-service methodology, and the Bicycle Compatibility Index developed through the FHWA[6]. Additionally, the Mineta researchers evaluated Dutch cycling standards and measurement techniques in order to guide the development of a "Bike Stress Index" scoring system based on key "levels of traffic stress" indicators[7]. This methodology takes into account the varying nature of cyclists and their tolerance for traffic stress. There are four levels for the index. Level 1 is the lowest stress, which is a route that can accommodate all cyclist types. Level 4 is the highest, with stress levels only tolerated by cyclists characterized in previous studies as "strong and fearless." The following list summarizes the various aspects present with each level as presented in the report:

- **Bike Stress Level 1:** Minimal traffic stress where cyclists are either physically separated from traffic or are in a slow and minimal traffic stream with no more than one lane per direction.
    - **Example:** Bike paths and low-volume residential streets.
- **Bike Stress Level 2:** Low traffic stress and suitable for most cyclists, but more demand for attention is required. Cyclists are either physically separated or are on a shared roadway with minimal traffic and low speed differentials.
    - **Example:** Bike lanes on collector streets, or lower volume streets with wide shoulders.
- **Bike Stress Level 3**: Higher stress due to multi-lane traffic and moderate speed differentials. While a bike lane may be provided, the conditions are not suitable for all cycling comfort levels due to speeds and volumes in the adjacent traffic lanes.
    - **Example**: Bike lanes on minor arterials under 35 mph.
- **Bike Stress Level 4**: Highest level of stress due to speed differential, lack of facilities and/or multi-lane traffic flow.
    - **Example**: No bike lanes on arterials or bike lanes on arterials above 35 mph.

[6] DOT – Department of Transportation. HCM – Highway Capacity Manual. FHWA – Federal Highway Administration

[7] "Low Stress Bicycling and Network Connectivity". Mineta Transportation Institute. 2012

For the non-motorized access analysis, a bike stress score was computed utilizing a modified version of the Mineta method due to data availability. Variables included:

- Street functional class as a proxy for the number of lanes and traffic flow
- Bike lane provision (bike lanes or other separated facilities such as cycletracks/off-street trails were included while sharrows or shared lanes were not included)
- Speed limit

The index then was computed based on a rubric, shown in **Table 3** below, and adopted from the Mineta method to appropriately score each street segment. If a street segment had no bike lane, the following metrics were utilized to apply a bike stress score to the segment. As shown in the table below, if a collector had a speed limit of 30 mph, the bike stress is 3. If a bike lane was present on a link that had a speed limit 35 mph or below, then the bike stress score would decrease by one unit.

Table 3: Bike/Level of Stress Calculation Matrix

	Speed Limit (MPH)			
	25	**30**	**35**	**40+**
Principal	4	4	4	4
Minor	3	4	4	4
Collector	2	3	4	4
Local	1	2	3	4
Off-Street Trail	1	1	1	1

On-Street Bicycle Lanes: The presence of striped on-street bicycle lanes reduces the LTS index by 1 when it is otherwise 2 or greater.

Source: Fehr & Peers, 2014

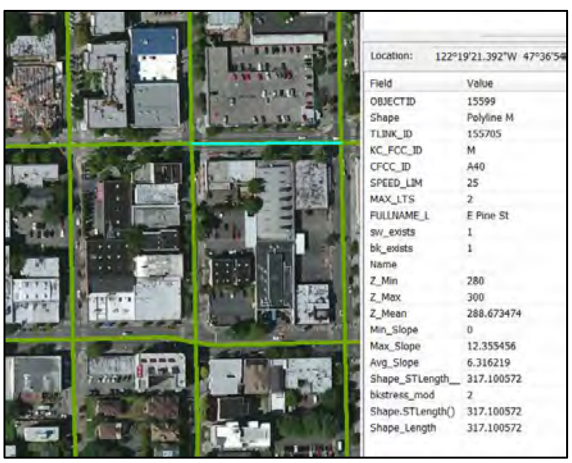
FINAL EXISTING CONDITIONS DATASET

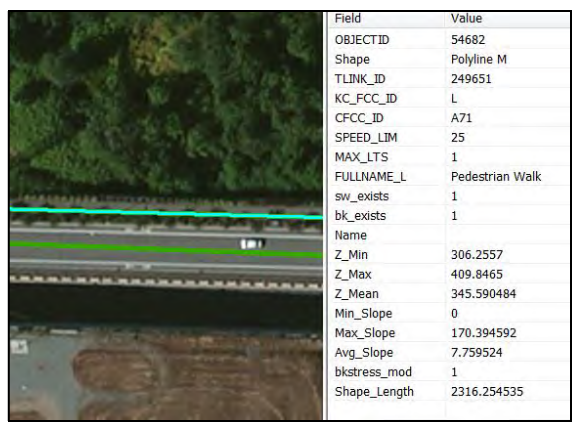
With the network cleaning and consolidation described above complete, a final GIS dataset was prepared. The network was clipped to a three-mile buffer around the 544 study stations. The three miles is consistent with Federal Transit Administration guidelines regarding non-motorized access to transit. Key fields in the dataset include:

- **kc_fcc_id:** Street Functional Class:

  P – Primary Arterial, M – Minor Arterial, C – Collector Arterial, L – Local Street or path
- **speed_lim** – Speed limit of the link in miles-per-hour
- **sw_exists** – Boolean (1 = yes, 0 – no) if a sidewalk is present on an arterial (one or both sides); score is one for all local residential streets
- **bk_exists** – Boolean (1 = yes, 0 – no) if a bike lane is present on a street
- **bkstress_mod** – Bike stress index of the link (from 1: Low to 4: High)

Figure 4: Example Attributes of a Minor Arterial (left) and an Off-street Path (right) from the final



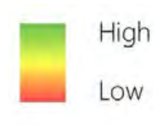


5. CONNECTIVITY ANALYSIS AND TOOLS

This chapter describes the connectivity metrics calculated to evaluate access to transit stops and stations and the tools the project team developed to calculate the metrics. The connectivity analysis tools were built for ArcGIS using Python scripts. Details on how the tools were developed and their specific analytic functions are summarized in **Appendix A** along with a handbook on applying the tools. This chapter also provides a brief description of the connectivity "surfaces" that are calculated by the tools and presents sample results.

Surfaces were calculated for each of the connectivity measures to help visualize the results and to facilitate the creation of a composite connectivity index that was used for ridership regression modeling. **Figure 5** below shows an example of the intersection density surface near the Federal Way Transit Center. While the surfaces will be described in more detail in the following section, there are several common features among all the surfaces.

- Color ramp: All the surfaces present the connectivity analysis results in a "color ramp" from red through yellow to green. Red areas denote a low/poor connectivity score, while green areas denote a high/good connectivity score. All the surfaces are based on ordinal scoring on a scale of 1-5, with 1 representing a poor score and 5 a good score.



- Masks: As shown in **Figure 5**, there are areas that are "masked-off" from the connectivity analysis. These areas include parks, water bodies, schools, colleges/universities, cemeteries, golf courses, and large commercial areas (e.g., malls). The reason for masking off these uses is that they tend to not have a lot of transportation infrastructure through the areas and therefore tend to score poorly. However, since these areas tend to be destinations, the project team did not want the lack of intersections or sidewalks in a park, for example, to negatively affect the connectivity score of an area. It is important to note that these masked areas do influence scores like route directness index (described below) since they can act as a barrier to traveling to a transit stop if a street or path does not pass through them.

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Density
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 5

Example Connectivity Surfaces

ROUTE DIRECTNESS INDEX (RDI)

Typically, the distance traveled along a network between two locations is longer than the direct, "as the crow flies" distance between the same two points. The closer these two distance measurements are between a given set of locations, the higher the Route-Directness-Index (RDI), and the less circuitous the path is between two locations. This tool uses a set of origin points (in the case of this project, transit stop locations) and destination points (intersections within three miles of the transit stop) to create a "surface" or map that reflects the RDI for all destinations within the three-mile buffer around the transit stop. The figures below show an RDI surface for a one-mile radius[8] around the Northgate transit station and a bus stop in Capitol Hill. As shown in the Northgate example in **Figure 6**, an area scores poorly in the RDI metric (yellow and orange colors) west of the transit station as a result of a lack of access across the freeway. In comparison, the RDI around a Capitol Hill bus stop is very good (green colors) since the density of the street grid provides good access and connectivity outward from the station.

The score categories for the RDI calculation are defined below:

Table 4: RDI Scoring Categories

Ratio of Straight-Line to Network Distance	Score
>.8	5
.6-.8	4
.4-.6	3
.2-.4	2
<.2	1

[8] The one-mile radius is used for visualization. The tool calculates the surface over a three-mile radius.

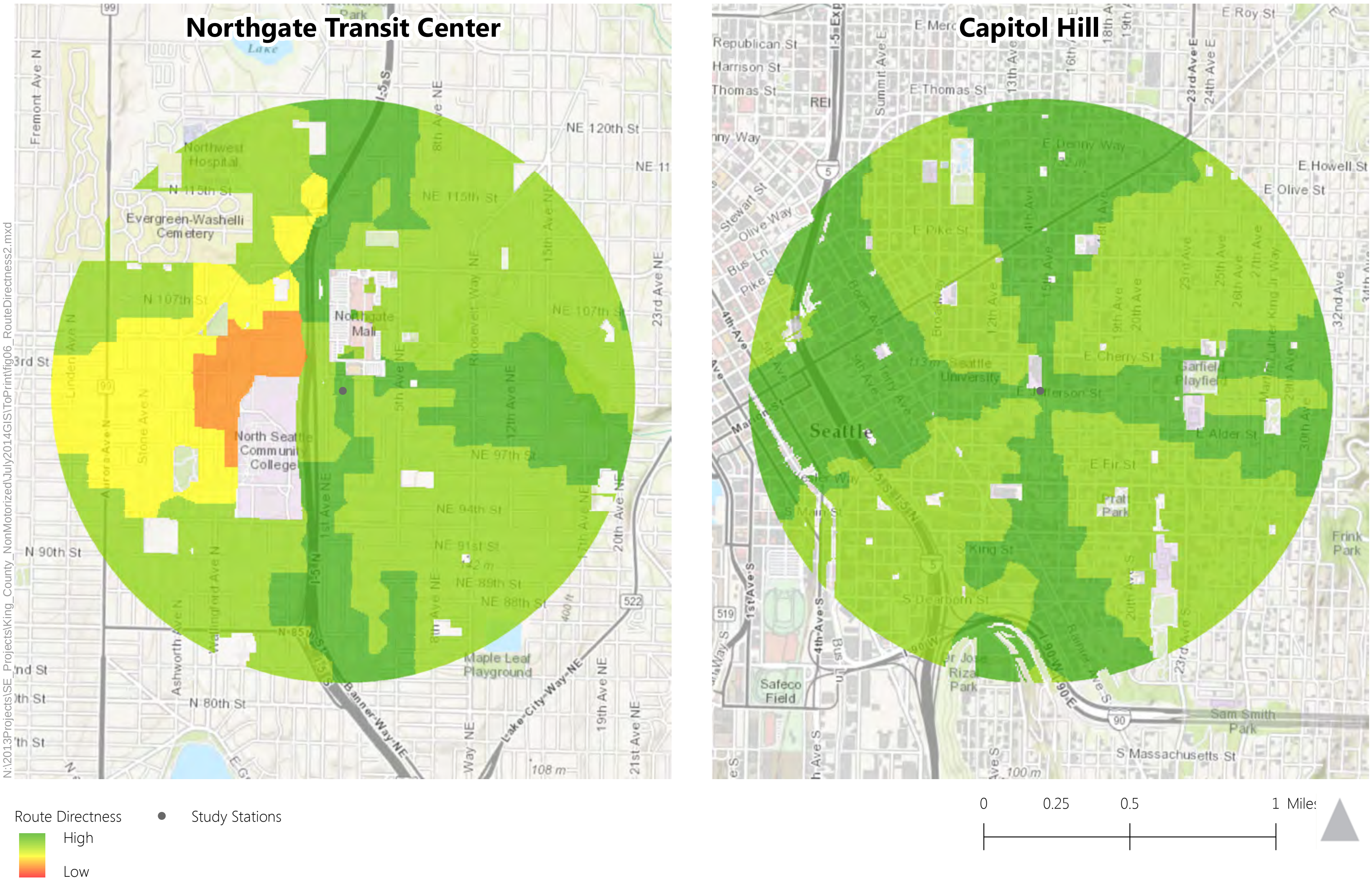

Figure 6

Examples of Route Directness in
Northgate Transit Center (Left) and Capitol Hill (Right)

BIKE STRESS SURFACE

The bike stress tool compares the network distance required to reach each station from eight cardinal points located one mile away from the transit stop. As shown in **Figure 7** below, the network distance is first computed using the full network (in blue), regardless of the bike stress on each link. A second network routing analysis (in green) is conducted with a network constrained to only those links with a bike stress of 3 or below[9]. This constrained network is the "lower stress" network that a bicyclist would utilize and represents the routing options available. The distance required along the constrained network is compared to the full network in order to determine a difference ratio, or the amount of diversion required for a cyclist to remain on a lower stress network. The Mineta Institute research states that a majority of cyclists will travel at most 25% out-of-route in order to travel along a lower stress street segment if they approach a high stress option. Higher levels of diversion tend not to be tolerable and riders will not make the trip. The method described in the Mineta Institute research utilized relative person-trips from a travel demand model to determine an area average for bike stress. In the absence of travel demand model data, population density at each of the eight points serves as a proxy of the relative number of trips originating from those points. **Table 5** shows the bike stress scoring categories.

Table 5: Bike Stress Scoring Categories

Ratio of Low Stress Network Distance to Unconstrained Network Distance	Score
<1.05	5
1.05 - 1.10	4
1.10 - 1.15	3
1.15 - 1.25	2
>1.25	1

[9] While research states that a bike stress level of 2 provides a suitable environment for a majority of potential cyclists (over 60%), it was assumed that people taking relatively short bike trips to transit would be willing to tolerate somewhat higher levels of stress, therefore a bike stress level of 3 was used in this study.

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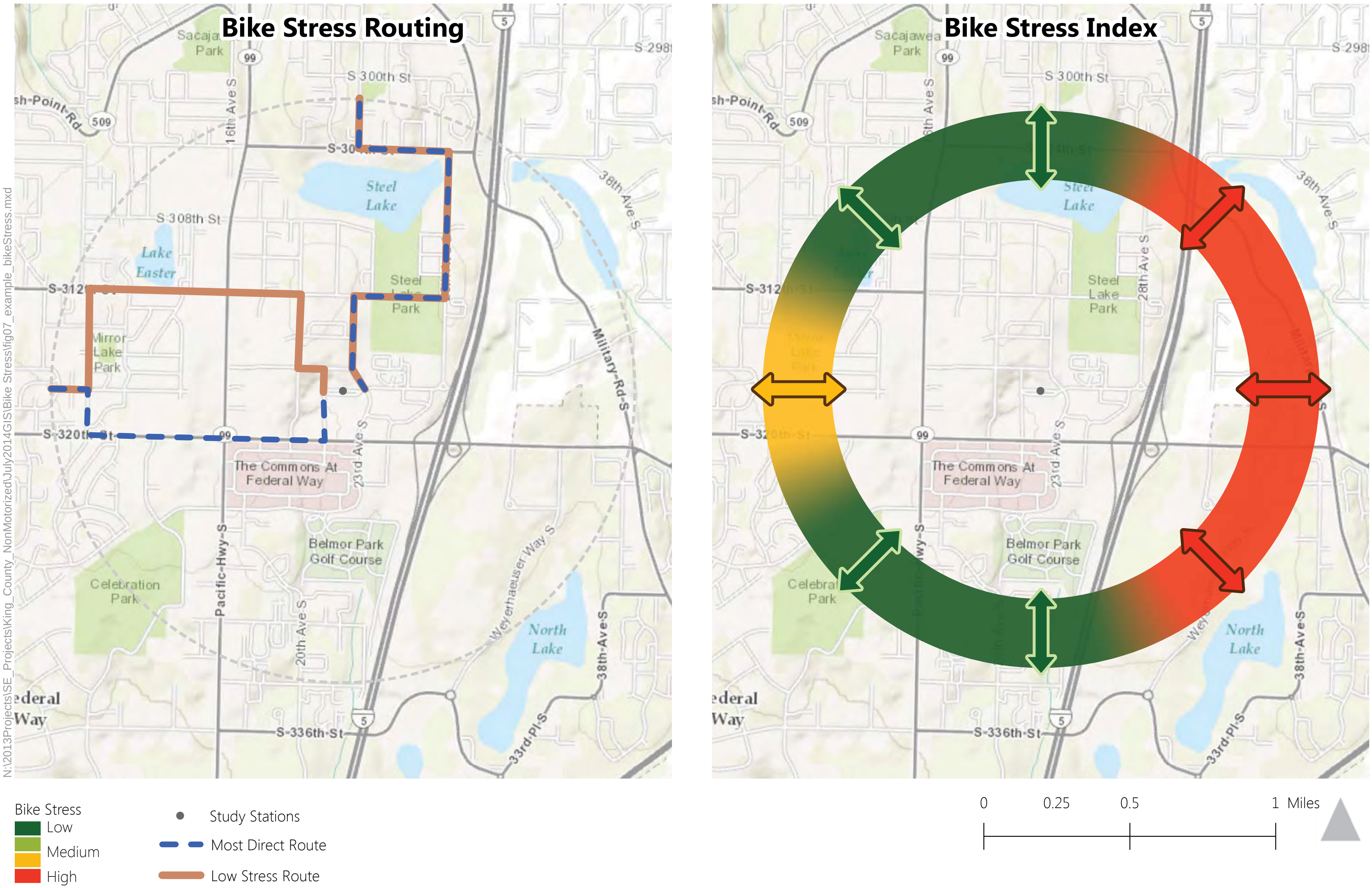

Figure 7

Example of Bike Stress Routing (Left) and Bike Stress Index (Right)

SURFACES: INTERSECTION AND SIDEWALK/WALKWAY DENSITY

In order to compute sidewalk/walkway and intersection density, the tool calculates the distance from the sidewalk/intersection feature and assigns a score. A score of five is defined at the sidewalk/intersection and decays linearly to one at a distance of 300 feet as shown in **Table 6**. This scoring is based on Seattle's 300 foot downtown grid as a good example of intersection and sidewalk/walkway grid density. Downtown gridded street networks are often used as a "standard" of good pedestrian permeability in other non-motorized analyses. This surface is calculated for the entire study area and then aggregated to each station area. Examples are shown in **Figure 8**.

Table 6: Intersection and Sidewalk/Walkway Density Scoring

Distance from Signalized Crossing	Score
<50 feet	5
50 - 100 feet	4
100 - 150 feet	3
150 - 300 feet	2
>300 feet	1

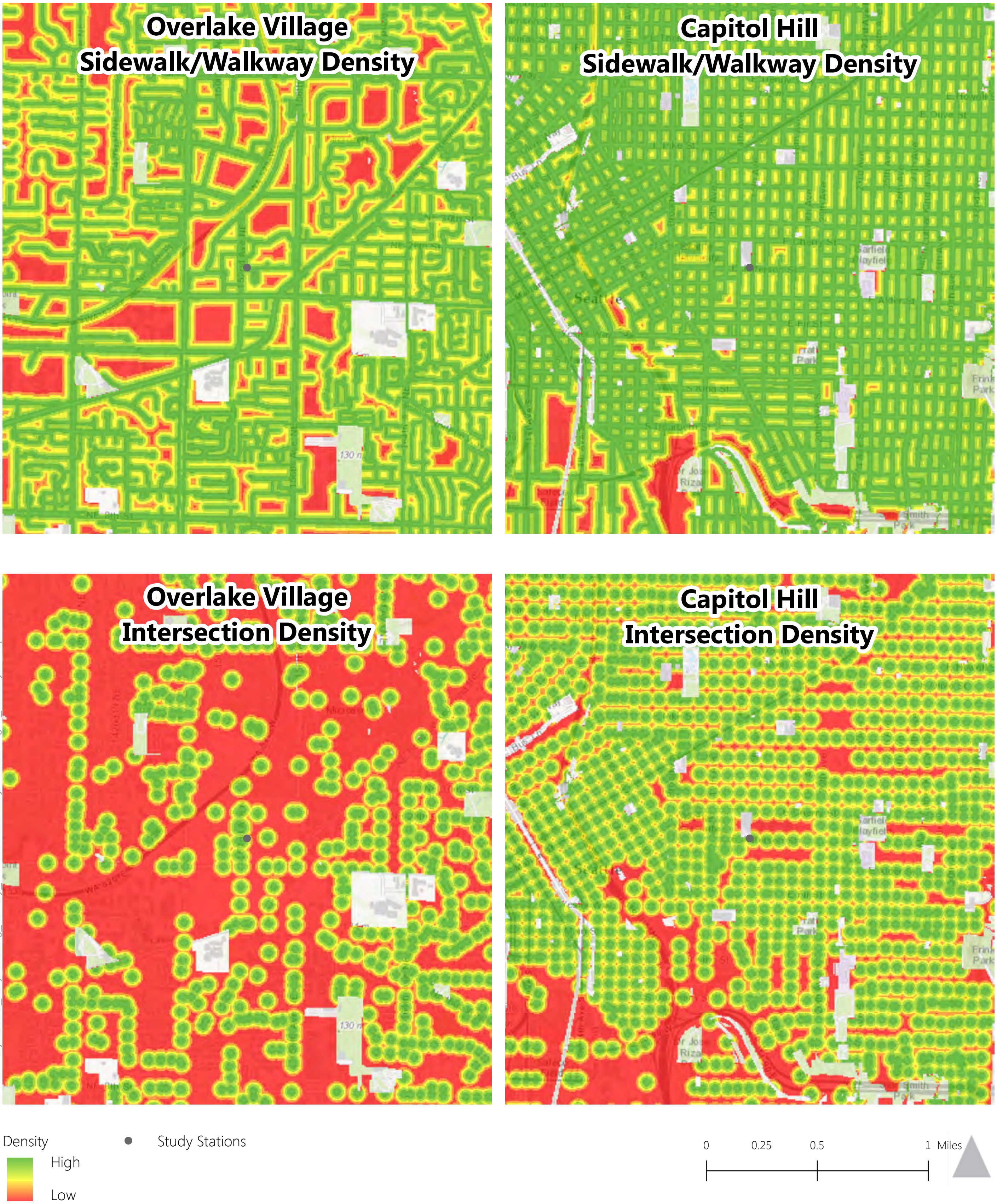

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Figure 8

Examples of Sidewalk/Walkway Density (Top Row) and Intersection Density (Bottom Row)

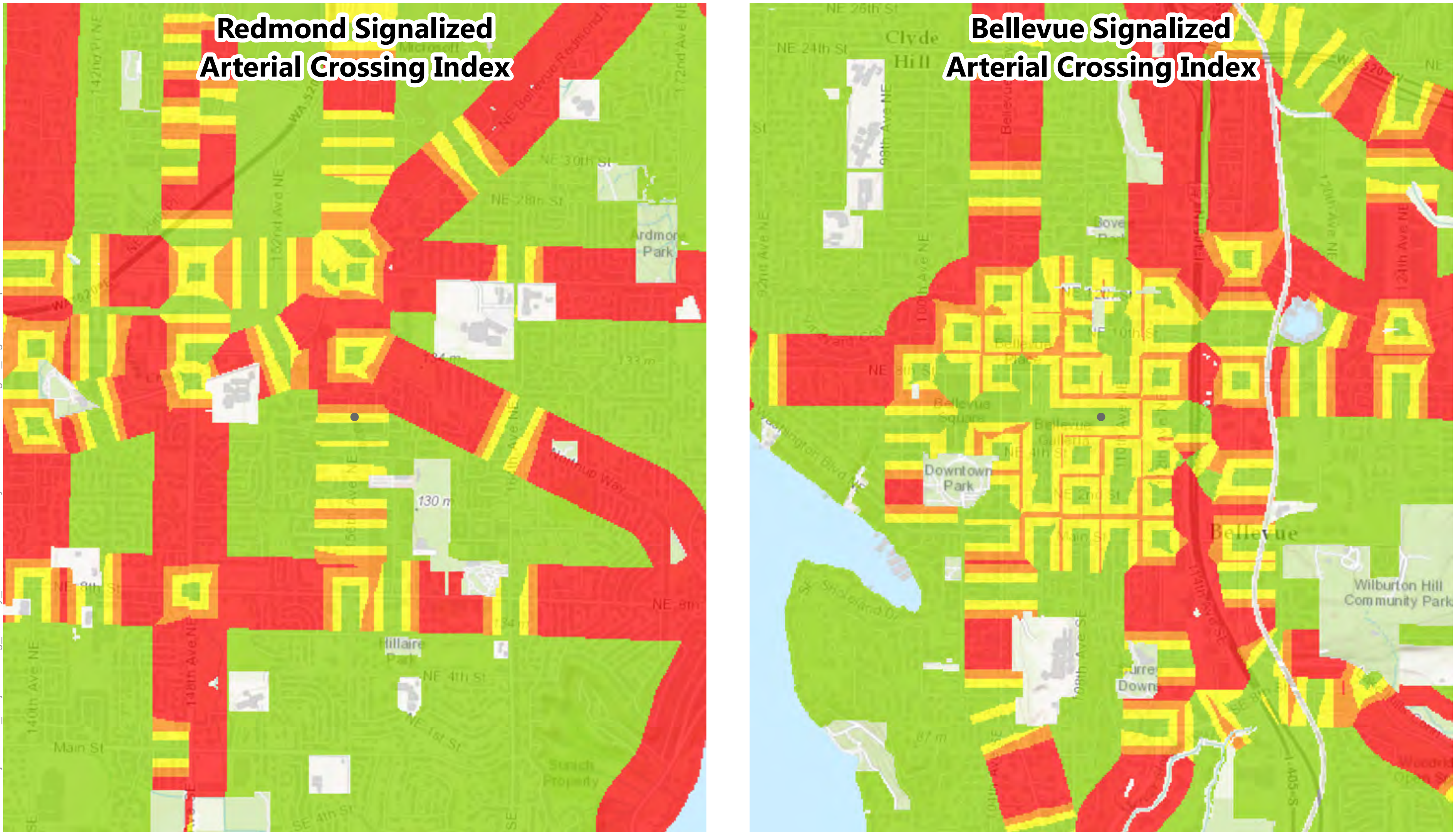
SURFACES: ARTERIAL SIGNALIZED CROSSINGS

Similar to the intersection and sidewalk/walkway density tool, the signalized arterial crossing tool uses distance to develop a score. For this tool, the goal was to generate high scores in areas with 300 foot arterial signal spacing (as is present in Downtown Seattle). High scores (value of five) are defined for areas within 150 feet of a traffic signal, and the score decreases in 100 foot increments from there. **Table 7** summarizes the scoring.

Table 7: Arterial Signalized Crossing Scoring

Distance from Signalized Crossing	Score
<150 feet	5
150 - 250 feet	4
250 - 350 feet	3
350 - 450 feet	2
>450 feet	1

The arterial signal tool is unique in that the score is generated in a linear manner along the arterial. The score along the arterial is then assigned to areas 600 feet in either direction (perpendicular to the arterial) to summarize how easy it is for businesses and homes along the street and in the neighborhoods adjacent to the street to cross in order to access transit stops. At a point beyond 600 feet, the arterial crossing score is set to five. **Figure 9** below shows an example of this surface. The left image depicts an area with relatively large gaps in signalized arterial crossings whereas the downtown core of the City of Bellevue is characterized by a relatively high density of signalized crossings, as shown in the right image.



Ease of Crossing
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 9

Examples of Signalized Arterial Index
in Redmond (Left) and Bellevue (Right)

TRAVEL SHEDS

Current tools within ArcGIS provide the capability to calculate travel sheds based on walking and bicycling modes. The 15-minute bicycle shed is calculated based on a given "budget" of energy that is required to travel 15 minutes via bicycle along a flat surface. The budget of energy required to travel on a flat surface over that time span is 500,000 joules, or approximately 120 calories. Each street segment is assigned a slope from the underlying terrain data and the amount of energy required to travel each segment is calculated based on its distance and slope. The travel shed is computed by calculating the distance reachable from each station by utilizing the energy budget of 500,000 joules. **Figure 10** below shows the impact of terrain on bicycle shed areas, with the valley near Redmond allowing for an extensive reach to the north, while the hills in Seattle limit the shed's area.

The 15-minute walk shed is computed based on a 15 minute walking distance with an assumed average walking speed of 3.5 feet per second. All walkable links are included in the walk shed analysis and terrain is not incorporated in the calculation[10]. No terrain adjustments are taken since none of the research in the literature review indicated that terrain was a major barrier when walking to access transit. **Figure 10** also shows the 15-minute walk sheds.

[10] Arterials without sidewalks are included in the walk shed as the sidewalk density score accounts for gaps in sidewalk coverage. Roads that prohibit walking are excluded (freeways).

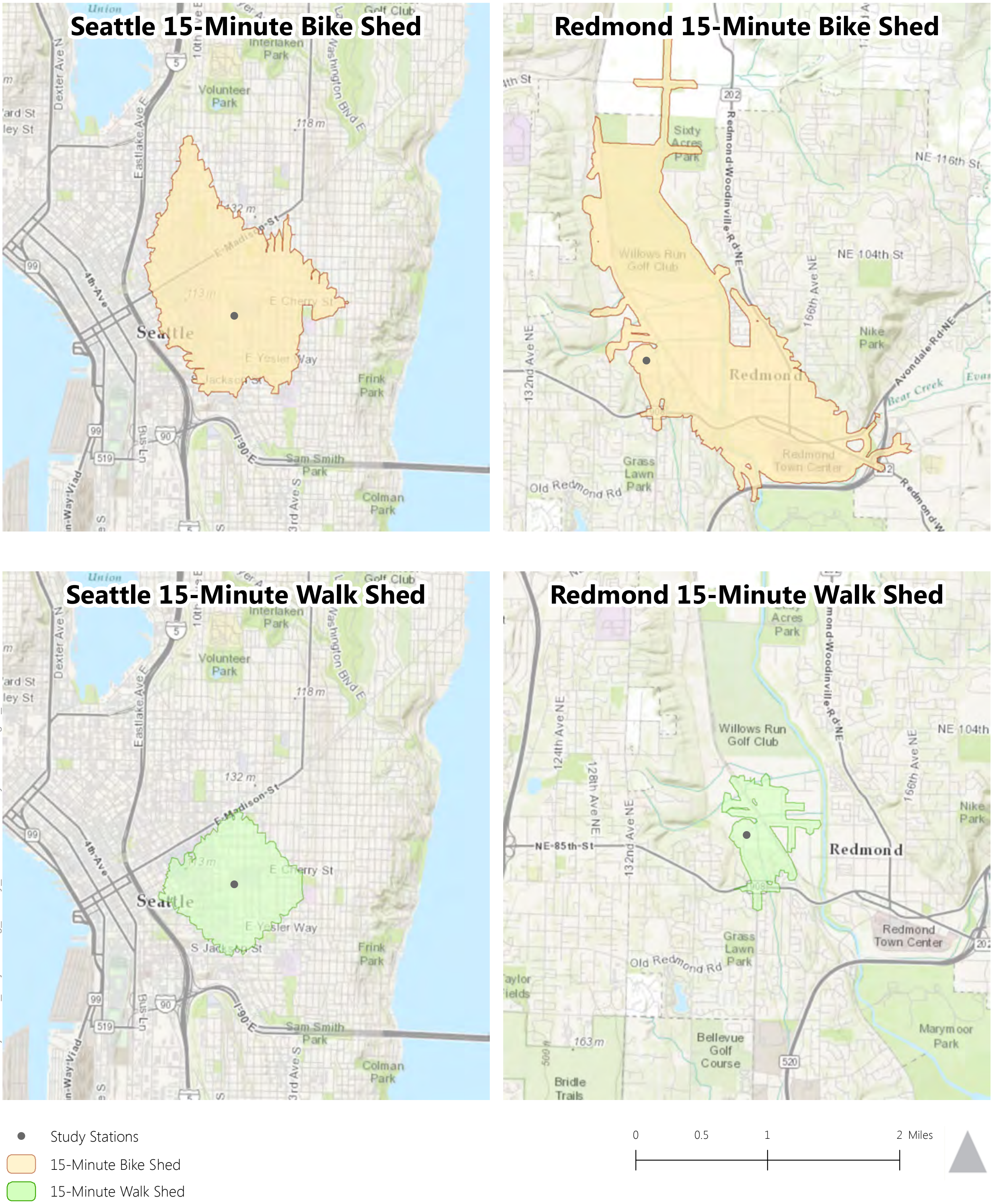


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Figure 10

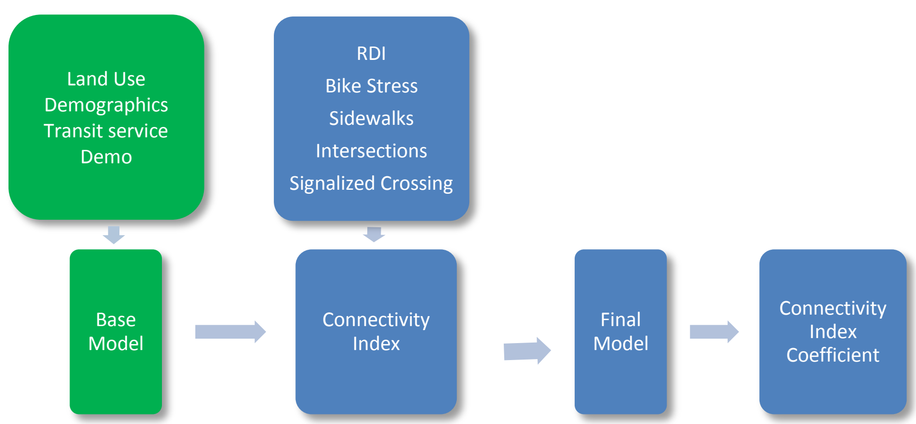
Examples of 15-Minute Travel Shed Areas in Seattle (Left) and Redmond (Right)

6. REGRESSION MODELING

A key goal of this project is to understand how the connectivity variables described in the prior chapter relate to transit ridership. In this way, we can better understand how non-motorized projects can help to improve access to transit and add transit riders. To understand this relationship between non-motorized connectivity and transit ridership, the project team used linear regression modeling techniques.

The first step in developing the regression model was to develop a "base" ridership model that relates land use, demographic, and transit-service factors to ridership. This step would allow for a clear comparison of station-areas to determine the relative impact that non-motorized connectivity has on ridership. For example, if two stations have similar land use, demographic, and transit-service characteristics, yet one station has poor connectivity and the other has good connectivity; the difference in the ridership at those stations can be attributed to the difference in connectivity. **Figure 11** highlights the regression process that identified the coefficient - and therefore the relative impact - of the connectivity index on transit ridership. The following section describes this process.

Figure 11. Connectivity Modeling Process



SAMPLE DETERMINATION

The analysis began with the full list of 544 transit stations provided by King County Metro and Sound Transit. To consolidate information at transit centers and to aggregate inbound and outbound stop pairs, ridership was totaled within a 450-foot buffer of each stop/transit center. After reviewing all the stop data, Downtown Seattle bus stops and train stations were removed from the sample. Downtown Seattle is unique in that there is a high density of stops/stations and high variability in ridership at those stops. The ridership variability is largely due to small-scale land use characteristics adjacent to the transit stops[11]. Unfortunately, the PSRC land use database is at a larger scale than can be analyzed at the Downtown Seattle stop level, so the project team removed these stops.

Sounder stations were also removed since Sounder has different travel characteristics (peak service only) and the travel sheds for Sounder stations tend to be much larger than for the other stops/stations in the sample set. For example, riders may arrive from as far as three miles from the Auburn station whereas the longest distance a rider would travel to access a RapidRide station in Seattle is most likely a mile or less due to density of available stops.

While Downtown Seattle and Sounder stops were not included in the base ridership model development, the final tools developed for this project are applicable for these areas and other locations in the region as the model's focus was on isolating non-motorized connectivity impacts on ridership rather than on land use or other characteristics. In other words, the model will be sensitive to non-motorized transportation improvements throughout the study area, including Downtown Seattle and Sounder station areas. The final chapter in this report summarizes how the model can be used along with its limitations.

From the original 544 stops, the regression analysis considered 170 locations. Note that most of the reduction was due to the pairing of inbound and outbound stops and transit center bays, which roughly reduces the total sample size in half.

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[11] Examples of land use characteristics include major regional services like the Seattle Central Library, regional facilities, like the King County Courthouse, and clusters of land uses like hotels or restaurants, or tourist attractions.

BASE MODEL

The first step in developing the regression model was to develop a "base" ridership model that relates land use, demographic, and transit-service factors to ridership. This is an important step since non-motorized connectivity variables are often correlated with the types of inputs in the base model. In other words, dense areas tend to have better non-motorized connectivity. By developing a strong base model, we reduce the likelihood that we overstate the ridership benefits of non-motorized access improvements[12]

A number of factors were tested when developing the base model to determine best-fit and statistical significance. The variables tested within the model runs are shown in **Table 8**.

Table 8. Regression Model Variables

Variable	*Scale*	*Source*
Population density	People per acre (half-mile buffer)	ACS Census Block Group
Employment density	Jobs per acres (half-mile buffer)	ACS Census Block Group
Stop type	Bus/Rail/Transit Center	KCM, ST, CT
Number of routes	Routes per stop	KCM, ST, CT
Number of transit trips	Trips per stop	KCM, ST, CT
Population below the poverty line	Station-area Percentage (half-mile buffer)	ACS Census Block Group
Population minority	Station-area Percentage (half-mile buffer)	ACS Census Block Group
Zero car households	Station-area Percentage (half-mile buffer)	ACS Census Block Group
Station-area median income	Thousands of dollars	ACS Census Block Group
Total hours that transit service is provided at the station	Total hours	KCM, ST, CT

[12] A major goal of the base model development is to ensure that non-motorized connectivity improvements do not "take credit" for other factors like land use, demographics, or service factors. By identifying the strongest non-connectivity variables that relate to transit ridership in the base model and retaining those variables in a model that includes connectivity variables, we reduce the likelihood of introducing connectivity variables that serve as a "proxy" for other non-connectivity factors.

Table 8. Regression Model Variables (cont'd)

Variable	*Scale*	*Source*
Employment reach of the routes that serve the station	Jobs/station	ACS Census Block Group
Population reach of the routes that serve the station	People/station	ACS Census Block Group

A number of variable transformations were also evaluated including logarithmic transformations of both the dependent (total boardings) and independent variables. Ultimately, the best performing model was based on a logarithmic transformation of ridership and linear independent variables. This type of relationship is not uncommon in transit ridership-type models that have a mix of lower ridership and higher ridership stops/stations, where the high ridership stops have many times the ridership of the median stop.

The base model before adding the connectivity index had an adjusted R-squared value of 0.633 as shown in **Table 9.** With a log transformation of total boardings, the coefficient results can be interpreted for a variable such as population density to mean that a ten-unit increase in population density will translate into a 7% increase in the transit station boardings[13].

[13] Standard practice in regression modeling states that a variable is "significant" at a level of 90 to 95% or better. However, in cases where particular variables need to be controlled for, they are often included in a model even if the significance level is not above 90%.

Table 9: Base Model Coefficients

	Estimate	Significance
Intercept	2.34	**
Population Density	0.007	**
Total Daily Trips	0.0054	***
Parking Spaces	0.001	***
Hours of Service	0.0905	***
Area Median income	-0.002	*
Employment Density	0.003	*

Sig. Levels: *** = > 99%, ** > 90%, * > 70% | R-Squared = 0.633

CREATING THE CONNECTIVITY COMPOSITE VARIABLE

A key objective of the regression modeling process was to determine a relative "connectivity composite" that incorporates all of the connectivity variables, weighting each variable based on its relative impact on transit ridership. The composite provides a single, straightforward measure of the connectivity characteristics that matter most to transit ridership. The variables included in the development of the composite index were:

- Route-directness Index (RDI)
- Sidewalk/Walkway Density
- Intersection Density
- Arterial Crossing Index
- Bike Stress Index

A number of regression models were created by including each variable separately with the base regression model. The relative correlation with ridership for each of the connectivity variables was evaluated by comparing the model coefficients[14]. The only potential issue with this method is multi-collinearity: in other words, the issue of whether the five connectivity variables measure truly independent connectivity characteristics. This question was addressed by creating a model including all of the connectivity variables together with the base regression model. In this expanded model, two variables were found to be collinear: sidewalk/walkway density and intersection density. The collinearity between sidewalk/walkway and intersection density is expected due to the related nature of how the two variables were computed (sidewalks and walkways are along the same streets that intersect). To account for this collinearity, the coefficients of these two variables were halved and the weighting percentages were re-calculated as shown in **Table 10**.

[14] Comparing coefficients is an effective means of evaluating the different connectivity variables because all the connectivity variables are defined using an ordinal scale from 1 to 5.

Table 10: Connectivity Coefficients

	Coefficient	Weight Percentage
RDI	0.860	36%
Bike Stress (BS)	0.145	6%
Sidewalk/Walkway Density (SW)	0.669	14%
Intersection Density (ID)	0.393	8%
Signalized Crossing (SC)	0.878	36%

The final connectivity composite was calculated by weighting the station-area score for each of the five connectivity variables by their relative weight percentages to result in a connectivity score between 1 and 5.

$$\boldsymbol{Connecitivty\ Composite} = \mathbf{.36}(\boldsymbol{RDI}) + \mathbf{.06}(\boldsymbol{BS}) + \mathbf{.14}(\boldsymbol{SW}) + \mathbf{.08}(\boldsymbol{ID}) + \mathbf{.36}(\boldsymbol{SC})$$

MODEL CALIBRATION

The initial regression model that included the connectivity composite variable along with the other base variables was calibrated as part of the Case Studies, which are described more thoroughly in a later chapter. The model calibration involved a review of model performance at the four Case Study locations, along with 20 other locations throughout the study area. The calibration sites included a mix of large transit centers, park and ride lots, and several lower-ridership locations. The model was calibrated by looking at how well the model performed under both static conditions (i.e., how well did the model match the observed ridership) and dynamic conditions (i.e., is the model appropriately sensitive to changes to independent variable values). Through the calibration process, the following issues were identified:

- A Link Light Rail factor was added into the model since ridership at Link stations is consistently higher than bus stop locations. This type of light rail "dummy" variable is often included in models to account for people's bias to ride rail more than other modes of transit.
- A "subgroup" analysis was performed to determine if there were any biases in different types of transit stop types. The subgroups included stops with low existing ridership, smaller park and ride stops, and large transit centers with and without

parking lots. In the case of the large transit centers with large parking lots, the Parking Space variable was consistently leading to an over-prediction of ridership. The coefficient on the Parking Space variable was reduced and all other of the coefficients were increased proportionally to improve the model fit for major transit centers, including Northgate, Bellevue, Redmond, Eastgate, Burien, and Tukwila International Boulevard.

- Based on feedback from jurisdictions, the predicted change in ridership from connectivity improvements was too sensitive to the bike stress variable. As a result, the weight of the Bike Stress component of the connectivity variable was modified to produce results that were more in line with the region's bike access-to-transit mode share of between 0.5% and 2%. The updated model was tested across a set of transit stops that were expected to have a large amount of bicycle infrastructure investments, including Northgate, Mt Baker, Burien Transit Center, and Bellevue Transit Center. The Bike Stress weight was refined to ensure that the expected number of new riders that were being predicted as a result of new bicycle infrastructure was not out-of-magnitude with observed bicycle mode shares in the region.

With these model calibration adjustments in place, the connectivity model was finalized and is shown in **Table 11**. The effect of the connectivity index variable on ridership can be interpreted as "a one unit improvement in the connectivity composite will result in 25% increase in daily boardings."

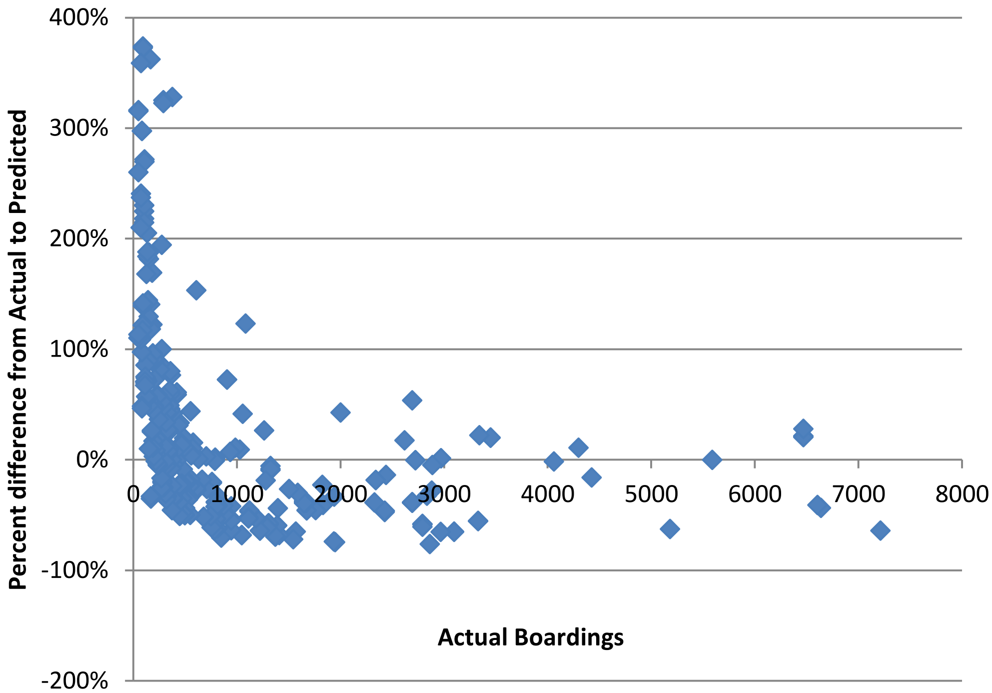
Table 11: Final Regression Results

	Coefficient	Significance
Intercept	*1.88*	**
Employment Density	0.002	*
Link factor	0.98	***
Population Density	0.005	*
Total Daily Trips	0.0049	***
Parking Spaces	0.0013	***
Hours of Service	0.097	**
Area Median Income	-0.002	*
Connectivity Composite	0.25	*

Sig. Levels: *** = > 99%, ** > 90%, * > 70% R-square = 0.730

In our testing, the model performs best for transit stops and stations with more than 200 average daily boardings. For the lower ridership transit stops, the model tends to over-predict ridership as shown in **Figure 12**. However, it is important to keep in mind that the primary goal of the model was not to predict ridership exclusively (there are several other models in the region that are better predictors of transit ridership), but to understand the potential change in ridership that could result from improved non-motorized connectivity improvements. With this in mind, the model is well suited to estimate the change in transit ridership that could result from non-motorized connectivity improvements at both high and low-ridership transit stops. This ability to predict the effect on ridership is in large part due to the logarithmic structure of the model. Since the model predicts the percent-change in transit ridership as opposed to the absolute change in ridership, low-ridership stops are not as prone to being overestimated, particularly if the percent change is applied to observed ridership (appropriate for near-term analysis) or a more robust ridership forecast (for long-term analysis). The Case Study chapter will describe in additional detail how the project team suggests the connectivity model be used to obtain the most accurate results.

Figure 12. Scatter plot of Actual vs. Prediction for Daily Boardings



7. EXISTING CONDITIONS CONNECTIVITY ANALYSIS RESULTS

Using the final calibrated model, non-motorized connectivity was analyzed across the full study area. To facilitate this analysis, a GIS tool was developed to aggregate individual connectivity surface scores into a composite connectivity index, which can be mapped and tabulated. Overall, the results of the composite connectivity analysis met expectations. Areas within and near Downtown Seattle exhibited the highest composite connectivity scores while the low scoring areas were concentrated in industrial and large commercial areas in the suburban cities. The connectivity scores ranged from a high of 4.05 to a low of 2.81. **Table 12** highlights the top 15 and bottom 15 station locations.

Table 12: Top 15 and Bottom 15 Station Locations for Composite Connectivity Index Scores

Stop Location (Highest Scoring)	*Area*	*Score*	*Stop Location (Lowest Scoring)*	*Area*	*Score*
CONVENTION PLACE	Seattle	4.05	INTERNATIONAL BLVD & S 208TH ST	SeaTac	3.01
SENECA ST & 4TH AVE	Seattle	4.03	WEST VALLEY HWY & S LNGARES WAY	Tukwila	2.99
BELLEVUE AVE & E PINE ST	Seattle	3.99	INTERNATIONAL BLVD & S 182ND ST	SeaTac	2.99
WESTLAKE STATION	Seattle	3.98	ELLIOTT AVE W & W PROSPECT ST	Seattle	2.98
SENECA ST & BOREN AVE	Seattle	3.98	EVERETT SOUNDER	Everett	2.97
VIRGINIA ST & 6TH AVE	Seattle	3.97	OVERLAKE VILLAGE	Redmond	2.95
3RD AVE & COLUMBIA ST	Seattle	3.97	PACIFIC HWY S & S 260TH ST	Des Moines	2.93
3RD AVE & UNION ST	Seattle	3.95	MUKILTEO SOUNDER	Mukilteo	2.90
PREFONTAINE PL S & YESLER WAY	Seattle	3.92	ANDOVER PARK W & MINKLER BLVD	Tukwila	2.90
DENNY WAY & DEXTER AVE N	Seattle	3.91	PACIFIC HWY S & S 240TH ST	Des Moines	2.89
3RD AVE & VINE ST	Seattle	3.90	EDMONDS SOUNDER	Edmonds	2.88
DENNY WAY & STEWART ST	Seattle	3.89	PACIFIC HWY S & KENT-DESNES RD	Des Moines	2.87
NE PACIFIC ST & NE PACIFIC PL	Seattle	3.87	ANDOVER PARK W & TRILAND DR	Tukwila	2.87
5TH AVE S & S JACKSON ST	Seattle	3.86	SODO BUSWAY & S LANDER ST	Seattle	2.81
1ST AVE N & DENNY WAY	Seattle	3.86	WEST VALLEY HWY & STRANDER BLVD	Tukwila	2.81

The connectivity composite maps demonstrate how the station area scores can be visually interpreted. **Figures 13 through 17** highlight a sample of station areas that score across the range of the connectivity composite scores.

Areas in Seattle generally scored moderate to high in the connectivity composite score, primarily due to the City's gridded network. A fine street grid typically improves the RDI, intersection density, sidewalk/walkway density, and bike stress scores. The West Seattle location scored 3.64, with some notable gaps due to arterial crossing difficulties along Delridge, Admiral Way, and Fauntleroy. In contrast, the downtown Seattle location on the right scored 4.05 in the connectivity composite score. Some of the terrain constraints near the waterfront, and surrounding hills can be seen in **Figure 13**.

Similar to the West Seattle location, the Othello LRT and Mt. Baker LRT station areas in **Figure 14** have a robust street grid, but with some noticeable gaps in arterial crossings and some areas with high bike stress. The hill to the west of the Mt. Baker station is apparent, as it limits connectivity, while the Othello area has good connectivity along Dr. MLK Way, but limited crossing opportunities of Seward Park Avenue. The Mt. Baker station scored 3.56 while Othello scored 3.63.

The maps in **Figure 15** highlight two key barriers in the areas' connectivity composite: the I-5 crossing barrier near Northgate Transit Center and the SR-520 barrier in the street grid near Overlake Village. The Northgate Transit Center scored 3.15 while the Overlake Village station was 2.95.

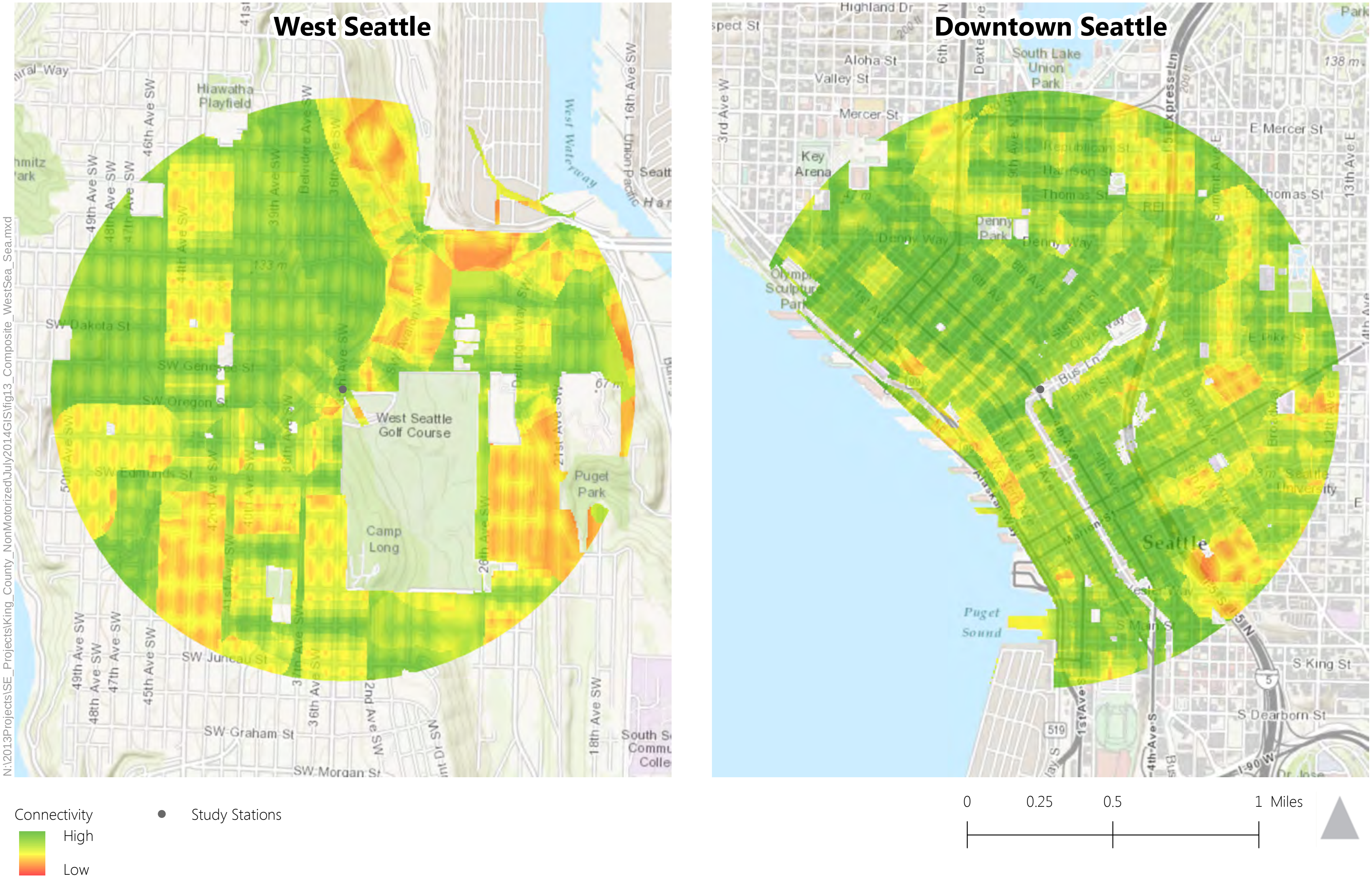


Figure 13

Composite Connectivity Scores
West Seattle (Left) and Downtown Seattle (Right)

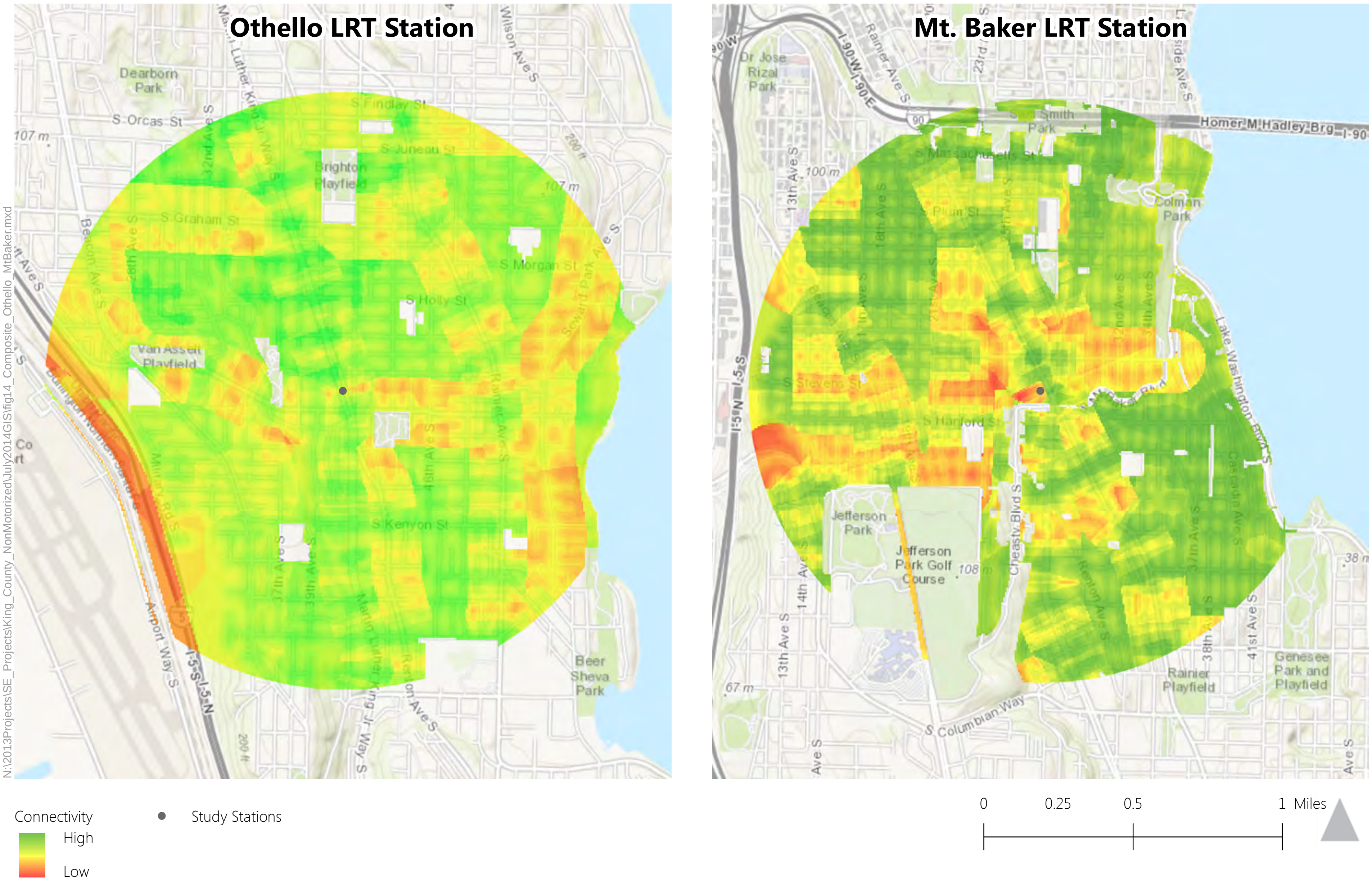


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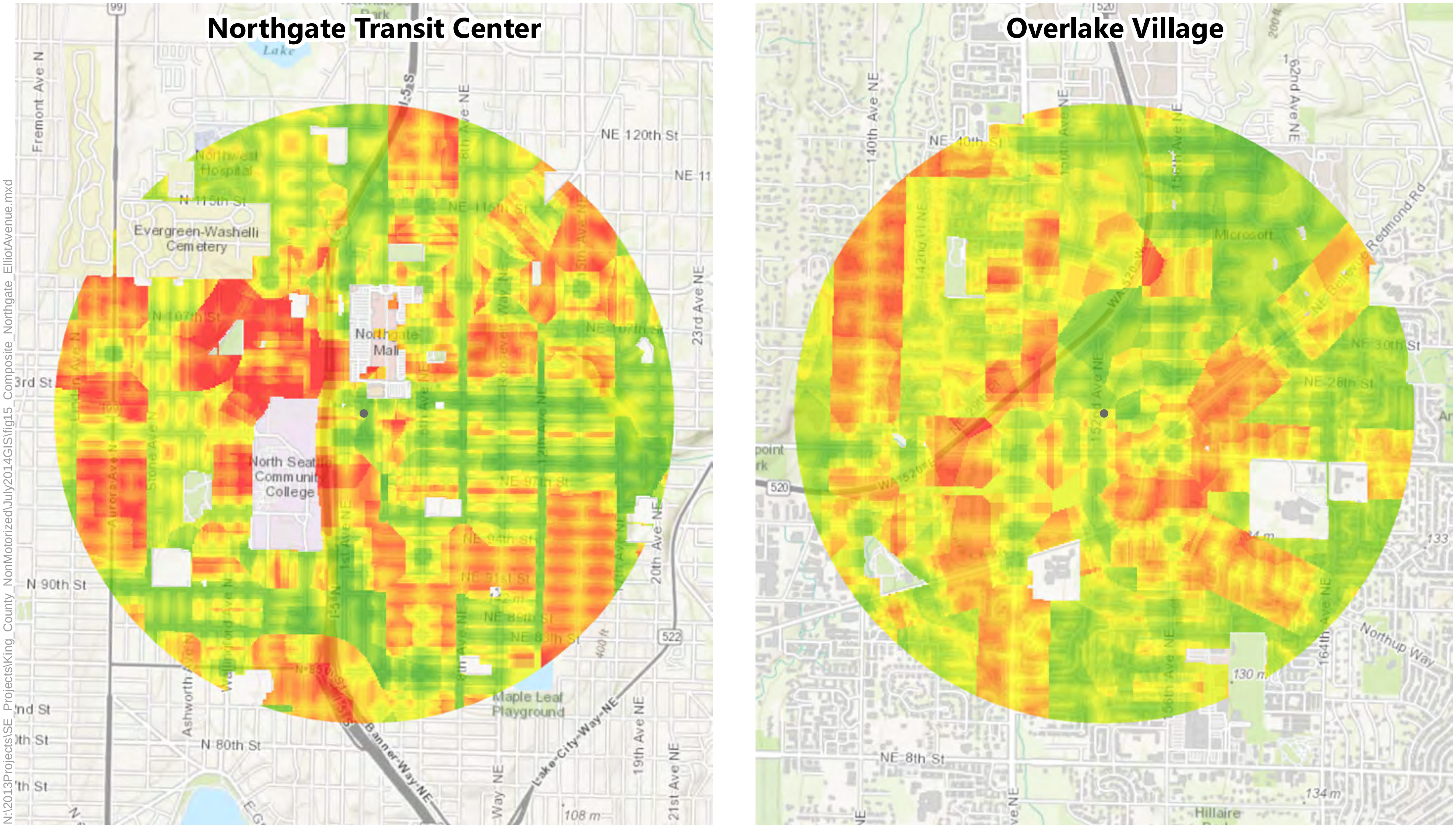
Figure 14

Composite Connectivity Scores
Othello (Left) and Mt. Baker (Right) LRT Stations



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Connectivity
High
Low

● Study Stations

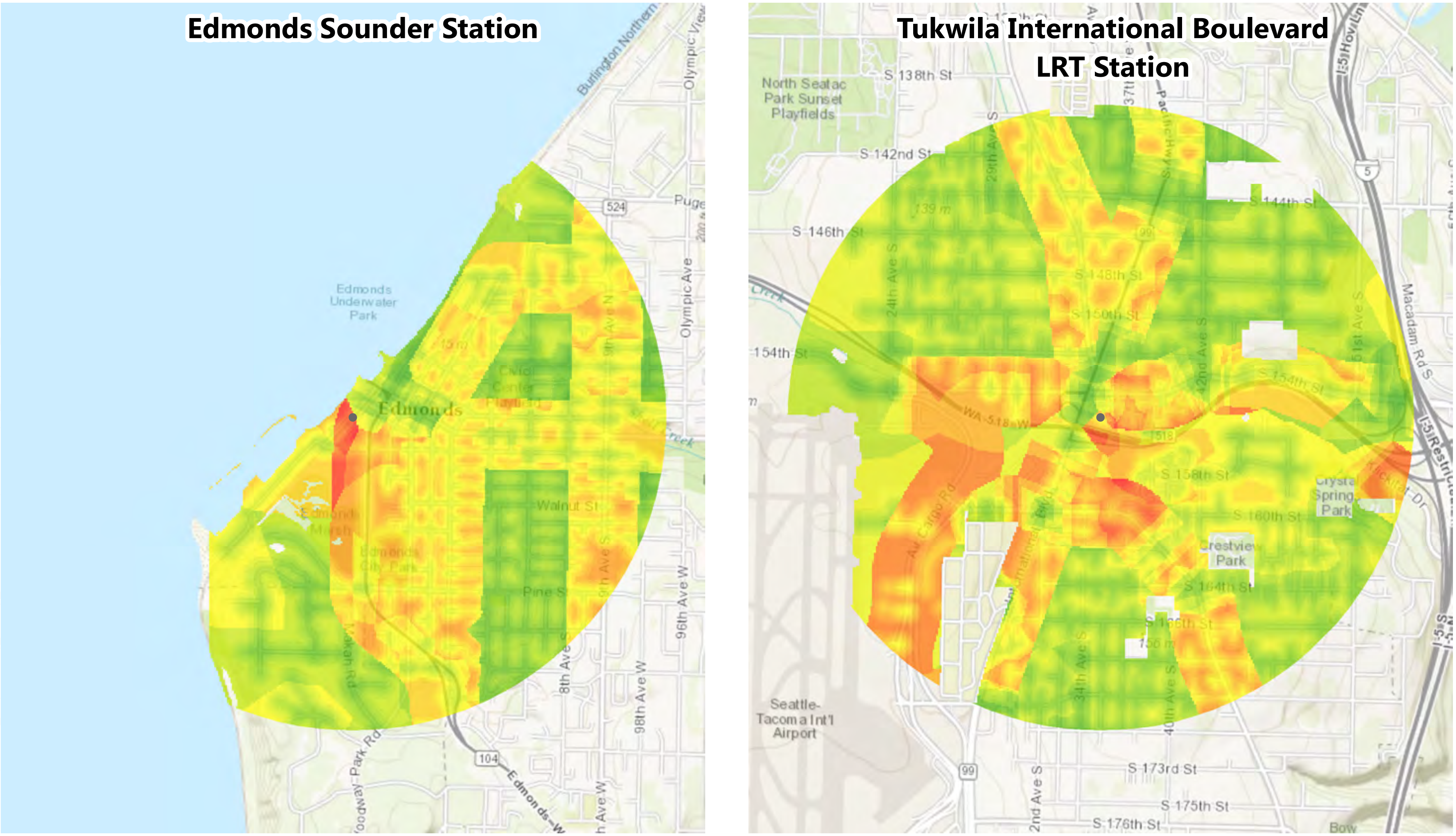
0 0.25 0.5 1 Miles

Figure 15

Composite Connectivity Scores
Northgate Transit Center (Left) and Overlake Village (Right)

In more suburban areas, connectivity is typically impacted by long gaps in signalized crossings, higher bike stress environments, and lower RDI scores. As shown in **Figure 16,** the Edmonds station area scored 2.88 due to many of these factors and the barrier of SR-104. The Tukwila International Boulevard Station scored 3.06 due to arterial crossing difficulty and high bike stress. Notice that the connectivity scores within the residential neighborhoods tends to be good, but that the main barriers are often near the main arterial streets around the stations.

The maps in **Figure 17** highlight additional examples of suburban area connectivity scores. Notable gaps in these areas are due to barriers across freeways and arterials as well as large spacing between intersections. The Kent-Des Moines Road stop scored 3.13 while Federal Way TC scored 3.10.



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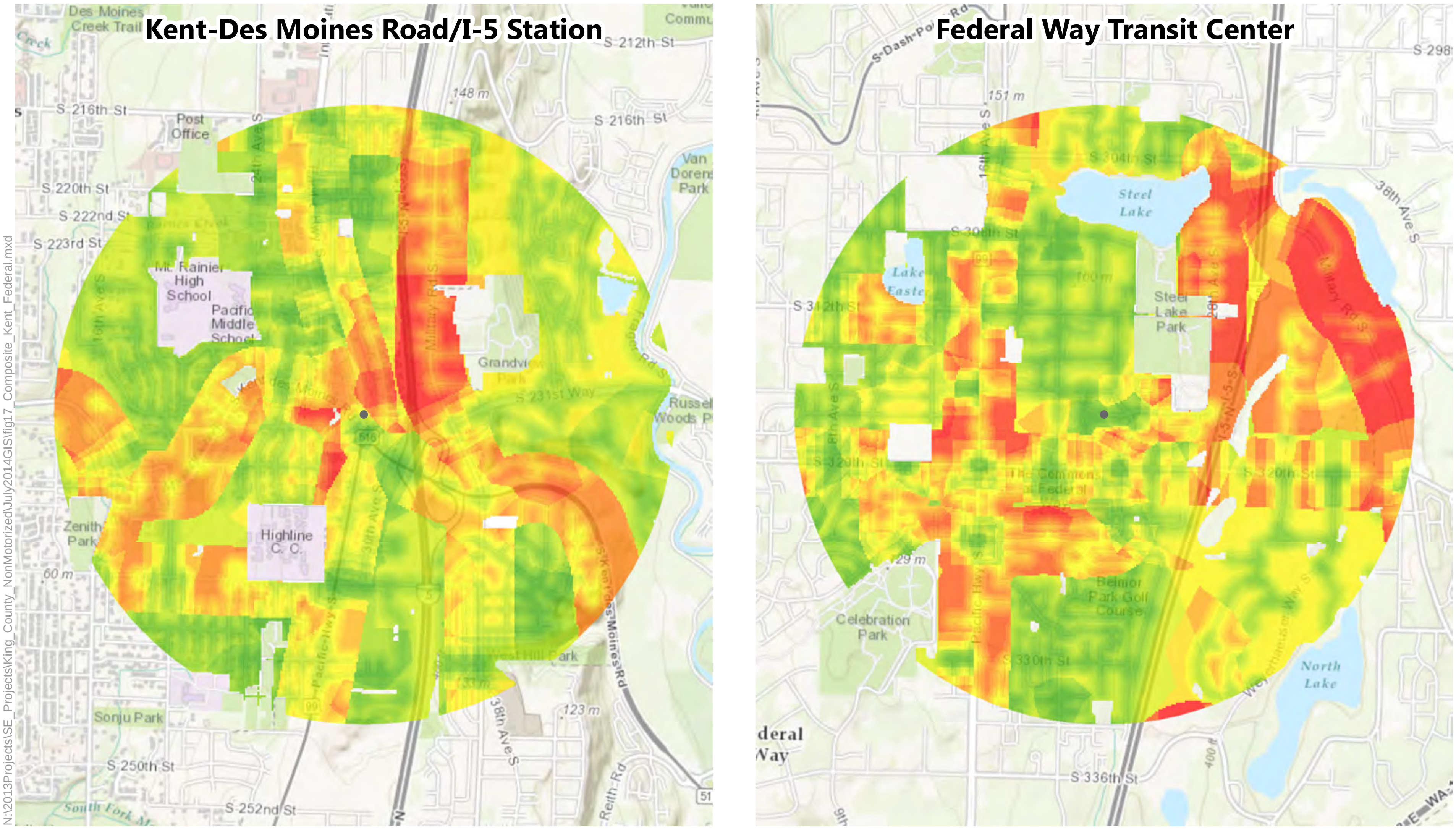
Connectivity
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 16

Composite Connectivity Scores
Edmonds Sounder Station (Left) and
Tukwila International Boulevard LRT Station (Right)



Connectivity
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 17

Composite Connectivity Scores
Kent-Des Moines Road/I-5 Station (Left) and Federal Way Transit Center (Right)

As highlighted above, the connectivity maps visually depict areas with poor non-motorized connectivity around transit stops and stations. While these maps can be helpful in identifying where improvements may be warranted, a more detailed look at the individual connectivity surfaces can also be helpful. The following chapters on Project Prioritization and Case Studies provide more ideas on how planners can use the connectivity analysis results to identify station areas that could benefit most from additional projects and which types of projects may be of the greatest value.

8. FUTURE PROJECTS DATASET

A key goal of this project was to test the performance of the connectivity model on a set of future non-motorized transportation projects. The purpose of this evaluation was to see how the model performed and to develop recommendations for King County Metro and Sound Transit staff to apply the model.

Before the model could be applied to the future projects, data had to be collected and prepared from the jurisdictions in the study area. Similar to the existing conditions data preparation, the future projects dataset required a substantial amount of work to prepare and join all the jurisdictions' data in order to develop a consolidated future projects network that could be analyzed with the GIS tools.

The project team collected any available future non-motorized plans or projects from the jurisdictions in the study area including new street connections. This included GIS datasets developed through transportation master plans as well as redevelopment and subarea plans. **Appendix F** provides examples of subarea and transportation plans that were utilized to define future projects.

New links were created for new/extended off-street trails and new streets while the existing street network attributes were modified for cycletracks, bike lanes, and sidewalks. The cycletracks, bike lanes, and sidewalks required a manual process to join the attributes to the existing network because of incompatibility with spatial projections from the various jurisdiction data. **Figure 17** highlights two examples of this issue.

Figure 18: Gaps in Seattle Bike Plan and the Existing Street Network (left) and Discrepancies between the Network and the Bellevue Bike Plan GIS Data (right)

Given the variety of data sources used and the variability in terms of how jurisdictions organize future non-motorized project data, the project team could not develop a traditional "list" of future non-motorized projects. For example, the Seattle Bike Master Plan shapefile has a large number of bike lanes and cycletracks, however they are not separated into distinct projects. Instead, a bike lane along a certain corridor is composed either by one continuous line through the corridor or by a number of shapefile segments broken out by block. As another example, the planned sidewalks in the Tukwila Capital Improvement Program do not have specific project identifiers associated with each segment. Instead, there are general shapefile links that can be as short as one block to as long as ten blocks.

To efficiently prioritize non-motorized projects, future improvements were grouped by project type and were evaluated on a station-area unit of analysis. Because many of the connectivity metrics utilize a one-mile Euclidean analysis area, any projects within that area should be included for a station-area evaluation. For example, every bike lane segment within a one-mile radius of a station was included in the bike lane project type analysis[15].

Upon completion of the data preparation and cleaning process, the following fields were added to the GIS network dataset:

- **Project Type**: [proj_type] – Type of project as noted below
- **Project Source**: [proj_source] – City shapefile source
- **Updated Bike Stress Value**: [bkstr_new] – Value from 1 to 4
- **Updated Sidewalk Exists Value**: [sw_exist_n] – Boolean value

To understand which types of projects tend to result in the greatest change in non-motorized connectivity scores, the project team flagged each project type as defined below.

- 1 – Off-street trails
- 2 – Cycletracks
- 3 – Bike lanes
- 4 – New streets
- 5 – New sidewalks
- New signalized arterial crossings added to the signals layer. New signals were based on any greenway or trail crossings of arterials/collectors, new streets, and new pedestrian bridges

Note that only projects that would affect the connectivity variables were coded into the network. For example, greenway links were not added to the network because they were only present on local streets, thus the greenways would not impact the bike stress score. Additionally, future sidewalks on local streets were not added to the network because local streets are assumed to have adequate walking access to transit, as described in the Data Preparation Chapter.

[15] Ideally, each of the jurisdictions would have discrete non-motorized project lists. The optimal scale for a project would be one that could reasonably be funded and constructed by the jurisdiction.

9. FUTURE PROJECTS CONNECTIVITY ANALYSIS RESULTS

With the future projects dataset complete, the connectivity tools were applied to calculate the change in connectivity for each transit stop. The results in this section highlight stop locations that experienced the largest change for each of the five connectivity variables. Additionally, the project team evaluated the change in travel sheds that result from the future projects. While travel sheds were not included in the final connectivity model, they help to show how non-motorized access can improve with the connectivity projects. Lastly, the project team also calculated the final change in the composite connectivity score to understand the net improvement in non-motorized access.

ROUTE DIRECTNESS INDEX

Primarily, areas with new streets or major barrier crossing projects experienced the largest change in RDI. This included SeaTac (City Center), Tukwila (Southcenter), Overlake Village, Federal Way Transit Center, and Northgate. **Table 13** highlights the RDI change for each of these areas.

Table 13: Stop Locations with the Largest Change in RDI

Stop Location	***Area***	***Change in Score***
WEST VALLEY HWY & STRANDER BLVD	Tukwila	1.01
OVERLAKE VILLAGE	Redmond	0.87
156TH AVE NE & NE 28TH ST	Redmond	0.64
156TH AVE NE & NE 31ST ST	Redmond	0.61
BOEING ACS & S LONGACRES WAY	Tukwila	0.56
WEST VALLEY HWY & S LONGACRES WAY	Tukwila	0.45
INTERNATIONAL BLVD & S 180TH ST	SeaTac	0.44
INTERNATIONAL BLVD & S 182ND ST	SeaTac	0.38
NORTHGATE TC	Seattle	0.37
FEDERAL WAY TC	Federal Way	0.23

Figure 19 below highlights how the RDI scores for the Overlake Village area changed because of the new street grid and the pedestrian bridge over SR-520. Note the large

improvement in areas to the north and east of the station, along with moderate improvements to the RDI in areas west of SR-520.

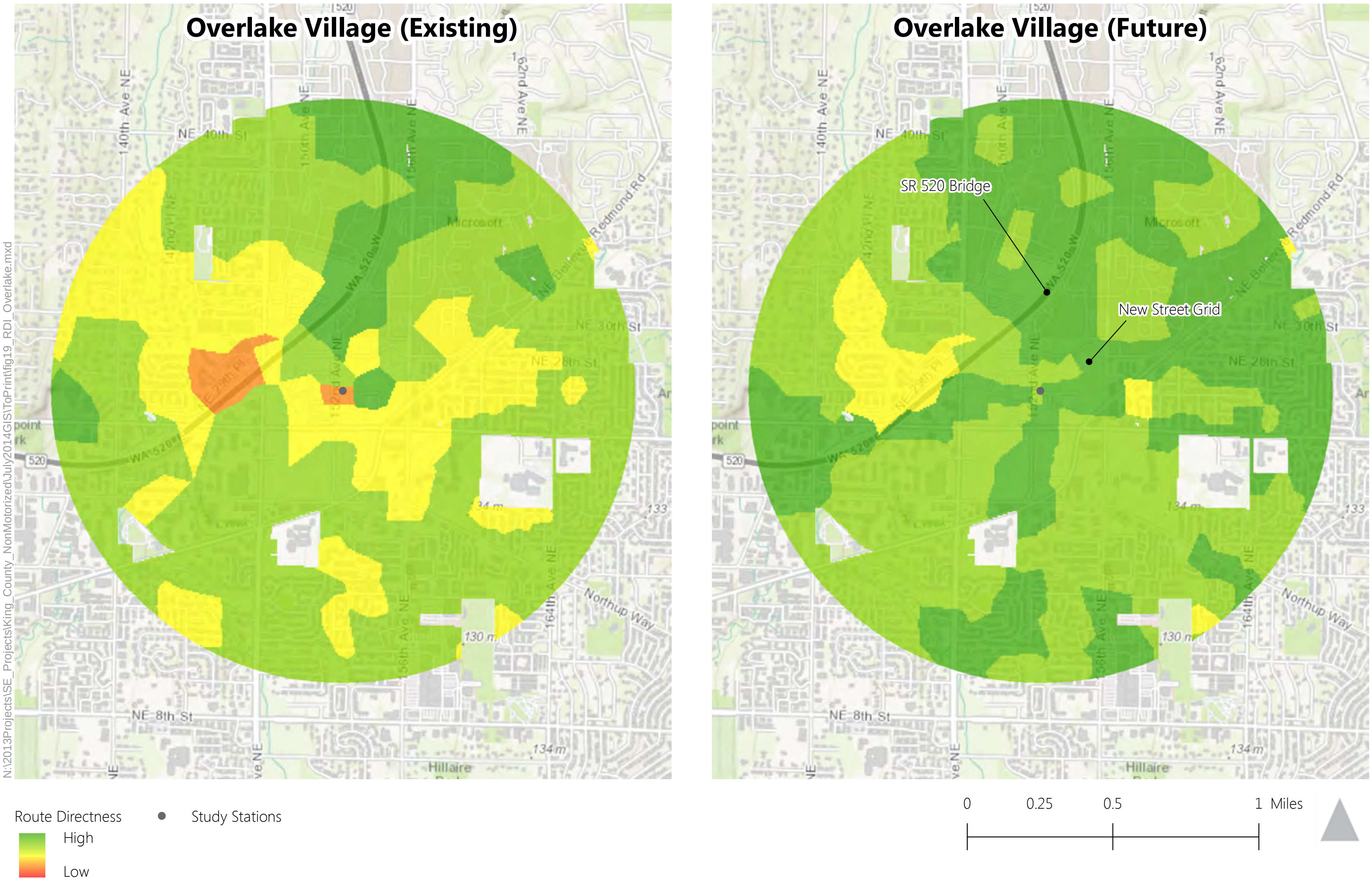


Figure 19

Existing (Left) and Future (Right)
RDI Scores for Overlake Village

SIGNALIZED ARTERIAL CROSSING

Many of the changes in the signalized arterial crossing index were a result of improved crossings from bicycle greenway development in Seattle as shown in **Table 14.** Additionally, some areas outside of Seattle with new streets or trails that crossed arterials experienced a large change in the crossing index such as Federal Way Transit Center and NE 8th Street and 124th Avenue NE in the Bel-Red area.

Table 14: Stop Locations with the Largest Change in Signalized Arterial Crossing Index

Stop Location	***Area***	***Change in Score***
15TH AVE NW & NW 85TH ST	Seattle	0.45
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	0.44
15TH AVE NW & NW MARKET ST	Seattle	0.38
FEDERAL WAY TC	Federal Way	0.37
15TH AVE NW & NW LEARY WAY	Seattle	0.37
E THOMAS ST & 16TH AVE E	Seattle	0.37
NE 8TH ST & 124TH AVE NE	Bellevue	0.37
CALIFORNIA AVE SW & SW FINDLAY ST	Seattle	0.36
1ST AVE NE & NE 95TH ST	Seattle	0.34
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	0.33

Figure 20 details the change in signalized arterial crossings near the stop at NW 85th Street and 15th Avenue NW. The improved arterial crossing score is primarily a result of proposed greenways in the area. This is a good example of how greenway treatments can benefit both bicyclists and pedestrians alike.

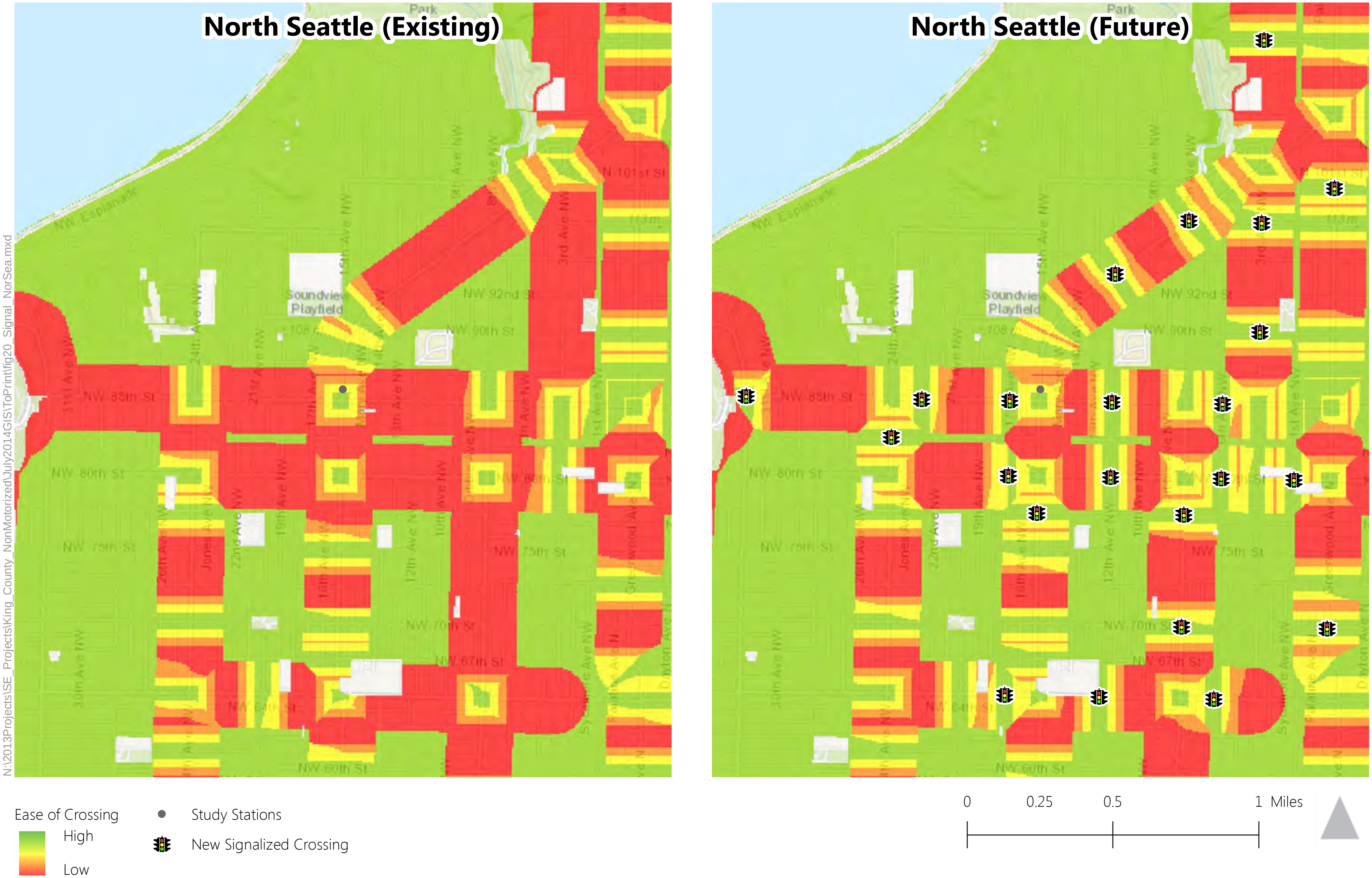


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Figure 20

Existing (Left) and Future (Right)
Signalized Arterial Crossing Score for North Seattle

SIDEWALK/WALKWAY DENSITY

Similar to the RDI results, the sidewalk/walkway density scores changed the most in areas with new street grids as these new streets filled in gaps in sidewalk density in the area. Federal Way Transit Center, Tukwila (Southcenter), and Overlake Village were among the areas that realized the largest change as shown in **Table 15**.

Table 15: Stop Locations with the Largest Change in the Sidewalk Density Score

Stop Location	***Area***	***Change in Score***
NE 8TH ST & 124TH AVE NE	Bellevue	0.49
ANDOVER PARK W & MINKLER BLVD	Tukwila	0.45
FEDERAL WAY TC	Federal Way	0.43
STRANDER BLVD & ANDOVER PARK E	Tukwila	0.38
ANDOVER PARK W & BAKER BLVD	Tukwila	0.33
PACIFIC HWY S & S 312TH ST	Federal Way	0.31
NE 8TH ST & 140TH AVE NE	Bellevue	0.29
OVERLAKE VILLAGE	Redmond	0.28
WEST VALLEY HWY & STRANDER BLVD	Tukwila	0.27
S 180TH ST & SPERRY DR	Tukwila	0.25

Figure 21 highlights the change in sidewalk density within a portion of the Tukwila Urban Center (Southcenter). The new street grid provided improved sidewalk coverage as a result of the planned redevelopment of the area.

Density
High
Low

Study Stations

0 0.25 0.5 1 Miles

Figure 21

Existing (Left) and Future (Right)
Sidewalk Density Scores for Tukwila Urban Center

INTERSECTION DENSITY

The results of the intersection density analysis displayed somewhat similar outcomes to the sidewalk/walkway density variable as shown in **Table 16**. In general, areas that added new streets to the network realized the greatest change in the intersection density score, such as Overlake Village, Tukwila (Southcenter), and SeaTac.

Table 16: Stop Locations with the Largest Change in the Intersection Density Score

Stop Location	***Area***	***Change in Score***
OVERLAKE VILLAGE	Redmond	0.39
ANDOVER PARK W & MINKLER BLVD	Tukwila	0.39
156TH AVE NE & NE 24TH ST	Bellevue	0.36
STRANDER BLVD & ANDOVER PARK E	Tukwila	0.33
ANDOVER PARK W & BAKER BLVD	Tukwila	0.31
WEST VALLEY HWY & STRANDER BLVD	Tukwila	0.28
156TH AVE NE & NE 31ST ST	Redmond	0.26
INTERNATIONAL BLVD & S 180TH ST	SeaTac	0.23
LYNNWOOD TC	Lynnwood	0.23
INTERNATIONAL BLVD & S 176TH ST	SeaTac	0.21

Figure 22 highlights the change in intersection density in the urban center of SeaTac. The new street grid in the area created a number of additional intersections.

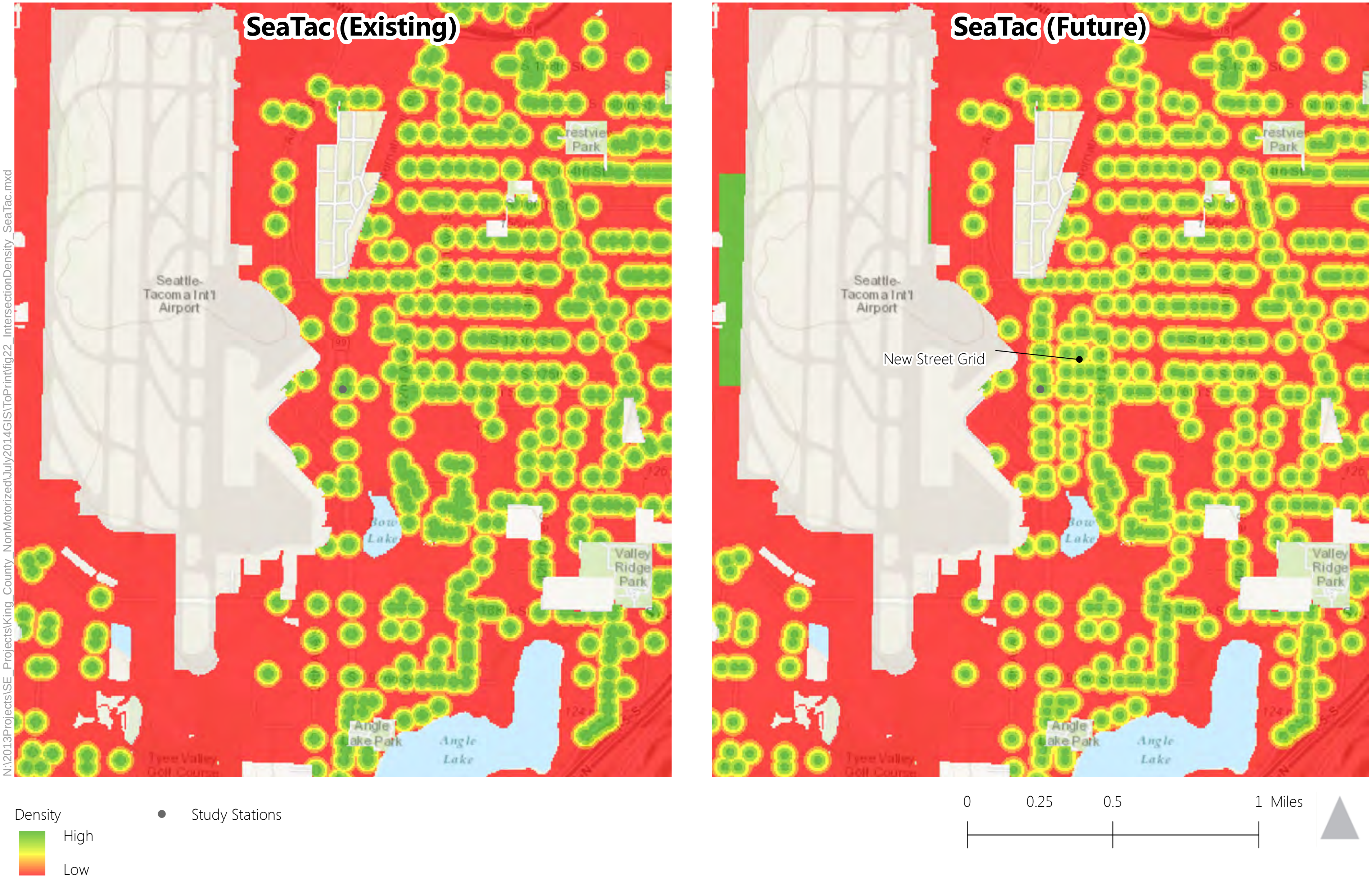


Figure 22

Existing (Left) and Future (Right) Intersection Density Scores for SeaTac

BIKE STRESS

As shown in **Table 17**, a number of locations experienced a large change in the bike stress score due to the wide variety of bicycle projects in the study area. In general, areas with future bike lanes or cycletracks in areas with minimal existing bicycle infrastructure exhibited the greatest change. This included stations in Tukwila, Redmond, Burien, and Bellevue.

Table 17: Stop Locations with the Largest Reduction in the Bike Stress Average

Stop Location	***Area***	***Percent Reduction in Bike Stress Average***
ANDOVER PARK W & TRILAND DR	Tukwila	-47%
RAINIER BEACH STATION	Seattle	-47%
OVERLAKE TC	Redmond	-47%
BURIEN TC	Burien	-46%
INTERNATIONAL BLVD & S 216TH ST	SeaTac	-46%
INTERNATIONAL BLVD & S 200TH ST	SeaTac	-45%
SW 148TH ST & AMBAUM BLVD SW	Burien	-45%
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	-45%
156TH AVE NE & NE 36TH ST	Redmond	-45%
BELLEVUE TC	Bellevue	-43%

Figure 23 highlights the large change in bicycle stress near the Overlake Village area, particularly due to the new street grid and bike lane implementation.

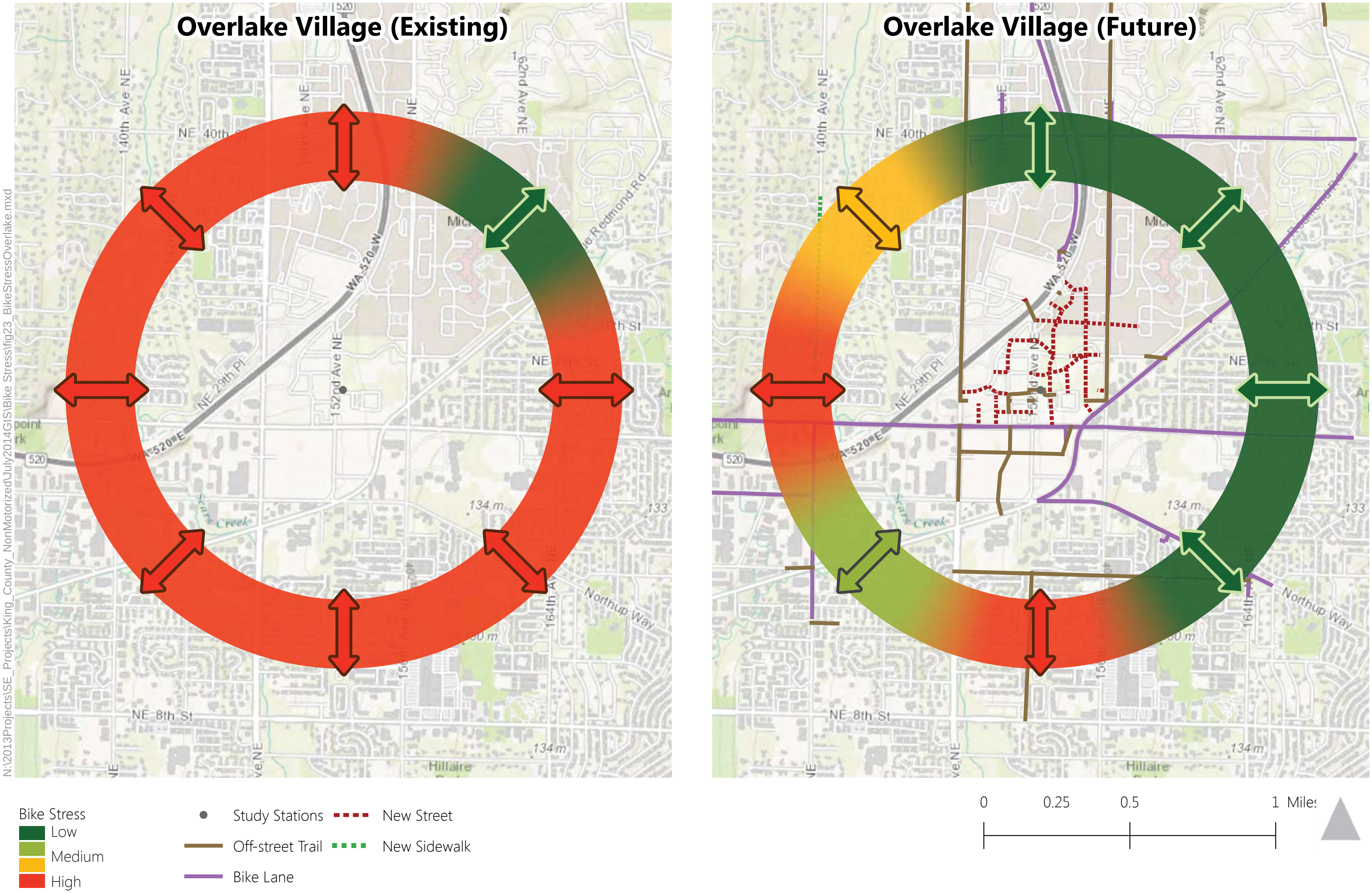


Figure 23

Existing (Left) and Future (Right)
Bike Stress Scores for Overlake Village

TRAVEL SHEDS

The 15-minute walk and bike sheds were most impacted by network improvements such as new streets or off-street paths and pedestrian bridges. This was true for areas near the Tukwila Urban Center, downtown SeaTac, Overlake Village, and the Bel-Red corridor. **Table 18** highlights the top 15 locations as measured by percent change in the area of the 15-minute walk sheds and bike sheds.

Table 18: Top 15 locations in Walk Shed and Bike shed Area Increase

Walk Shed Increase			Bike Shed Increase		
Stop Location	***Area***	***Percent Change in Walk Shed***	***Stop Location***	***Area***	***Percent Change in Bike Shed***
WEST VALLEY HWY & STRANDER BLVD	Tukwila	97%	NORTHGATE TC	Seattle	108%
ANDOVER PARK W & MINKLER BLVD	Tukwila	90%	OVERLAKE VILLAGE	Redmond	89%
INTERNATIONAL BLVD & S 182ND ST	SeaTac	88%	5TH AVE NE & NE 103RD ST	Seattle	50%
BOEING ACS & S LONGACRES WAY	Renton	83%	INTL BLVD & S 182ND ST	SeaTac	45%
WEST VALLEY HWY & S LONGACRES WAY	Tukwila	79%	INTL BLVD & S 180TH ST	SeaTac	45%
OVERLAKE VILLAGE	Redmond	77%	1ST AVE NE & NE 95TH ST	Seattle	44%
INTERNATIONAL BLVD & S 180TH ST	SeaTac	70%	NE 83RD ST & 161ST AVE NE	Redmond	43%
ANDOVER PARK W & TRILAND DR	Tukwila	59%	INTERNATIONAL BLVD & S 176TH	SeaTac	42%
STRANDER BLVD & ANDOVER PARK E	Tukwila	48%	SOUTHCENTER BLVD & 62ND AVE	Tukwila	41%
156TH AVE NE & NE 28TH ST	Redmond	45%	5TH AVE NE & NE 106TH ST	Seattle	33%
NORTHGATE TC	Seattle	45%	156TH AVE NE & NE 31ST ST	Redmond	32%
STRANDER BLVD & ANDOVER PARK W	Tukwila	37%	156TH AVE NE & NE 28TH ST	Redmond	29%
156TH AVE NE & NE 31ST ST	Redmond	36%	MERIDIAN AVE N & N 105TH ST	Seattle	26%
ANDOVER PARK W & BAKER BLVD	Tukwila	34%	148TH AVE NE & NE 40TH ST	Redmond	26%
FEDERAL WAY TC	Federal Way	34%	PACIFIC HWY S & S 312TH ST	Federal Way	16%

As an example, **Figure 24** shows the 45% improvement in the 15-minute walk shed near Northgate TC while **Figure 25** highlights the 108% increase in the 15-minute bike shed due to the non-motorized bridge across I-5.

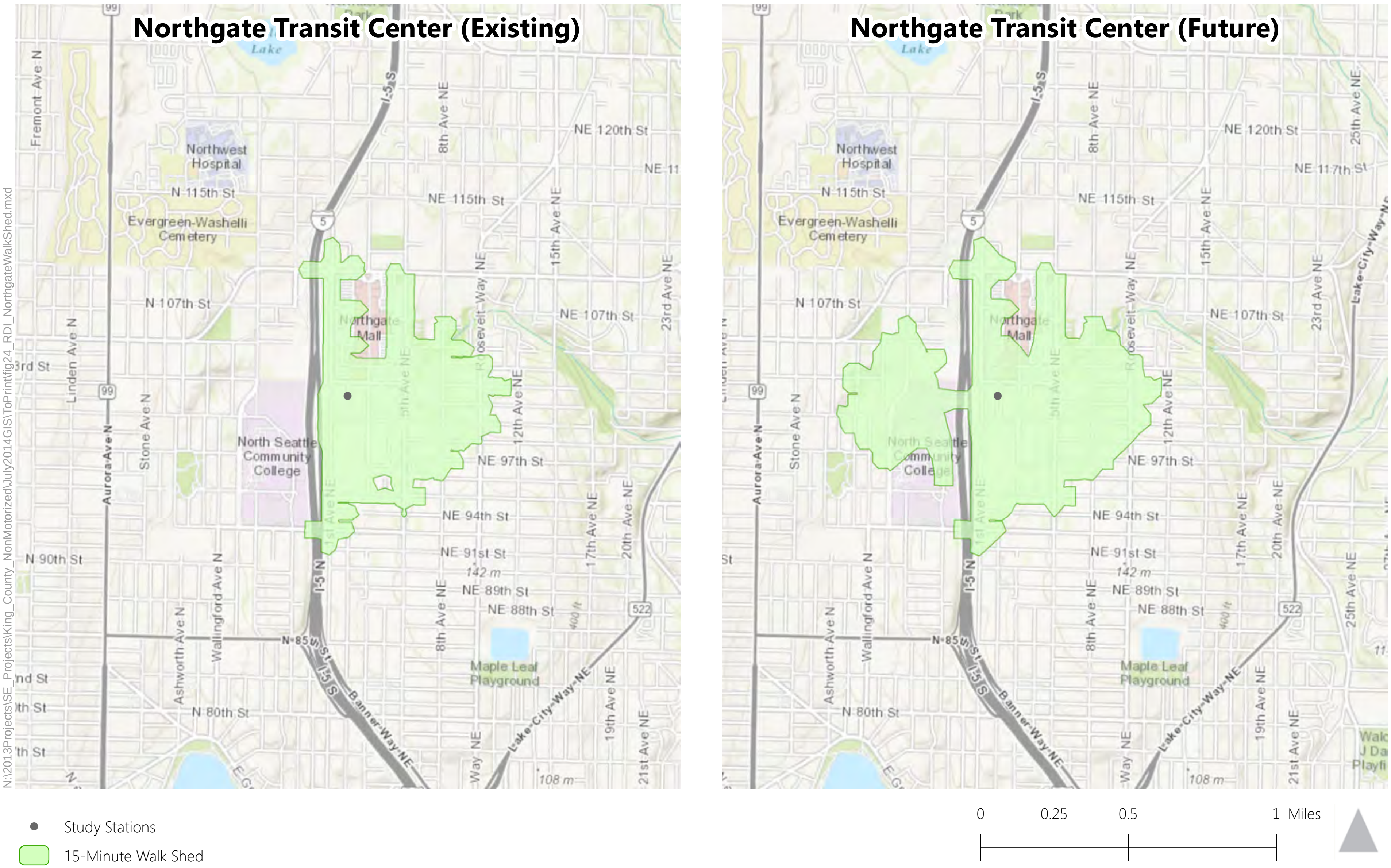
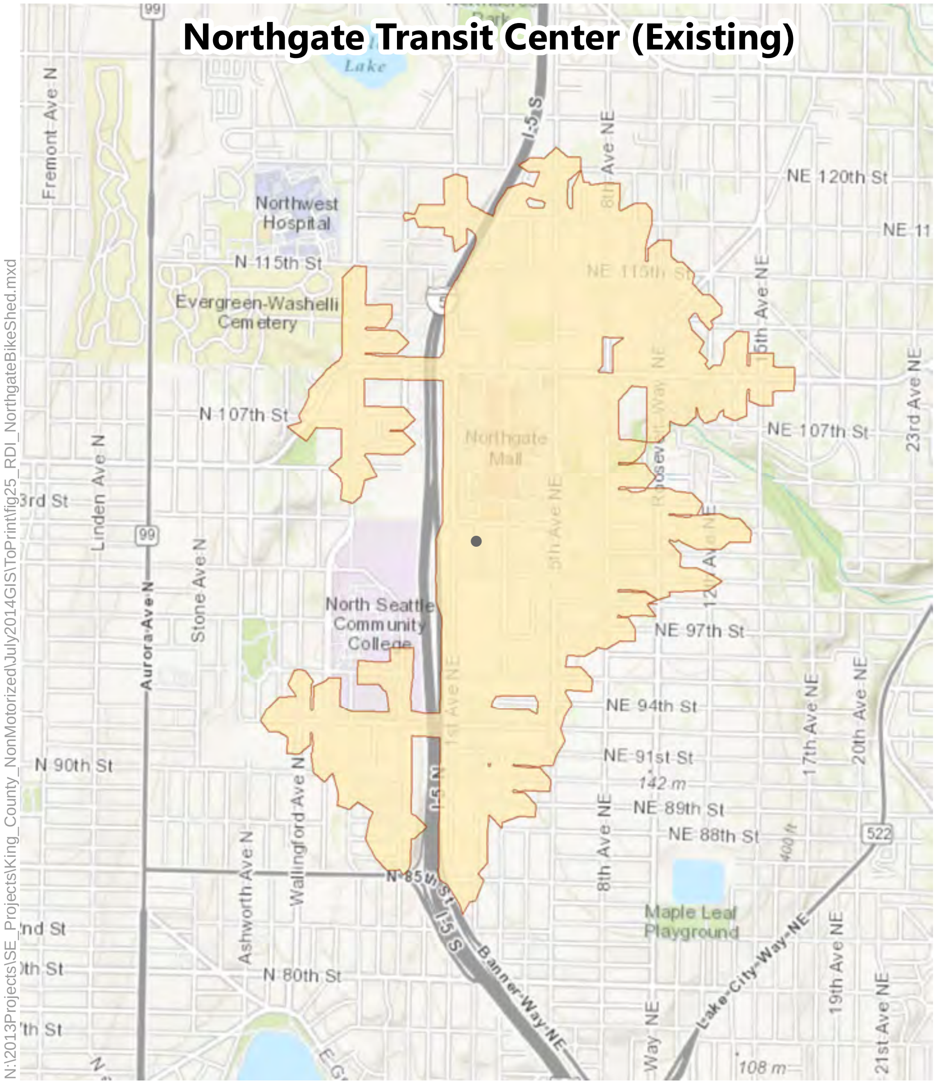
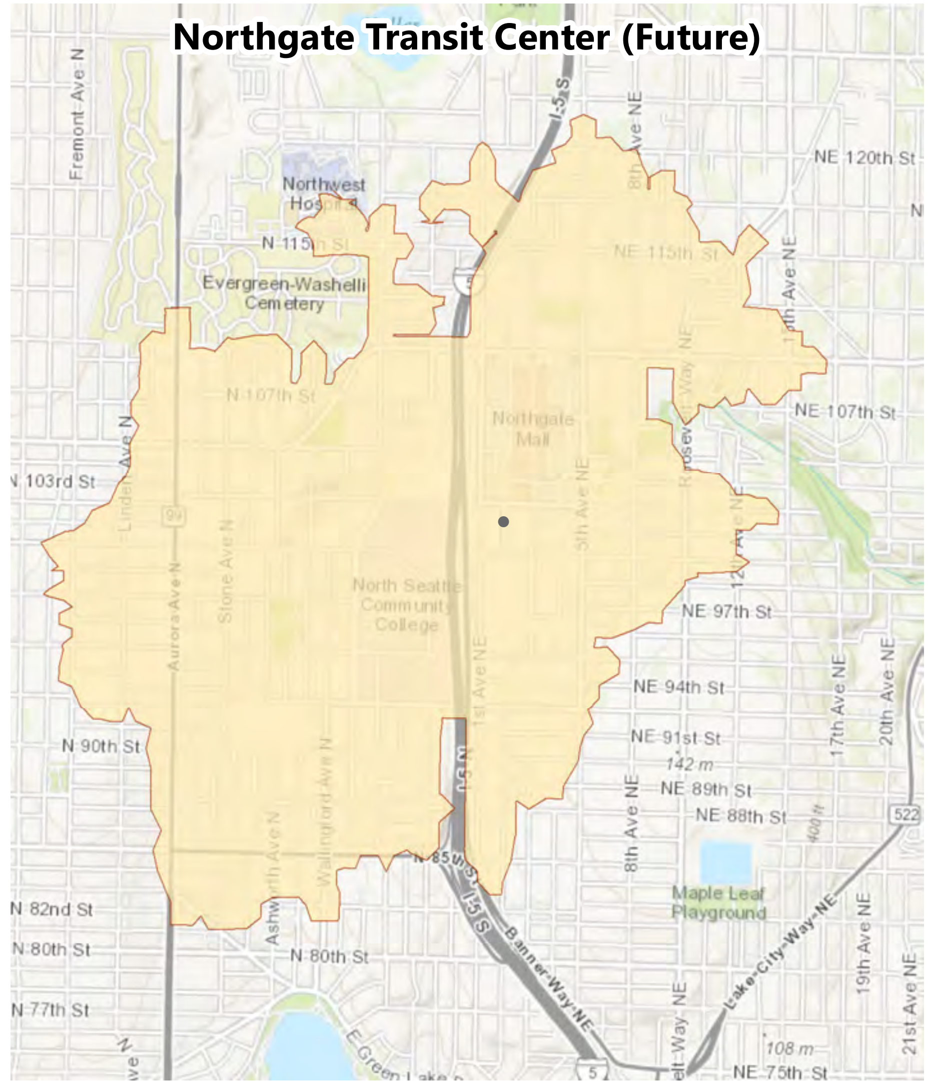


Figure 24

Existing (Left) and Future (Right) 15-Minute Walk Shed for the Northgate Transit Center Area





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- Study Stations
- 15-Minute Bike Shed

0 0.25 0.5 1 Miles

Figure 25

Existing (Left) and Future (Right)
15-Minute Bike Sheds for the Northgate Transit Center Area

COMPOSITE CONNECTIVITY SCORE

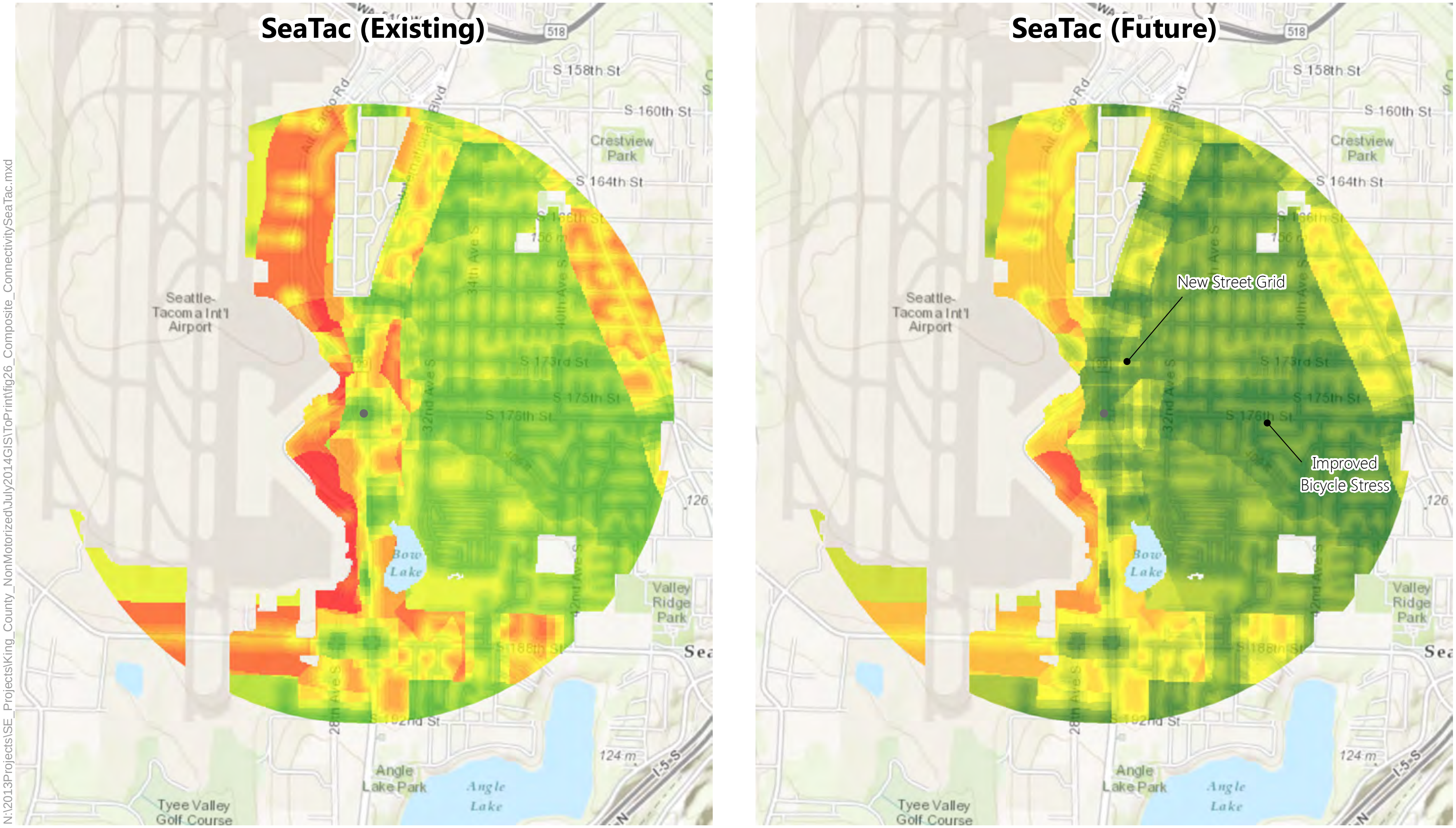
The updated connectivity variables were combined utilizing the regression weights to calculate the future composite connectivity scores. The top 25 station areas with the greatest change in connectivity are listed in **Table 19**.

Table 19: Stations with the Largest Change in the Connectivity Composite Score

Stop Location	***Area***	***Existing Connectivity***	***Future Connectivity***	***Change in Connectivity***
OVERLAKE VILLAGE	Redmond	2.95	3.44	0.49
FEDERAL WAY TC	Federal Way	3.10	3.58	0.48
WEST VALLEY HWY & STRANDER BLVD	Tukwila	2.81	3.29	0.48
156TH AVE NE & NE 31ST ST	Redmond	3.16	3.63	0.47
INTERNATIONAL BLVD & S 180TH ST	SeaTac	3.15	3.59	0.44
ANDOVER PARK W & TRILAND DR	Tukwila	2.87	3.29	0.42
NORTHGATE TC	Seattle	3.15	3.55	0.40
WEST VALLEY HWY & S LONGACRES WAY	Tukwila	2.99	3.38	0.39
INTERNATIONAL BLVD & S 182ND ST	SeaTac	2.99	3.37	0.38
ANDOVER PARK W & MINKLER BLVD	Tukwila	2.90	3.25	0.35
NE NORTHGATE WAY & ROOSEVELT WAY	Seattle	3.26	3.59	0.33
156TH AVE NE & NE 28TH ST	Redmond	3.18	3.49	0.31
INTERNATIONAL BLVD & S 176TH ST	SeaTac	3.30	3.59	0.29
STRANDER BLVD & ANDOVER PARK E	Tukwila	3.12	3.40	0.28
15TH AVE NW & NW LEARY WAY	Seattle	3.32	3.60	0.28
1ST AVE NE & NE 95TH ST	Seattle	3.33	3.60	0.27
5TH AVE NE & NE 103RD ST	Seattle	3.29	3.55	0.26
BOEING ACS & S LONGACRES WAY	Renton	3.02	3.28	0.26
BEACON HILL STATION	Seattle	3.32	3.56	0.24
S 180TH ST & SPERRY DR	Tukwila	3.10	3.34	0.24
MT BAKER	Seattle	3.56	3.80	0.24
156TH AVE NE & NE 24TH ST	Bellevue	3.32	3.55	0.23
PACIFIC HWY S & S 312TH ST	Federal Way	3.48	3.71	0.23
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	3.39	3.61	0.22
MERIDIAN AVE N & N 105TH ST	Seattle	3.38	3.61	0.23

A collection of areas with large and small changes in connectivity is highlighted in **Figures 26 through 30**.

The change in connectivity shown in **Figure 26** near the SeaTac city center are due to the future street grid as well as lowered bike stress in the area due to bicycle lane infrastructure. Gaps in connectivity still would exist to the near the airport and south of S 188th Street.



Connectivity

High

Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 26

Existing (Left) and Future (Right) Connectivity in SeaTac

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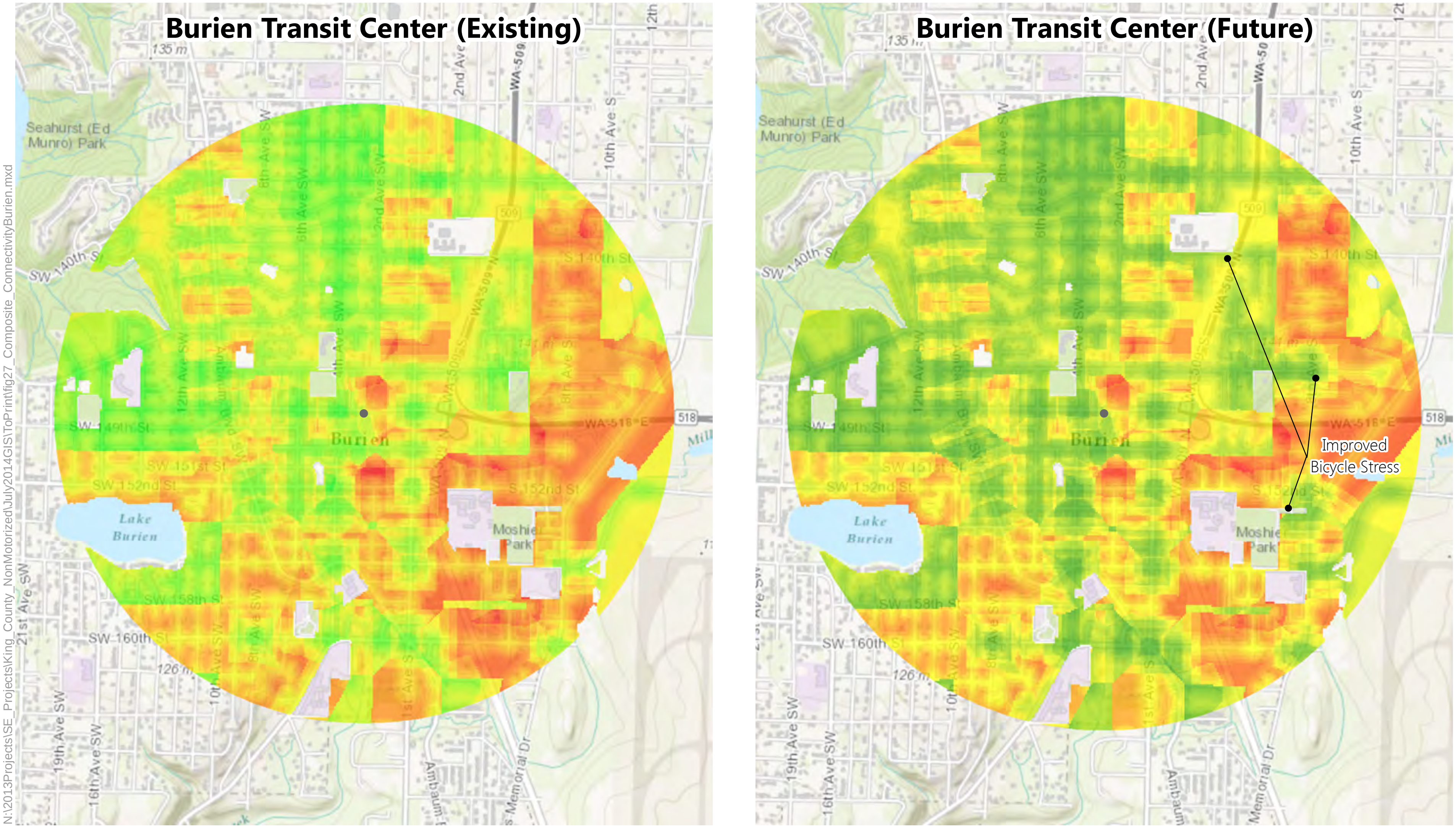
The Burien Transit Center area exhibited improvements primarily in lowered bicycle stress to the east and northeast of the station area due to bike lanes and the Des Moines Way trail as shown in **Figure 27**. The barrier created by SR-509 remains to the east of the Transit Center.



Connectivity
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 27

Existing (Left) and Futrure (Right) Connectivity in Burien Transit Center

As shown in **Figure 28**, the changes in West Seattle are more subtle. There are improvements along Avalon Way and Alaska Street because of greenway crossings. This type of result was typical in Seattle, where the existing connectivity score was relatively high to begin with.

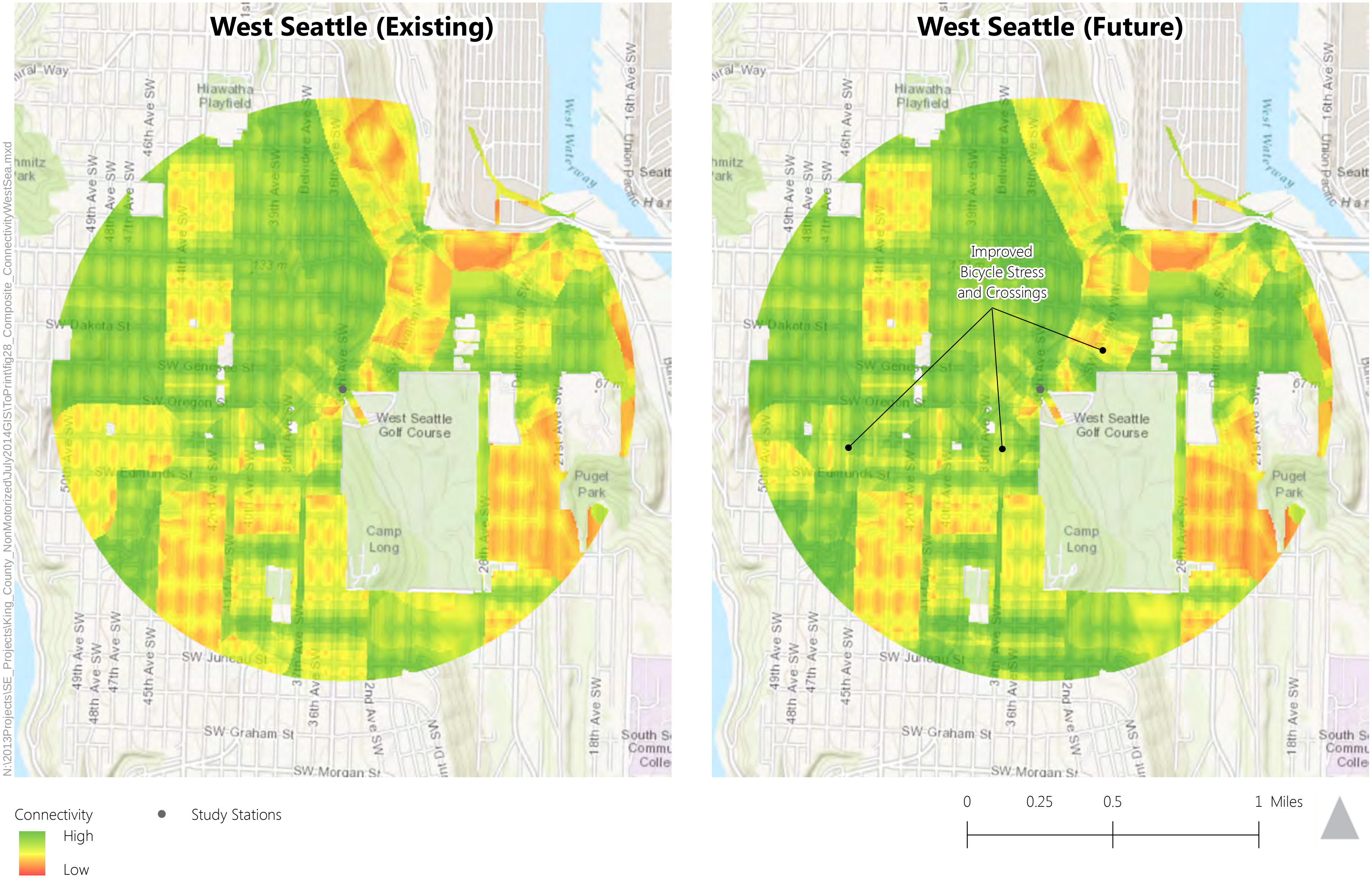


Figure 28

Existing (Left) and Future (Right) Connectivity in West Seattle

In **Figure 29**, note the substantial change in connectivity for the City Center area of Lynnwood to the north and east of the station. The new street grid, bicycle facilities and arterial crossings all provided improvements to the connectivity of the area.

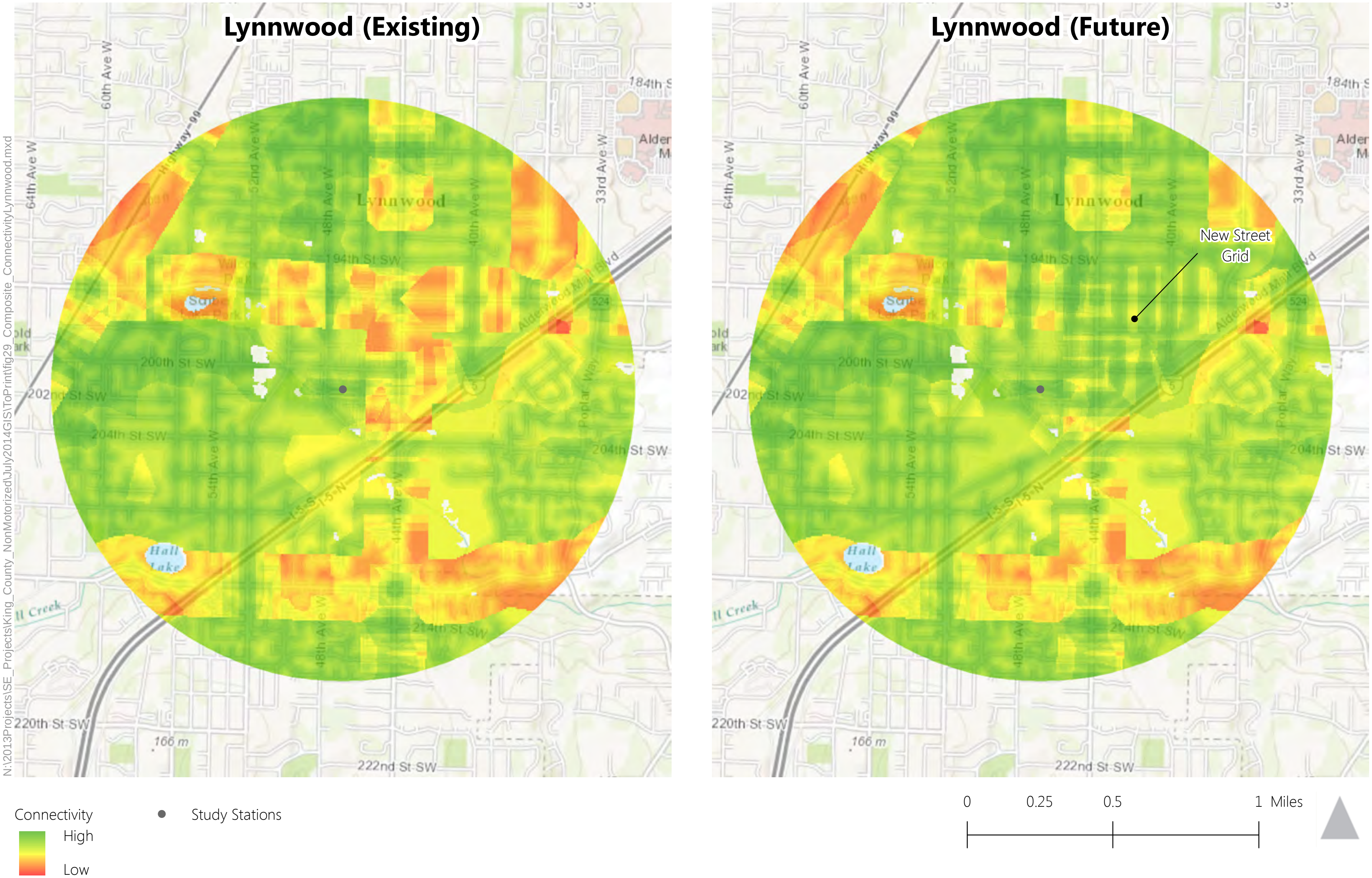
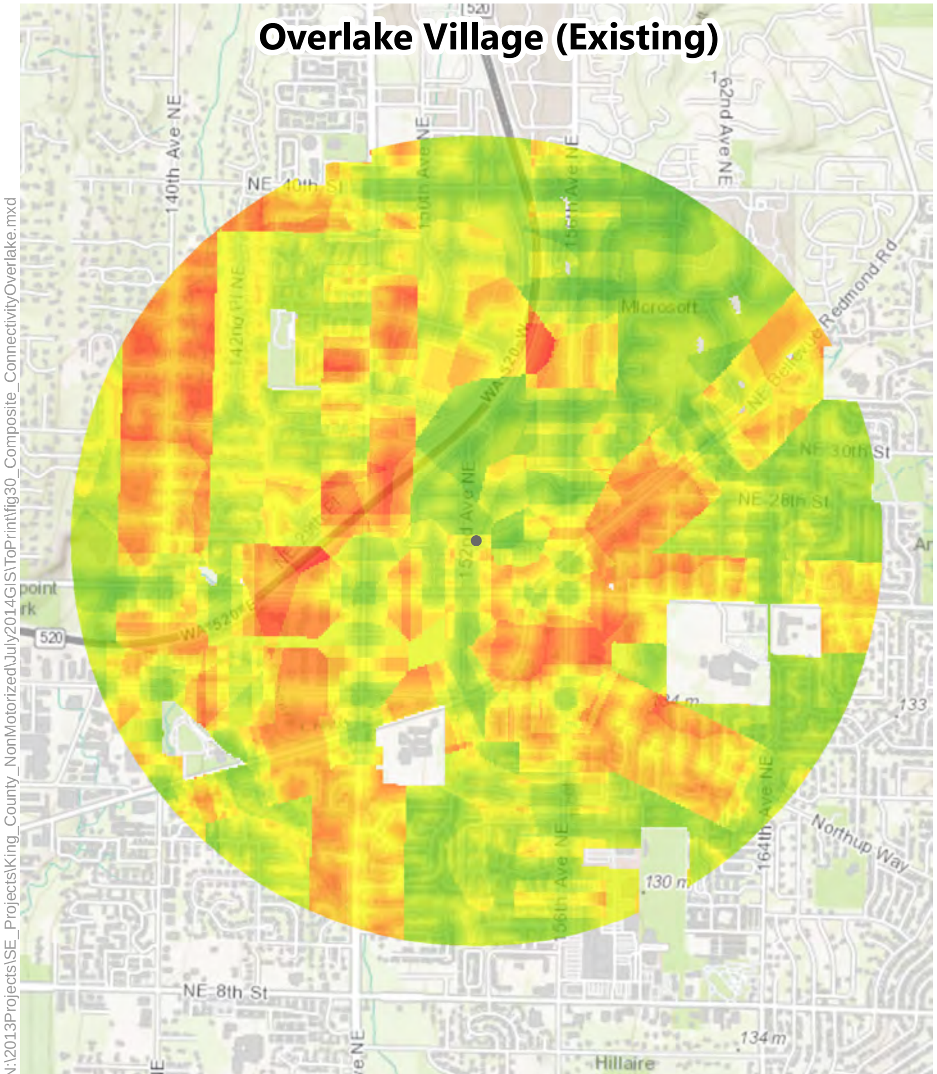
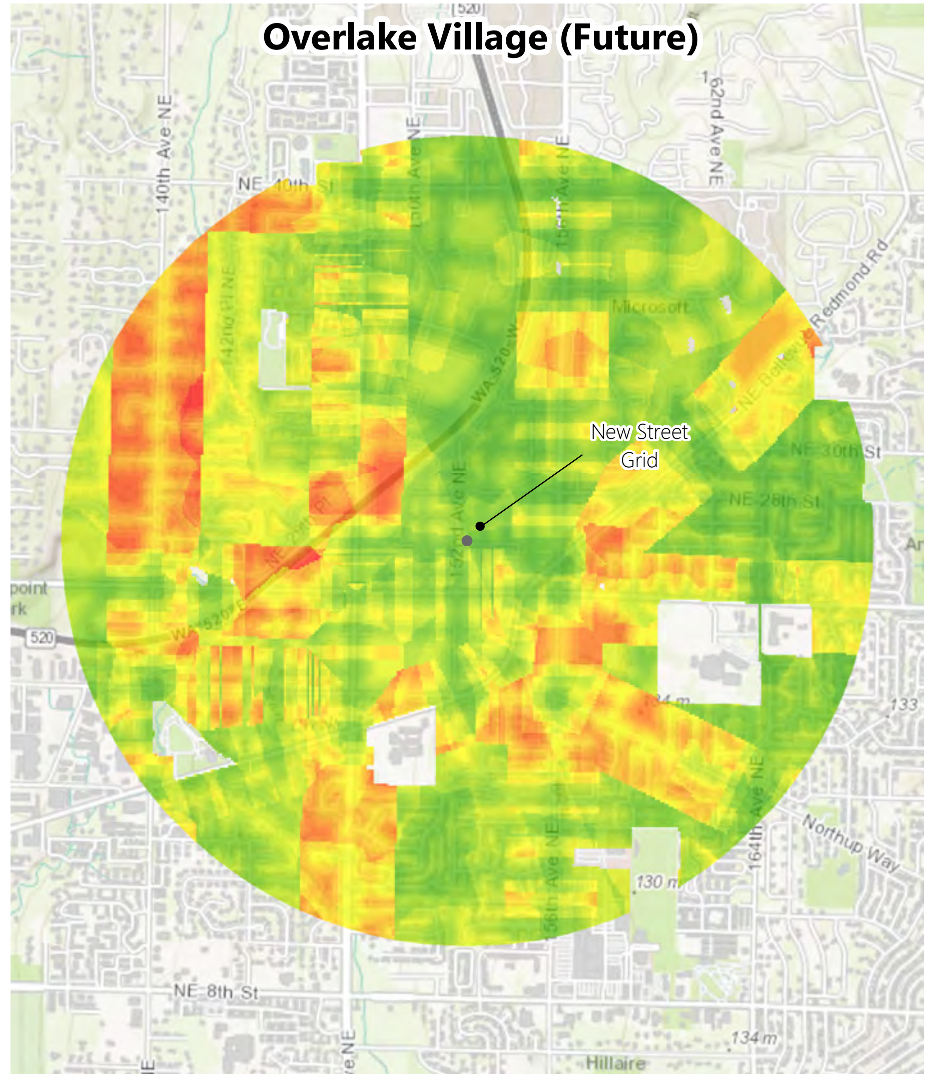


Figure 29

Existing (Left) and Future (Right) Connectivity in Lynnwood

A major improvement in connectivity for the Overlake Village area is due to the new street grid and the non-motorized bridge across SR-520 as shown in **Figure 30**. Additionally, connectivity improvements from the street grid in the Bel-Red corridor are evident to the southwest of the station area.





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Connectivity
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 30

Existing (Left) and Future (Right)
Connectivity in Overlake Village

10. PROJECT PRIORITIZATION

This chapter describes a specific application of the non-motorized connectivity analysis model to prioritize the future non-motorized projects presented in the prior chapter. Several different approaches to prioritization are presented, ranging from a focus on the projects that generate the most transit ridership, to a method that balances costs and ridership, to a method that considers population growth and some demographic characteristics. Note that these methods are just an example of how to leverage the tools for project prioritization. Each individual jurisdiction and agency may have different factors to consider when analyzing non-motorized projects.

METHODOLOGY

As described earlier, the project team was not able to develop a traditional non-motorized project list across the entire study area. In order to prioritize projects, we arranged the non-motorized projects from jurisdiction plans into the following project types:

- Off-street trails and cycletracks
- Bike lanes
- New streets
- New sidewalks
- New signalized arterial crossings

Using the connectivity analysis model and additional information described below, the project-types were prioritized with respect to the following:

- Percent change in daily ridership
- Net change in daily ridership
- Demographic/transit service proximity measures
- An aggregate measure that blends net daily ridership, cost, and demographic/transit service proximity measures

The methodologies for these prioritization frameworks are described below.

DAILY RIDERSHIP CHANGE

- The project-types were evaluated separately to determine the change in daily ridership at a transit stop-area. For example, the ridership results were calculated with only future bike lanes included in the network while separate results were calculated with only off-street trails and cycletracks included. The resulting ridership results from this analysis provided the following variables by project type:
    - Net change in daily ridership
    - Percent change in daily ridership

PROJECT COST

Planning-level project costs were estimated based on the method described below. Unit costs were based upon Seattle Department of Transportation (SDOT) and Washington Department of Transportation (WSDOT) standards. The costs were aggregated to the station-area in order to include all projects within a one-mile radius of a station. The following assumptions were utilized to determine the project costs:

- **Off-street path: $300 per linear foot**

  This cost assumes a 16 foot-wide asphalt paved trail with two foot gravel shoulders on each side, signage assumed every 1/4 mile both directions and continuous six foot wide lawn along one side of trail. Improvements required include curb and gutter, curb ramps, drainage infrastructure adjustments and installation, and minimal power pole relocation.

- **Cycletrack: $300 per linear foot**

  This cost assumes a seven foot-wide, one-way facility on each side of street along curb line. Improvements assumed include a three foot-wide continuous striped separation with vertical mountable traffic barrier, bike symbol, and "bike only" with informational signage every 1/4 mile. This cost estimate assumes that, on average, a cycletrack could require up to four new traffic signals per mile.

- **Bike Lane: $100 per linear foot**

  This cost assumes a six foot-wide, one-way facility on each side of street along curb line. Also assumed are bike symbol and "bike only" with informational signage every 1/4 mile. This estimate assumes that, on average, the bike lane would require up to two new traffic signals per mile.

- **New Street: $800 per linear foot**

  This cost assumes eight foot-wide buffered bike lanes, six foot-wide planting and six foot-wide sidewalk in both sides to be constructed. Costs include basic storm drainage installation including curb & gutter, inlets catch basins and pipe installation. This estimate does not include the cost of right-of-way or the cost of the travel lanes. This cost estimate assumes that these roads would not be built in the absence of new development that would pay for the basic roadway infrastructure and right-of-way.

- **Sidewalk: $500 per linear foot**

  This cost assumes curb and gutter, six foot-wide planting strip, and six foot-wide concrete sidewalk on each side of street.

- **Signals/intersection Improvements: $250,000 each location**

  This cost assumes new signal equipment, including poles, masts, controllers, loop detectors, and electrical components. Engineering design and installation costs are also assumed.

DEMOGRAPHICS AND TRANSIT SERVICE PROXIMITY

This measure provides a gauge of how well the projects serve certain demographic groups that tend to be more reliant on transit (young and elderly populations). Additional weight was also given to projects that were within a half-mile of other transit stops, with the idea that these projects could benefit transit stops other than the one being analyzed.

Demographic data was obtained from the 5-year 2011 ACS block group dataset. The traffic analysis zones (TAZ) from the Puget Sound Regional Council provided the population and employment change data for a 20 year horizon. Transit stop location data were obtained from the transit agencies. Utilizing a half-mile buffer, the following demographic and transit service variables were calculated for each transit stop-area:

- Percent station-area population under 24
- Percent station-area population over 60
- Percent change in population over 20 year horizon
- Percent change in employment over 20 year horizon
- Total number of Community Transit, Pierce Transit, and King County Metro, and Sound Transit stops within a half-mile buffer

DAILY RIDERSHIP PRIORITIZATION RESULTS

This section highlights the project-types that performed best at increasing daily ridership. The results for the percent change in daily ridership are presented first, followed by the net change in daily ridership. Percent change in ridership could be viewed as a longer-term variable that couples well with planned changes to land use or transit network growth. Areas that could experience a lot of growth in transit ridership and a large percentage increase in non-motorized connectivity ridership could be good targets for mid to long-term investments. The net change in ridership could be viewed as a near-term prioritization metric, since it is based on a calculation of new daily riders (based on exiting ridership) at a transit stop.

Percent Change in Daily Ridership

Table 20 highlights the projects that produced the largest change in connectivity and therefore the largest percent change in daily ridership. **Appendix B** contains the full list of projects ranked by change in ridership. Note that many of the projects are "new streets" as well as off-street trails and cycletracks. These types of projects had the greatest effect on the RDI and signalized arterial scores, which make up a large portion of the connectivity composite. Additionally, new greenways in Seattle provided a substantial improvement in the signalized arterial score.

Table 20: Top 40 Project Types with the Largest Percent Change in Daily Ridership

Stop Location	***Area***	***Project Type***	***% Change in Daily Ridership***
OVERLAKE VILLAGE	Redmond	New Streets	7.9%
*INTERNATIONAL BLVD & S 180TH ST	SeaTac	New Streets	7.2%
NORTHGATE TC	Seattle	Off-street Trails / Cycletracks**	6.8%
*STRANDER BLVD & ANDOVER PARK E	Tukwila	New Streets	6.4%
FEDERAL WAY TC	Federal Way	New Streets	6.3%
INTERNATIONAL BLVD & S 176TH ST	SeaTac	New Streets	6.2%
OVERLAKE VILLAGE	Redmond	Off-street Trails / Cycletracks**	6.1%
*ANDOVER PARK W & MINKLER BLVD	Tukwila	New Streets	5.9%
*156TH AVE NE & NE 31ST ST	Redmond	New Streets	5.6%
MERIDIAN AVE N & N 105TH ST	Seattle	Off-street Trails / Cycletracks	5.6%
*156TH AVE NE & NE 28TH ST	Redmond	New Streets	5.3%
*NE 8TH ST & 124TH AVE NE	Bellevue	New Streets	4.9%
LYNNWOOD TC	Lynnwood	New Streets	4.3%
REDMOND TC	Redmond	Off-street Trails / Cycletracks	4.3%
ANDOVER PARK W & BAKER BLVD	Tukwila	New Streets	4.2%
*156TH AVE NE & NE 31ST ST	Redmond	Off-street Trails / Cycletracks	4.2%
15TH AVE NW & NW 85TH ST	Seattle	Greenways / Signalized Crossings	4.1%
*NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Greenways / Signalized Crossings	4.0%
STRANDER BLVD & ANDOVER PARK W	Tukwila	New Streets	4.0%
*ANDOVER PARK W & TRILAND DR	Tukwila	Off-street Trails / Cycletracks	3.8%
15TH AVE NW & NW MARKET ST	Seattle	Greenways / Signalized Crossings	3.4%
*156TH AVE NE & NE 28TH ST	Redmond	Off-street Trails / Cycletracks	3.4%
*S 180TH ST & SPERRY DR	Tukwila	New Streets	3.4%
15TH AVE NW & NW LEARY WAY	Seattle	Greenways / Signalized Crossings	3.4%
E THOMAS ST & 16TH AVE E	Seattle	Greenways / Signalized Crossings	3.4%
TOTEM LAKE TC	Kirkland	New Streets	3.3%
CALIFORNIA AVE SW & SW FINDLAY ST	Seattle	Greenways / Signalized Crossings	3.3%
FEDERAL WAY TC	Federal Way	Off-street Trails / Cycletracks	3.2%
15TH AVE W & W DRAVUS ST	Seattle	Off-street Trails / Cycletracks	3.1%
156TH AVE NE & NE 24TH ST	Bellevue	New Streets	3.1%
BEACON HILL	Seattle	Off-street Trails / Cycletracks	3.1%
*1ST AVE NE & NE 95TH ST	Seattle	Greenways / Signalized Crossings	3.1%
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	3.0%
AURORA AVE N & N NORTHGATE WAY	Seattle	Off-street Trails / Cycletracks	3.0%
5TH AVE NE & NE 103RD ST	Seattle	Greenways / Signalized Crossings	2.9%
*15TH AVE E & E ROY ST	Seattle	Greenways / Signalized Crossings	2.9%
E MADISON ST & 17TH AVE	Seattle	Greenways / Signalized Crossings	2.8%
PACIFIC HWY S & S 312TH ST	Federal Way	New Streets	2.7%
INTERNATIONAL BLVD & S 200TH ST	SeaTac	Off-street Trails / Cycletracks	2.6%

*Stops with daily boardings below 200. Percent change for these stops may be overestimated based on model results
**Also includes pedestrian bridge

Potential Change in Net Daily Ridership

To determine the station-area project types that produced the largest change in net daily ridership, the percent change in ridership was applied to the existing observed boarding totals for each transit stop/station. This method of estimating/forecasting ridership is standard practice in the travel demand modeling/forecasting field and is known as the "difference method." It reduces the model's error by determining the change forecasted in the model and applying that change to a known value (existing daily boardings in this case). **Table 21** highlights the top 30 locations. **Appendix C** contains the full list of projects ranked by change in net daily ridership. In this case, there is a greater variation in project types because stations with high existing daily ridership and a moderate percent change in ridership can score well. Under this metric, project types such as new sidewalks and bike lanes are rated higher than they were in the previous metric. For example, new bike lanes in Bellevue Transit Center station area generated a 1.2% change in ridership, which amounts to 87 additional boardings.

Table 21: Top 30 Project Types with the Largest Change in Net Daily Ridership

Stop Location	*Area*	*Project Type*	*Percent Change in Daily Ridership*	*Potential New Daily Boardings*	*Cost ($ millions)*	*Annual Cost per Annual Rider*
NORTHGATE TC	Seattle	Off-street Trails / Cycletracks*	6.8%	443	$31.2	$19
WESTLAKE STATION	Seattle	Off-street Trails / Cycletracks	1.9%	329	$15.7	$13
3RD AVE & UNION ST	Seattle	Off-street Trails / Cycletracks	1.9%	249	$13.3	$14
FEDERAL WAY TC	Federal Way	New Streets	6.3%	149	$10.4	$19
NORTHGATE TC	Seattle	Greenways / Signalized Crossings	2.2%	140	$4.5	$9
NORTHGATE TC	Seattle	Bike Lanes	1.8%	116	$2.8	$6
MT BAKER	Seattle	Greenways / Signalized Crossings	2.1%	88	$3.0	$9
BELLEVUE TC	Bellevue	Bike Lanes	1.2%	87	$2.2	$7
BEACON HILL	Seattle	Off-street Trails / Cycletracks	3.1%	87	$15.2	$47
MT BAKER	Seattle	Off-street Trails / Cycletracks	1.9%	83	$10.5	$34
REDMOND TC	Redmond	Off-street Trails / Cycletracks	4.3%	76	$10.4	$36
INTERNATIONAL BLVD & S 176TH ST	SeaTac	New Streets	6.2%	76	$6.6	$23
FEDERAL WAY TC	Federal Way	Off-street Trails / Cycletracks	3.2%	75	$7.4	$26
15TH AVE NE & NE CAMPUS PKWY	Seattle	Off-street Trails / Cycletracks	1.0%	65	$14.1	$58
BURIEN TC	Burien	Bike Lanes	2.4%	65	$2.5	$10
3RD AVE & COLUMBIA ST	Seattle	Off-street Trails / Cycletracks	0.8%	60	$11.7	$52
BELLEVUE TC	Bellevue	Off-street Trails / Cycletracks	0.7%	51	$8.9	$46
BEACON HILL	Seattle	Greenways / Signalized Crossings	1.8%	51	$2.5	$13
LYNNWOOD TC	Lynnwood	New Streets	4.3%	48	$8.9	$49
SENECA ST & 4TH AVE	Seattle	Off-street Trails / Cycletracks	0.7%	47	$13.1	$74
15TH AVE NW & NW MARKET ST	Seattle	Greenways / Signalized Crossings	3.4%	47	$6.0	$35
5TH AVE S & S JACKSON ST	Seattle	Off-street Trails / Cycletracks	0.4%	46	$11.6	$67
15TH AVE NW & NW 85TH ST	Seattle	Greenways / Signalized Crossings	4.1%	46	$4.0	$24
INT'L DISTRICT STATION	Seattle	Off-street Trails / Cycletracks	1.1%	44	$11.0	$66
FEDERAL WAY TC	Federal Way	Bike Lanes	1.8%	42	$2.2	$13
15TH AVE NE & NE CAMPUS PKWY	Seattle	Bike Lanes	0.6%	40	$0.6	$4
OTHELLO	Seattle	Off-street Trails / Cycletracks	1.9%	39	$11.8	$81
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Greenway / Signalized Crossings	1.9%	37	$3.0	$22
ISSAQUAH TC	Issaquah	New Streets	2.4%	36	$4.3	$32
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Off-street Trails / Cycletracks	1.8%	36	$6.1	$46

*Also includes pedestrian bridge

DEMOGRAPHIC AND TRANSIT SERVICE

As described above, the project team also tested a prioritization measure that blends ridership, project cost, station-area demographics, and project proximity to other transit stops. The results of the demographic and transit service scoring metric are shown below. A detailed explanation of the ranking methodology can be found in **Appendix D**. **Table 22** identifies the station-areas with the highest scores.

Table 22: Demographic and Transit Service Scoring Metric

Stop Location	***Area***	***Percent Under 24***	***Percent Over 60***	***Percent Change in Pop.***	***Percent Change in Emp.***	***Transit Agency Stop Score***	***Total Score***
S 154TH ST & 32ND AVE S	SeaTac	4.0	2.0	1.0	4.5	0.5	12.0
BOEING ACS & S LONGACRES WAY	Tukwila	3.0	2.0	5.0	2.0	0.5	12.0
INTERNATIONAL BLVD & S 208TH ST	SeaTac	2.0	3.6	1.4	4.6	0.3	11.8
SENECA ST & 4TH AVE	Seattle	1.0	4.4	1.3	1.5	3.0	11.3
5TH AVE S & S JACKSON ST	Seattle	1.0	4.1	1.4	1.6	3.0	11.1
NE 8TH ST & 124TH AVE NE	Bellevue	2.0	4.0	1.9	2.4	0.5	10.8
PREFONTAINE PL S & YESLER WAY	Seattle	1.0	3.9	1.0	1.9	2.9	10.6
WESTLAKE STATION	Seattle	1.0	3.8	1.0	1.9	2.9	10.5
SOUTH TACOMA	Tacoma	4.0	2.0	1.3	2.4	0.8	10.5
FEDERAL WAY TC	Federal Way	3.3	3.5	1.0	1.9	0.8	10.4
INTERNATIONAL BLVD & S 180TH ST	SeaTac	2.2	3.6	1.0	2.0	1.5	10.4
EVERETT SOUNDER	Everett	2.4	2.8	1.6	3.6	0.1	10.4
ISSAQUAH TC	Issaquah	2.0	3.5	1.0	3.1	0.6	10.3
NE 8TH ST & 140TH AVE NE	Bellevue	2.0	3.5	3.1	1.0	0.6	10.2
15TH AVE NE & NE 45TH ST	Seattle	5.0	1.0	1.0	1.0	2.2	10.2
DENNY WAY & STEWART ST	Seattle	1.0	3.0	1.0	2.2	3.0	10.2
NE PACIFIC ST & NE PACIFIC PL	Seattle	2.1	3.8	1.0	1.9	1.4	10.2
INTERNATIONAL BLVD & S 176TH ST	SeaTac	2.7	2.3	1.0	2.9	1.1	10.0
148TH AVE NE & NE OLD REDMOND	Redmond	2.0	3.0	1.0	3.0	1.0	10.0
SW 148TH ST & AMBAUM BLVD SW	Burien	2.0	4.0	1.0	2.0	1.0	10.0
MONTLAKE BLVD NE & NE 45TH ST	Seattle	4.8	1.3	1.0	2.6	0.4	10.0
15TH AVE NE & NE CAMPUS PKWY	Seattle	4.9	1.0	1.0	1.4	1.8	10.0
FAIRVIEW AVE N & HARRISON ST	Seattle	1.0	3.0	1.0	3.0	2.0	10.0
E DENNY WAY & BELLEVUE AVE E	Seattle	1.0	3.0	1.0	3.0	2.0	10.0

As shown above, a mix of areas are represented in some of the high-scoring stop-areas. The first three locations are in Tukwila and SeaTac and have a good mix of young/older residents and a high level of planned growth. Several Downtown Seattle stops follow, which have a high proportion of elderly people and high transit stop densities.

AGGREGATE MEASURE

Combining all the prioritization measures described above, the team developed an Aggregate Rating each project-type. The demographic and transit service metric was adjusted to a ten-point scale in order to align with the ridership and cost per rider metrics. **Table 23** highlights the top 25 projects. **Appendix E** contains the full list of projects ranked by the aggregate prioritization measure.

Table 23: Aggregate Stop-Area Project Rankings

Stop Location	***Area***	***Project Type***	***Percent Change in Ridership***	***Estimated Cost ($millions)***	***Demo./ Pop/Emp Change Score***	***Pct. Change Ridership Score***	***Cost per Rider Score***	***Aggregate Score***
FEDERAL WAY TC	Federal Way	New Streets	6.3%	$10.35	9.2	7.2	7.5	24.0
INTERNATIONAL BLVD & S 176TH ST	SeaTac	New Streets	6.2%	$6.58	8.9	7.1	7.5	23.4
NORTHGATE TC	Seattle	Off-street Trails / Cycletracks*	6.8%	$31.21	7.0	7.8	7.5	22.3
BURIEN TC	Burien	Bike Lanes	2.4%	$2.48	8.3	2.7	10.0	21.1
FEDERAL WAY TC	Federal Way	Off-street Trails / Cycletracks	3.2%	$2.48	9.2	3.7	7.5	20.4
15TH AVE NW & NW 85TH ST	Seattle	Greenways / Signalized Xings	4.1%	$7.39	8.1	4.7	7.5	20.3
MT BAKER	Seattle	Greenways / Signalized Xings	2.1%	$4.00	7.9	2.3	10.0	20.3
PREFONTAINE PL S & YESLER WAY	Seattle	Bike Lanes	0.6%	$3.00	9.4	0.7	10.0	20.0
15TH AVE NE & NE CAMPUS PKWY	Seattle	Bike Lanes	0.6%	$0.85	8.8	0.7	10.0	19.5
NORTHGATE TC	Seattle	Greenways / Signalized Xings	2.2%	$0.59	7.0	2.5	10.0	19.5
BELLEVUE TC	Bellevue	Bike Lanes	1.2%	$4.50	8.1	1.4	10.0	19.5
15TH AVE NE & NE CAMPUS PKWY	Seattle	Greenways / Signalized Xings	0.4%	$2.22	8.8	0.4	10.0	19.3
NORTHGATE TC	Seattle	Bike Lanes	1.8%	$1.00	7.0	2.1	10.0	19.1
WESTLAKE STATION	Seattle	Off-street Trails / Cycletracks	1.9%	$2.85	9.3	2.1	7.5	18.9
SODO BUSWAY & S LANDER ST	Seattle	Bike Lanes	1.8%	$15.69	6.8	2.1	10.0	18.9
S JACKSON ST & 12TH AVE S	Seattle	Greenways / Signalized Xings	0.5%	$0.55	8.3	0.5	10.0	18.9
FEDERAL WAY TC	Federal Way	Bike Lanes	1.8%	$0.50	9.2	2.1	7.5	18.8
MT BAKER	Seattle	New Streets	0.6%	$2.16	7.9	0.7	10.0	18.6
AURORA VILLAGE TC	Shoreline	Bike Lanes	1.8%	$0.59	8.7	2.1	7.5	18.2
OVERLAKE VILLAGE	Redmond	New Streets	7.9%	$1.27	8.1	9.1	1.0	18.1
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Greenways / Signalized Xings	1.5%	$23.22	8.6	1.7	7.5	17.8
INTERNATIONAL BLVD & S 182ND ST	SeaTac	New Streets	6.1%	$2.50	8.7	7.0	2.0	17.6
1ST AVE W & W MERCER ST	Seattle	Bike Lanes	1.2%	$6.58	6.1	1.4	10.0	17.4
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Bike Lanes	1.2%	$0.34	8.6	1.4	7.5	17.4
3RD AVE & UNION ST	Seattle	Off-street Trails / Cycletracks	1.9%	$1.14	7.8	2.1	7.5	17.4

*Also includes pedestrian bridge

ADDITIONAL NOTES ON PROJECT PRIORITIZATION

In reviewing the different project prioritization results, some patterns emerged about which types of connectivity projects yielded the greatest number of new daily transit riders. These patterns varied somewhat based on the location or "placetype" of the transit stops. **Table 24** summarizes the key observations.

Table 24: Demographic and Transit Service Scoring Metric

Placetype	***Placetype Description***	***Most Beneficial Improvement Types***
New Town Centers	Typically suburban areas that have plans to transform commercial/ industrial areas to transit-oriented mixed use development (e.g., Overlake Village, Southcenter, Federal Way TC)	• New street connections (results in greater intersection and sidewalk density, better RDI) • Additional signalized arterial crossings • Off-street bicycle trails/cycletracks
Seattle Link Light Rail Stations	Existing Link light rail stations in Seattle, outside of Downtown (e.g., Mount Baker, Othello)	• Signalized arterial crossings (often associated with proposed Greenways) • Cycletracks and bike lanes
Major Seattle Bus Stops	High-ridership bus stops in Seattle, (over 300 boardings per day) (e.g., Broadway/John Street, 15th/Market, California/Fauntleroy)	• Signalized arterial crossings (often associated with proposed Greenways) • Cycletracks and bike lanes
Downtown Areas	Major transit facilities in Downtown Seattle and Bellevue	• Bike lanes and cycletracks
Large Suburban Park-and-Ride Lots	Locations like Eastgate, Issaquah, Burien	• Signalized arterial crossings • Bike lanes and off-street trails
Other Bus Stops	Moderate-ridership bus stops	• Signalized arterial crossings • Bike lanes and cycletracks

Table 24 indicates that adding new streets, which increase intersection density, sidewalk density, and reduce RDI tend to have the greatest benefit in the "New Town Center" areas that are commonly planned around major suburban transit facilities. To complement these improvements, signalized arterial crossings also substantially improve access and increase daily transit ridership. These areas also tend to have high stress roads near the transit centers. While the new streets can reduce stress, access is often

constrained by a major barrier, like a freeway, which is best addressed through off-street trails or cycle tracks parallel to major arterials that access the transit center.

In most of the other placetypes, signalized arterial crossings and improved bicycle facilities tended to yield the most benefit. This is in part due to the fact that most of the study area has good sidewalk coverage, but the study bus stops tend to be along busy, high-stress arterial streets with infrequent crossing opportunities. In downtown areas that tend to have excellent sidewalks and small street grids, reducing bicycle stress resulted in the largest gains. Suburban park-and-ride lots would likely benefit from new street connections, but these are not generally proposed in areas not poised to redevelop. Therefore, in these locations off-street trails emerge as strong projects, along with signalized arterial crossings.

As previously noted, due to the regional nature of the model, some project types would not show a change in the connectivity score and thus, ridership, even if the projects would result in a meaningful improvement to the quality of the pedestrian and bicycling environment. These types of improvements include wider sidewalks, illumination, repaving, and bicycle lockers. In addition, very small-scale projects, such as filling in a few dozen feet of missing sidewalk could tend to be missed using the analysis tools. The Case Study Chapter describes how these types of items were addressed through several specific example applications of the connectivity tools.

11. MARKET ANALYSIS

In addition to providing a means to identify and prioritize non-motorized network improvement projects, the connectivity index developed earlier can be combined with other transit and land use metrics to perform large-scale planning analyses. This chapter summarizes an area-wide analysis of transit usage, land use, and non-motorized connectivity to categorize the study area into three groups:

- **Marketing Potential:** Areas with good connectivity and good transit service, but lower public transit mode share
- **Investment Potential**: Areas that exhibit moderate to high density and good transit service, but with poor connectivity and low public transit mode share
- **Zoning Potential:** Areas with good connectivity and transit service, but low population density and public transit mode share

The following methodology was developed to identify the areas that fit the profiles described above:

1. Public transit mode share from the 2011 five-year ACS commute trip profiles at a block group level was assigned to each stop-area utilizing a half-mile buffer
2. The average population density for each station was determined based on a half-mile area using ACS population data at the block-group level
3. The existing non-motorized connectivity index for each transit stop/station in the study area was determined via the process defined in the existing conditions section of this report
4. Stop/station-areas were scored for each variable based on a combination of the factors listed above

To understand how station-areas rate within the region, the factors were scored based on quartile bins of the underlying data. For example, the top 25% station-areas exhibited a connectivity index above 3.75 while the bottom 25% scored below 3.15. Because population density was primarily a factor for the Zoning Potential, the scores were only given half the weight for the Marketing and Investment Potential ratings. Stations with public transit mode share above 25% were precluded from the results to prevent bias because of Downtown Seattle stations. The stations in Downtown Seattle mostly exhibit high levels of transit mode share, connectivity and population density and their inclusion would have diminished any measurable differences between other areas.

Existing Connectivity Index

Connectivity Index	Index Score: Marketing*	Investment*	Zoning*
<3.15	1	5	1
3.15 – 3.49	2	3	2
3.50 – 3.74	3	2	3
>3.75	5	1	5

Public Transit Mode Share

Public Transit	Index Score: Marketing	Investment	Zoning
<10%	5	5	5
10-14%	3	3	3
15-20%	2	2	2
>20%	1	1	1

Population Density

Population Density (people/acre)	Index Score: Marketing	Investment	Zoning
<10	0.5	0.5	5
10-14	1	1	3
15-25	1.5	1.5	2
>25	2.5	2.5	1

* Notes:

Marketing: Good connectivity and transit service, lower transit mode share

Investment: Moderate/high density, good transit service, poor connectivity

Zoning: Good connectivity and transit service, but low densities

RESULTS

Marketing Potential

In general, areas within Seattle scored the best due to relatively high existing connectivity scores and generally high population density values as shown in **Table 25**. In particular, areas in West Seattle and along the Aurora Corridor scored well while more suburban areas did not score as highly due to either lower connectivity scores or lower population density. Note that most of the areas with higher connectivity scores and population densities tended to have relatively high public transit usage as well. Burien and Shoreline are examples with lower existing transit mode shares. Despite the relatively high public transit usage, there are still a large number of trips that could be made by transit, and thus these areas are ripe for additional marketing to point out that transit is accessible. **Figure 31** highlights the marketing potential present in the study area. Because the underlying data was based upon the Census Block Group, the maps utilize this unit of analysis for score visualization purposes.

Table 25: Station Areas with High Potential for Marketing Efforts

Nearby Stop Name	***Area***	***Percent Public Transit Use***	***Existing Connectivity***	***Population Density***	***Marketing Score***
DENNY WAY & DEXTER AVE N	Seattle	17%	3.91	36.5	9.5
1ST AVE & DENNY WAY	Seattle	17%	3.86	30.6	9.5
15TH AVE NW & NW 85TH ST	Seattle	13%	3.57	21.5	7.5
AMBAUM BLVD SW & SW 144TH ST	Burien	7%	3.63	8.3	7.5
AURORA AVE N & N 165TH ST	Shoreline	12%	3.50	11.5	7
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	15%	3.53	21.5	6.5
SW BARTON ST & 29TH AVE SW	Seattle	16%	3.60	16.6	6.5
AURORA AVE N & N 100TH ST	Seattle	18%	3.60	22.0	6.5
MERIDIAN AVE N & N NORTHGATE WAY	Seattle	17%	3.60	15.7	6.5

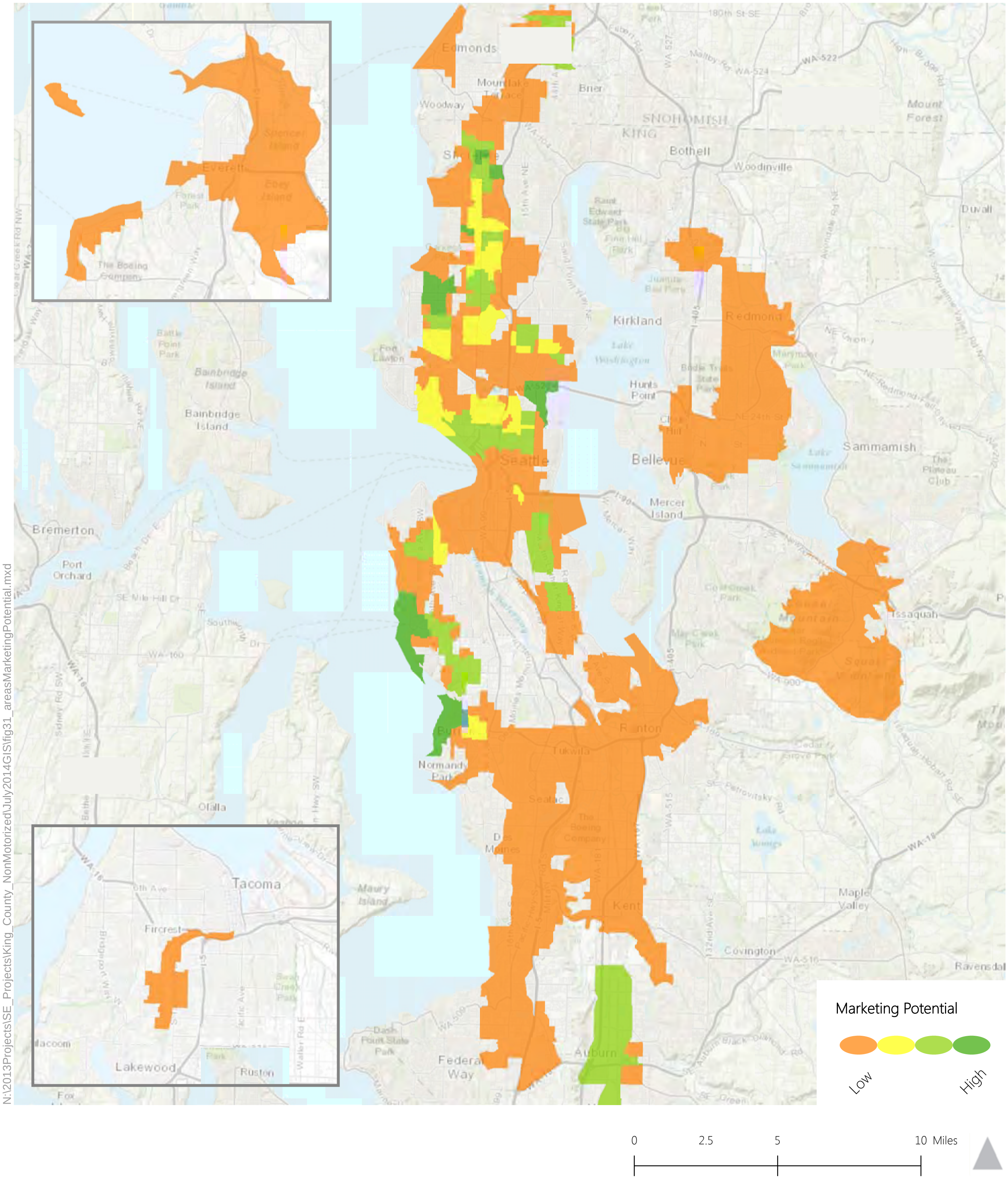

Figure 31

Station Areas with High Marketing Potential

Investment Potential

The results for the investment potential analysis were more varied between suburban and urban areas as shown in **Table 26**. Higher scoring areas included Federal Way, Everett, Mountlake Terrace, Des Moines, Edmonds, and Seattle. These areas exhibited lower scores in connectivity yet exhibited relatively high population densities. Providing improved connectivity to these relatively dense areas could boost ridership on the existing transit lines. **Figure 32** highlights the area-wide distribution of investment potential.

Table 26: Station Areas with High Potential for Infrastructure Investment

Nearby Stop Name	***Area***	***Percent Public Transit Use***	***Existing Connectivity***	***Population Density***	***Investment Score***
PACIFIC HWY S & S 260TH ST	Des Moines	5%	2.93	15.4	11.5
EVERETT STATION	Everett	9%	2.97	24.4	11.5
PACIFIC HWY S & S 288TH ST	Federal Way	7%	3.11	14.0	11
MOUNTLAKE TERRACE TC	Mountlake Terrace	8%	3.02	10.0	11
PACIFIC HWY S & S 240TH ST	Des Moines	6%	2.89	8.9	10.5
148TH AVE NE & NE 87TH ST	Redmond	8%	3.05	8.5	10.5
EDMONDS STATION	Edmonds	9%	2.88	8.5	10.5
AURORA AVE N & N 135TH ST	Seattle	10%	3.50	17.9	9.5

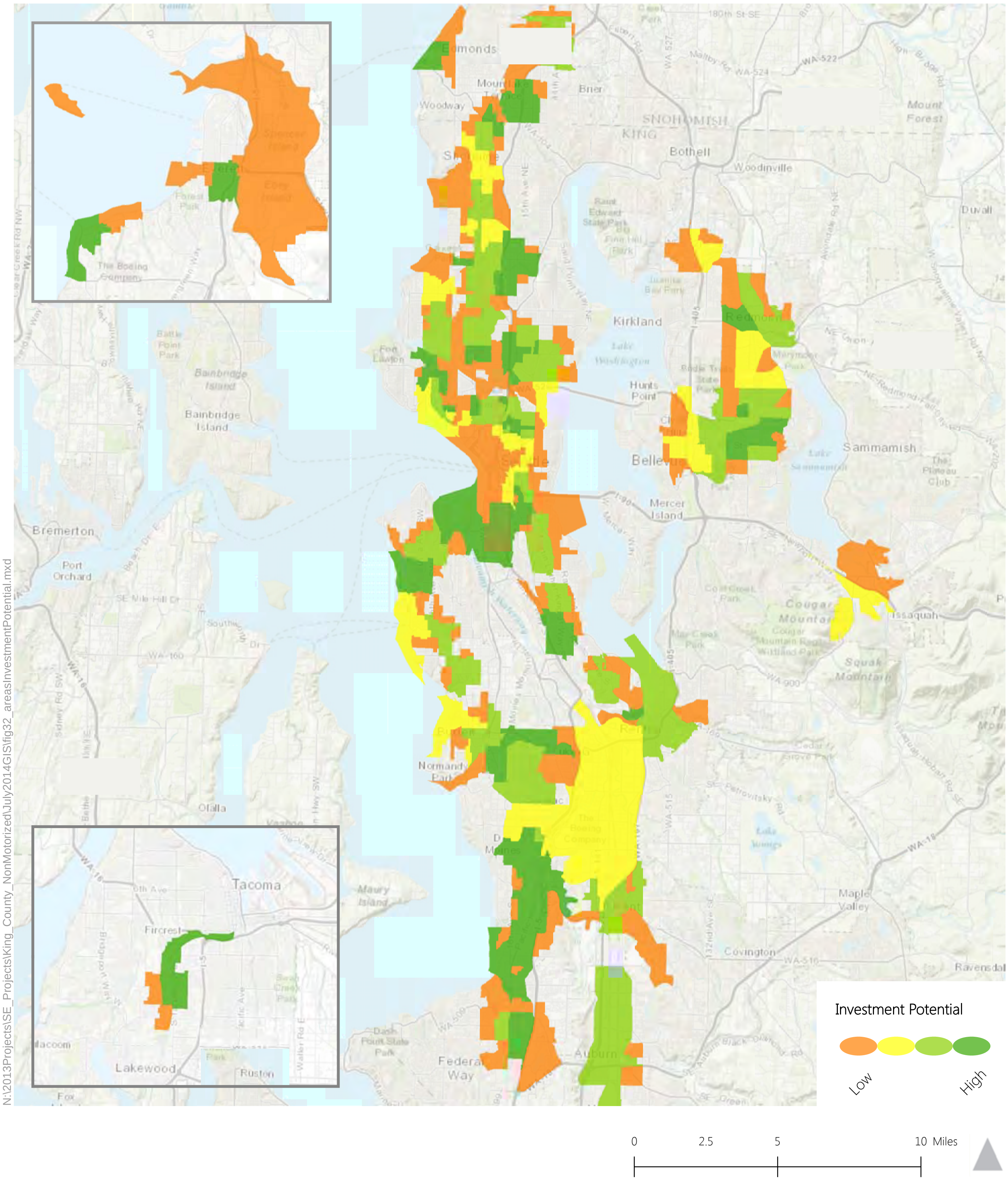

Figure 32

Station Areas with High Investment Potential

Zoning Change Potential

As shown in **Table 27**, the areas that exhibited the highest potential return from zoning changes also varied between suburban and urban areas. Burien, portions of West Seattle, Lynnwood, and Auburn all scored highly because of generally good connectivity and lower population density. Increased zoning or improved conditions to encourage redevelopment could increase population density and the pool of potential transit riders. **Figure 33** highlights those areas that scored the highest for potential zoning change.

Table 27: Station Areas with High Potential Return from Zoning Changes

Nearby Stop Name	***Area***	***Percent Public Transit Use***	***Existing Connectivity***	***Population Density***	***Zoning Score***
AMBAUM BLVD SW & SW 144TH ST	Burien	7%	3.63	8.3	13
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	13%	3.50	7.8	11
LYNNWOOD TC	Lynnwood	16%	3.52	5.5	10
AUBURN TC	Auburn	15%	3.64	4.4	10
NE PACIFIC ST & NE PACIFIC PL	Seattle	16%	3.87	10.5	10
AURORA AVE N & N 165TH ST	Seattle	12%	3.50	11.5	9
AURORA AVE N & 185TH ST	Seattle	24%	3.50	13.6	8
15TH AVE NW & NW 85TH ST	Seattle	13%	3.57	21.5	8

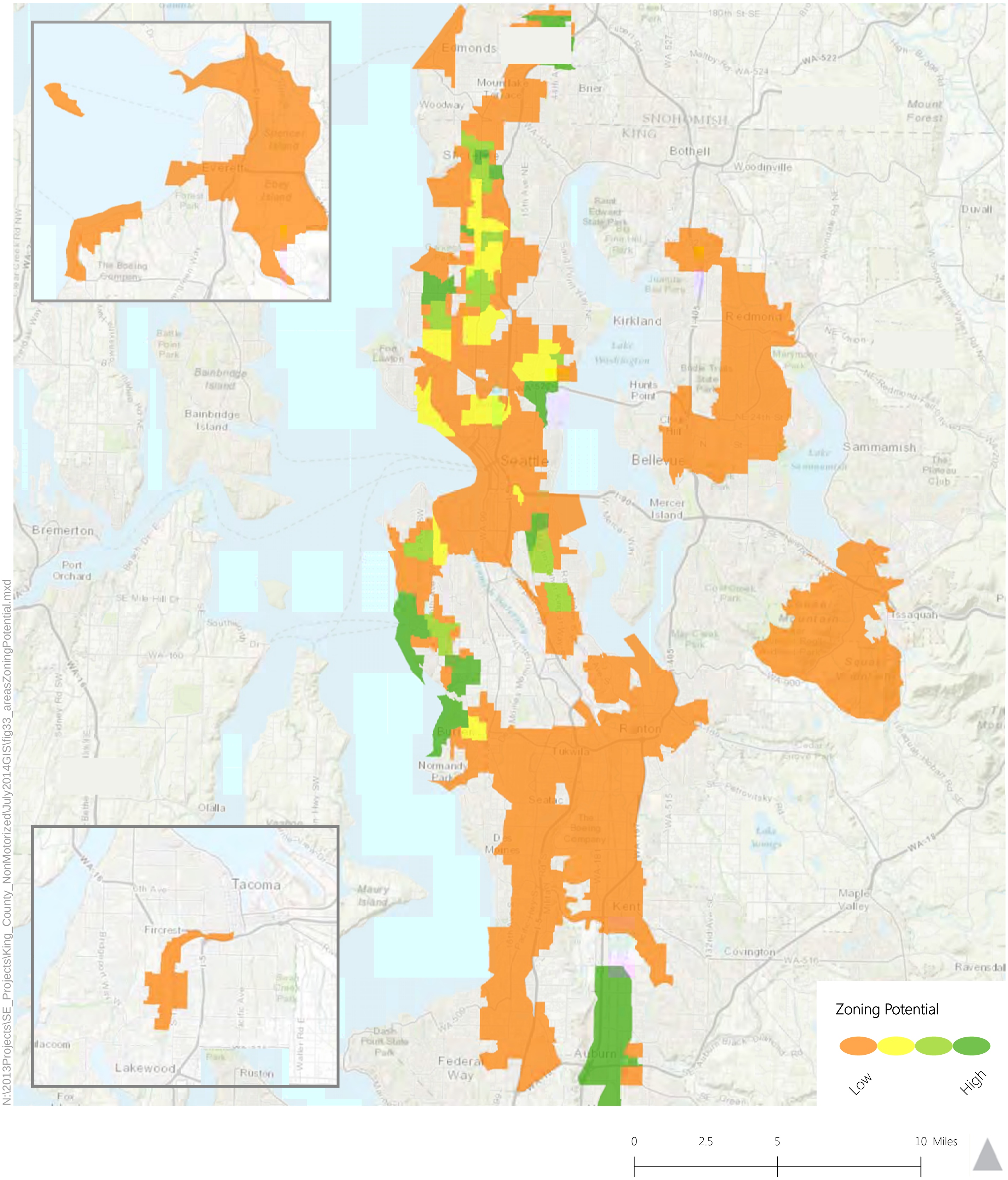

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Figure 33

Station Areas with High Zoning Potential

12. CASE STUDIES

This chapter summarizes four "case studies" where the project team applied the connectivity tools and regression model to achieve the following outcomes:

- Verify the connectivity data collected from some of the jurisdictions
- Verify the output of the connectivity tools
- Calibrate and validate the regression model
- Evaluate 2035 conditions at the case study locations to provide guidance on how to apply the tools developed in this study and identify potential "blind spots" that must be considered when applying the tools for future studies.

CASE STUDY LOCATIONS

The project team selected the following four locations for the case study tool applications:

- Northgate Transit Center - Seattle
- Overlake Village - Redmond
- Mount Baker Transit Center/Link Station - Seattle
- Federal Way Transit Center – Federal Way

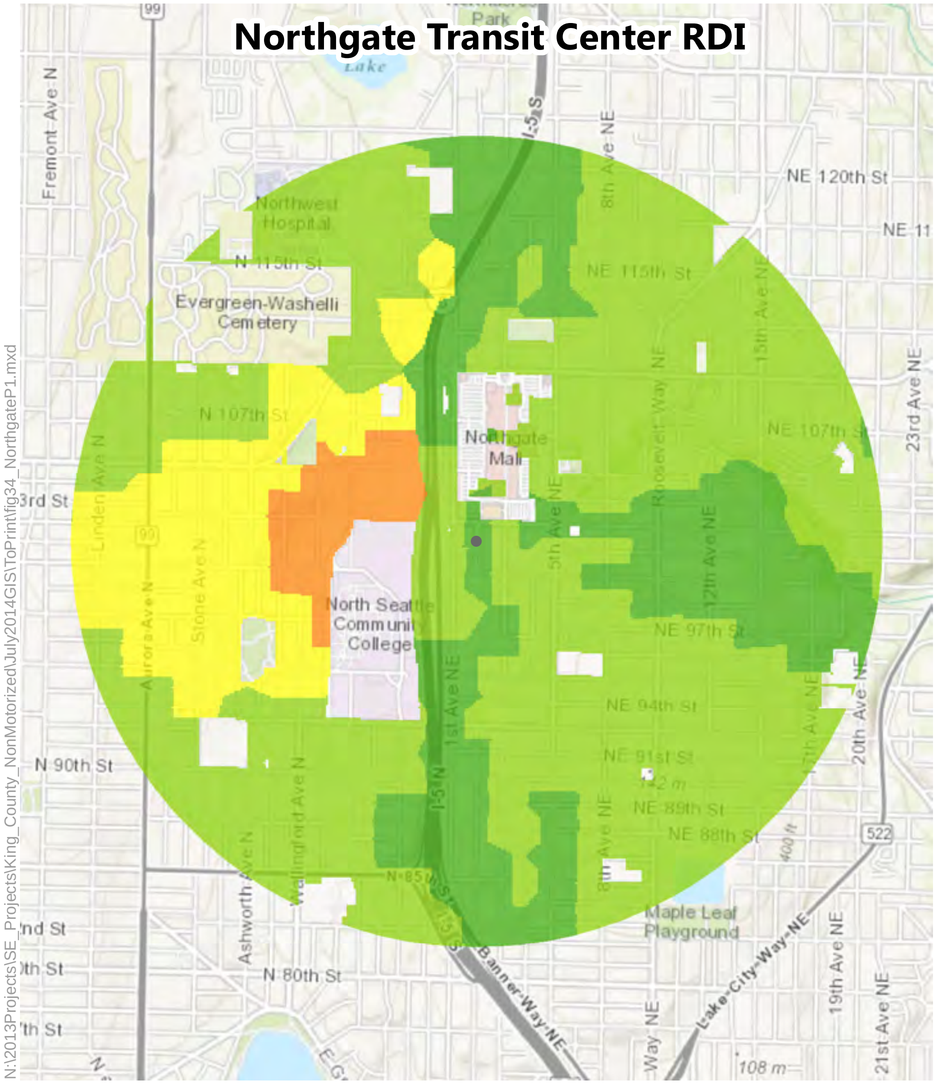
The project team chose these locations because they all have active transportation and land use planning efforts being undertaken by local jurisdictions, represent a variety of urban forms, and have varying degrees of existing non-motorized connectivity. Three of the four areas are future Link light rail stations (all but Mount Baker). The addition of Link substantially alters the transit service characteristics of the areas. All case study locations are expecting increased land use development intensities in the future. Understanding how well the model responds to these changes was an important element of the case studies.

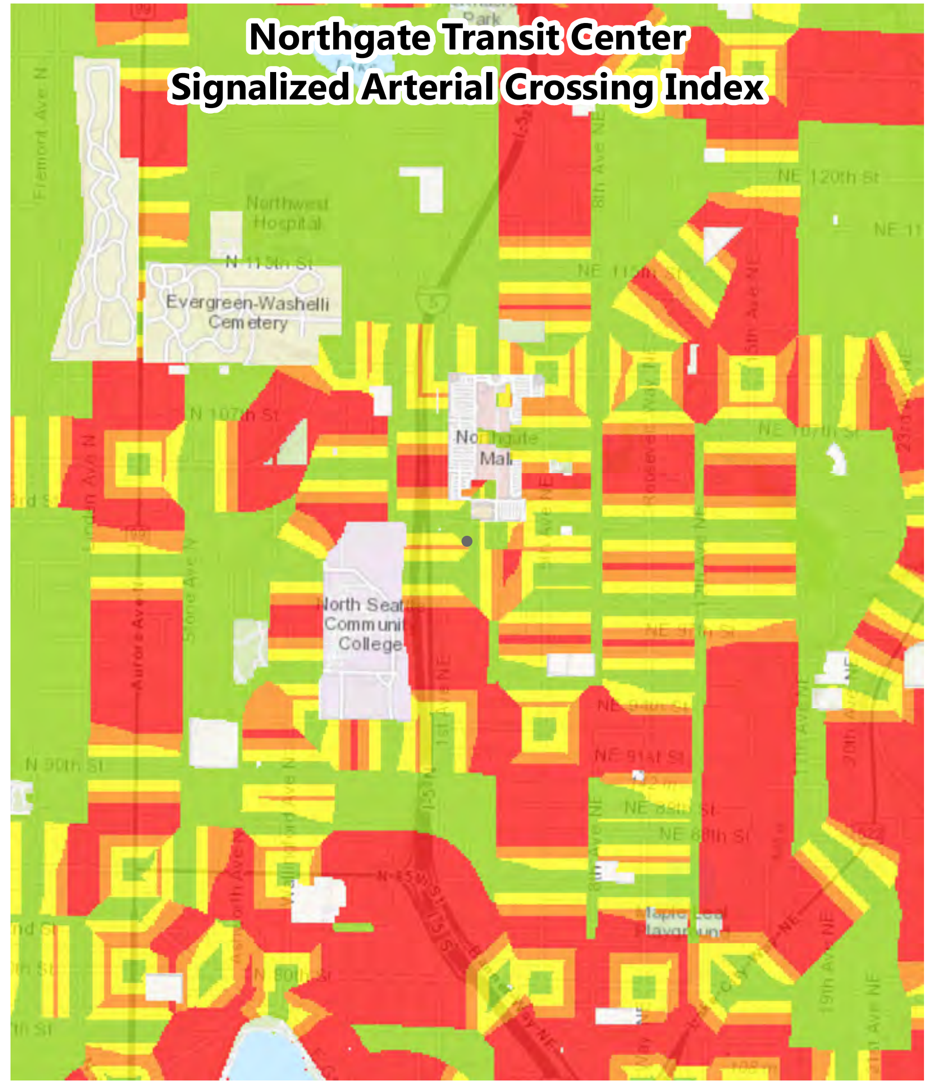
EXISTING CONDITIONS DATA VERIFICATION

Given the large study area and number of jurisdictions from which the project team collected existing conditions data, a detailed verification of the GIS data was not possible across the entire region. These case studies provided the opportunity for the team to go into the field and compare the jurisdiction's GIS data against actual conditions. Below is a summary of the findings by case study area. In general, the project team found that the jurisdiction GIS data were a good match to actual field conditions.

Northgate Transit Center

Figures 34 through 37 show the connectivity surfaces calculated from the existing conditions data in the Northgate Transit Center area:





Route Directness
High
Low

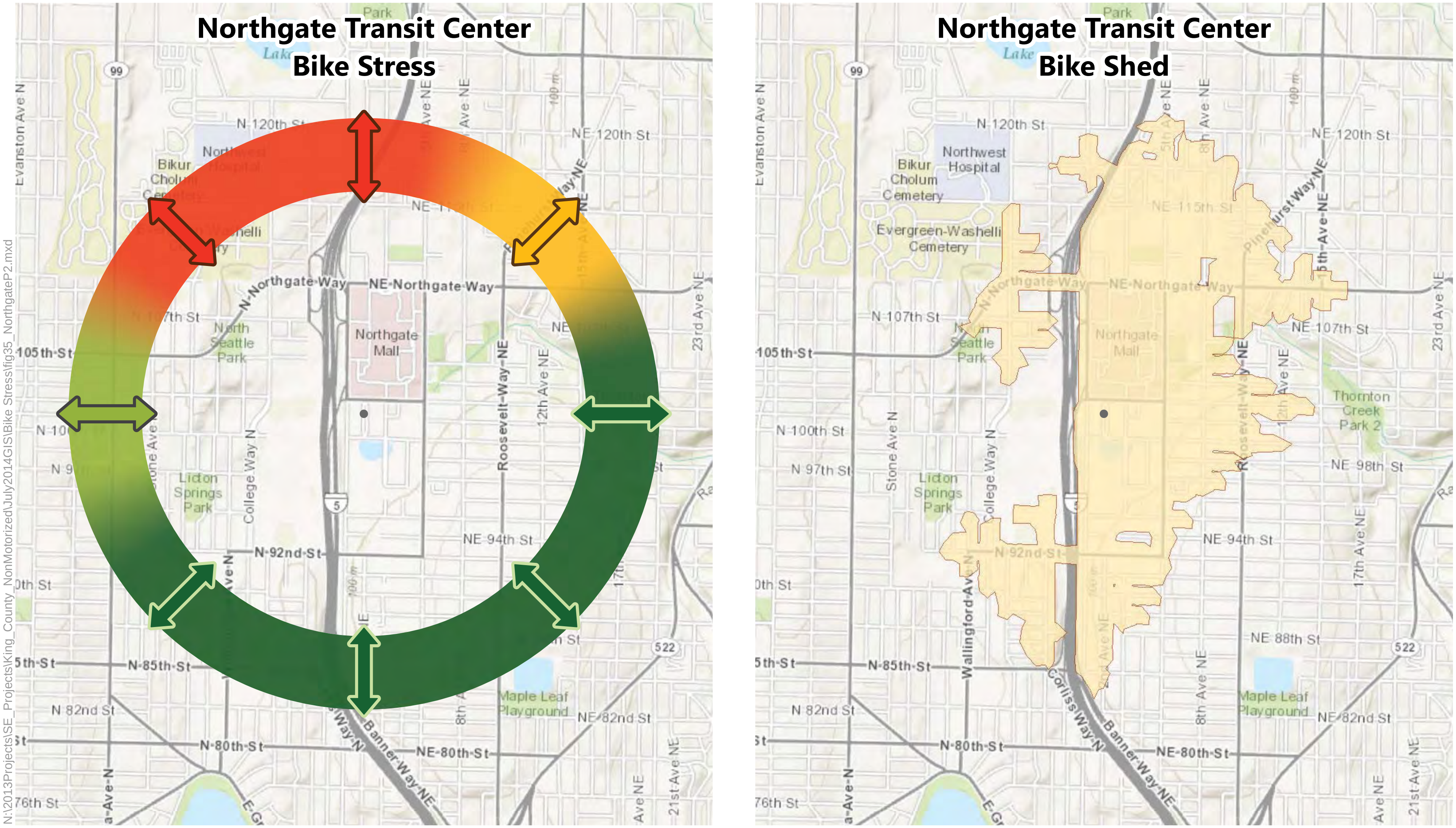
● Study Stations

Ease of Crossing
High
Low

0 0.25 0.5 1 Miles

Figure 34

Northgate Transit Center RDI and Signalized Arterial Crossing Index



N:\2013Projects\SE_Projects\King_County_NonMotorized\July2014GIS\Bike Stress\fig35_NorthgateP2.mxd

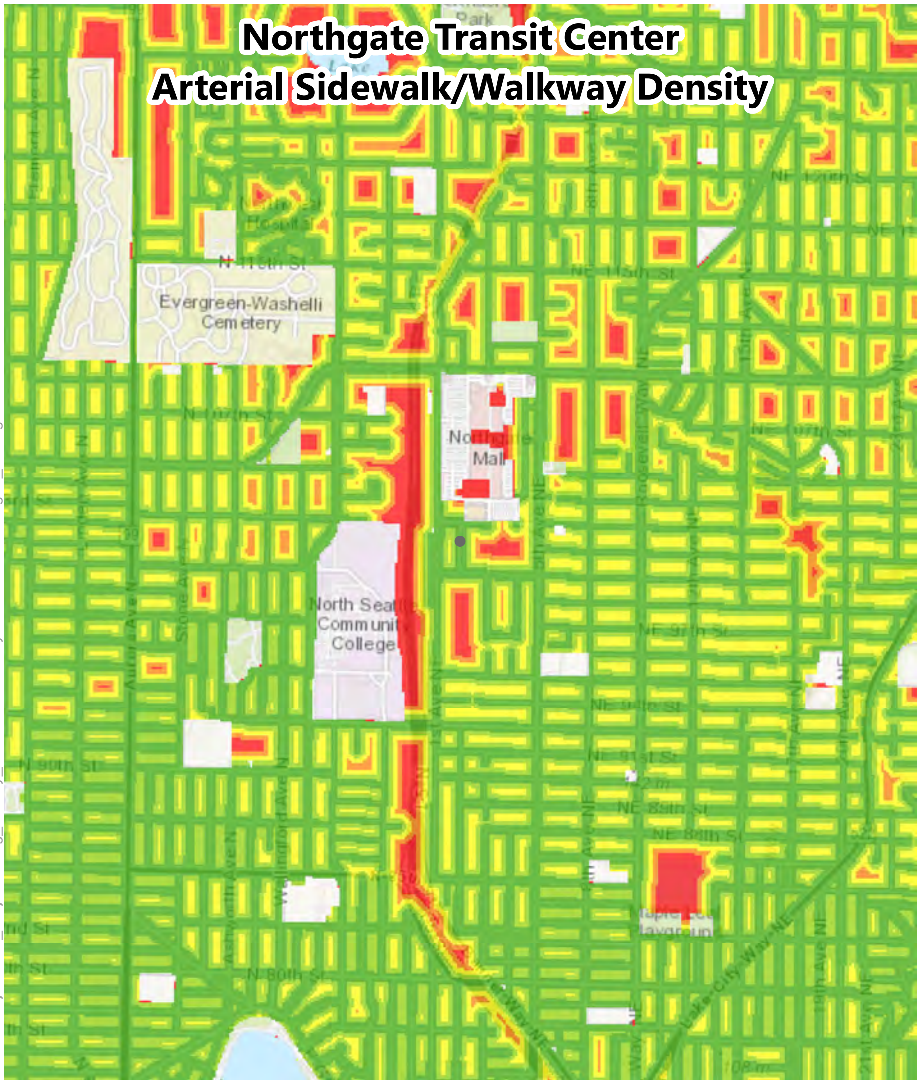
Bike Stress
- Low
- Medium
- High

- Study Stations
- 15-Minute Bike Shed

0 0.25 0.5 1 Miles

Figure 35

Northgate Transit Center Bike Stress and Bike Shed



Density
High
Low

● Study Stations

0 0.25 0.5 1 Miles

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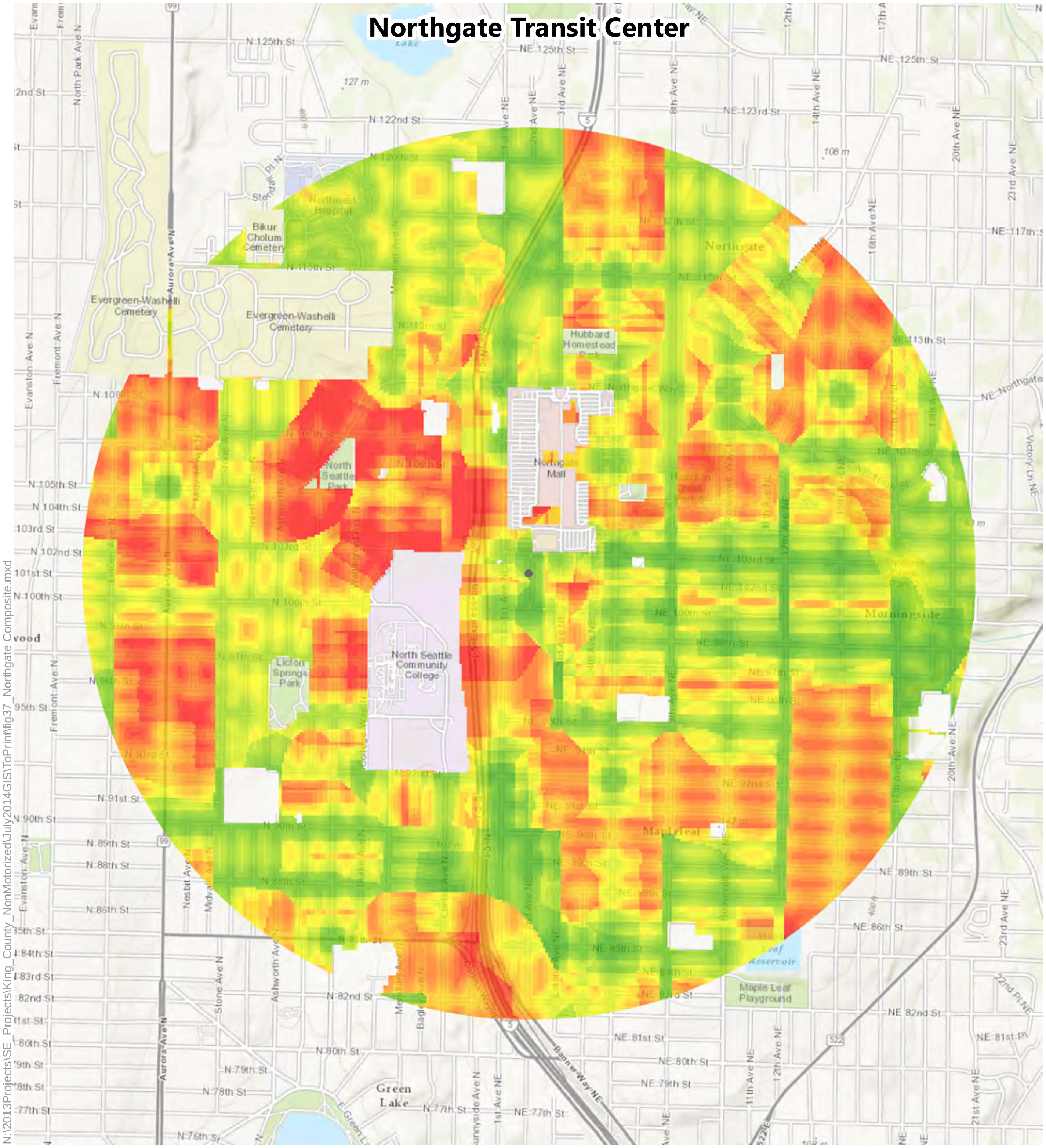
Figure 36

Northgate Transit Center
Arterial Sidewalk/Walkway Density and Intersection Density



Connectivity
High
Low

● Study Stations

0 0.125 0.25 0.5 Miles

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Figure 37

Northgate Transit Center
Composite Connectivity Scores

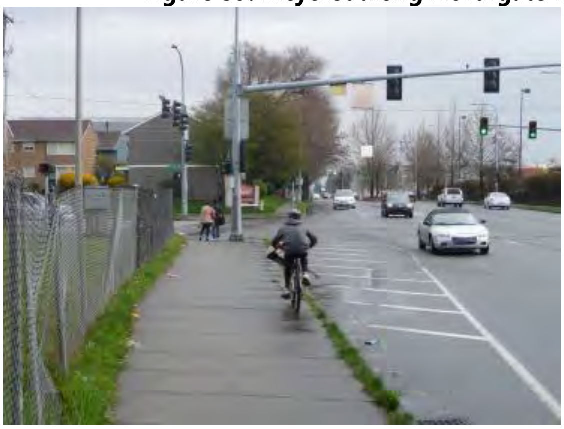
Based on the field work, the data shown in the connectivity surfaces generally matched our observations. Below are a few highlights for the Northgate area:

- The poor scoring area on the RDI map reflects the lack of connections across I-5 from the transit center.
- The field work verified the signalized arterial crossings; however, there were several flashing crosswalk beacons along College Way that were not accounted for since they are not traffic signals as defined by the City of Seattle. While unavailable in a standard data format, they act as signalized arterial crossings.
- Field data verified a lack of signalized crossings along Roosevelt Ave and 92nd Street, as shown; however, these are relatively narrow and low volume arterials compared to the “average” arterial in the county and crossing these streets is less challenging than wider arterials like Northgate Way.
- The bike stress results were confirmed. Traveling from the north and northwest requires traversing the I-5/Northgate interchange, which has no bicycle facilities and clearly meets the definition of a high stress route. When traveling from the south, there are several routes to choose from, many of them being lower-stress local streets. The bicycle travel shed does identify the terrain to the south and east, which limits the practicality of bicycling for many cyclists.

Below are some pictures taken during the field visit:

Figure 38: Pedestrian Underpass of I-5 and Unsignalized Crossing of Roosevelt Ave

Figure 39: Bicyclist along Northgate Way and Urban Form near Transit Center



While the GIS data from the City of Seattle matched our observations, the field work highlighted some additional considerations that were not captured in the GIS information:

- Sidewalk conditions are poor in some locations with broken panels that would be difficult to traverse by those with mobility limitations. Overgrowth in certain areas narrows the sidewalk as well.
- Urban form around the station is mixed with good pedestrian-scaled uses along portions of Northgate Way and 5th Avenue. 1st Avenue is not a great pedestrian environment, being adjacent to parking lots and retaining walls near the transit center.
- Street light coverage is generally good in the area, although vegetation blocks lighting in some of the neighborhoods to the east.

Overlake Village

Figures 40 through 43 show the connectivity surfaces calculated from the existing conditions data in the Overlake Village area:

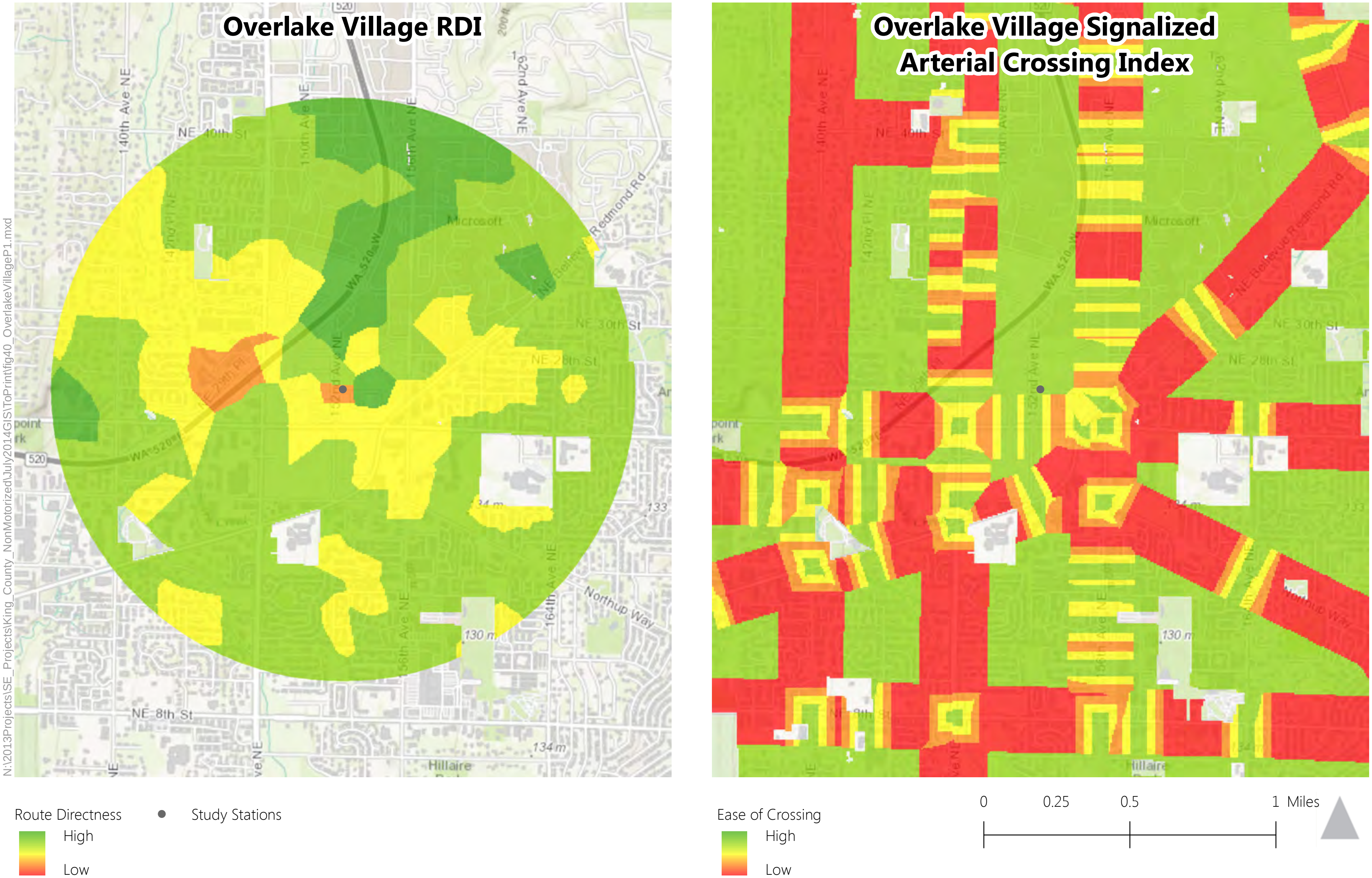
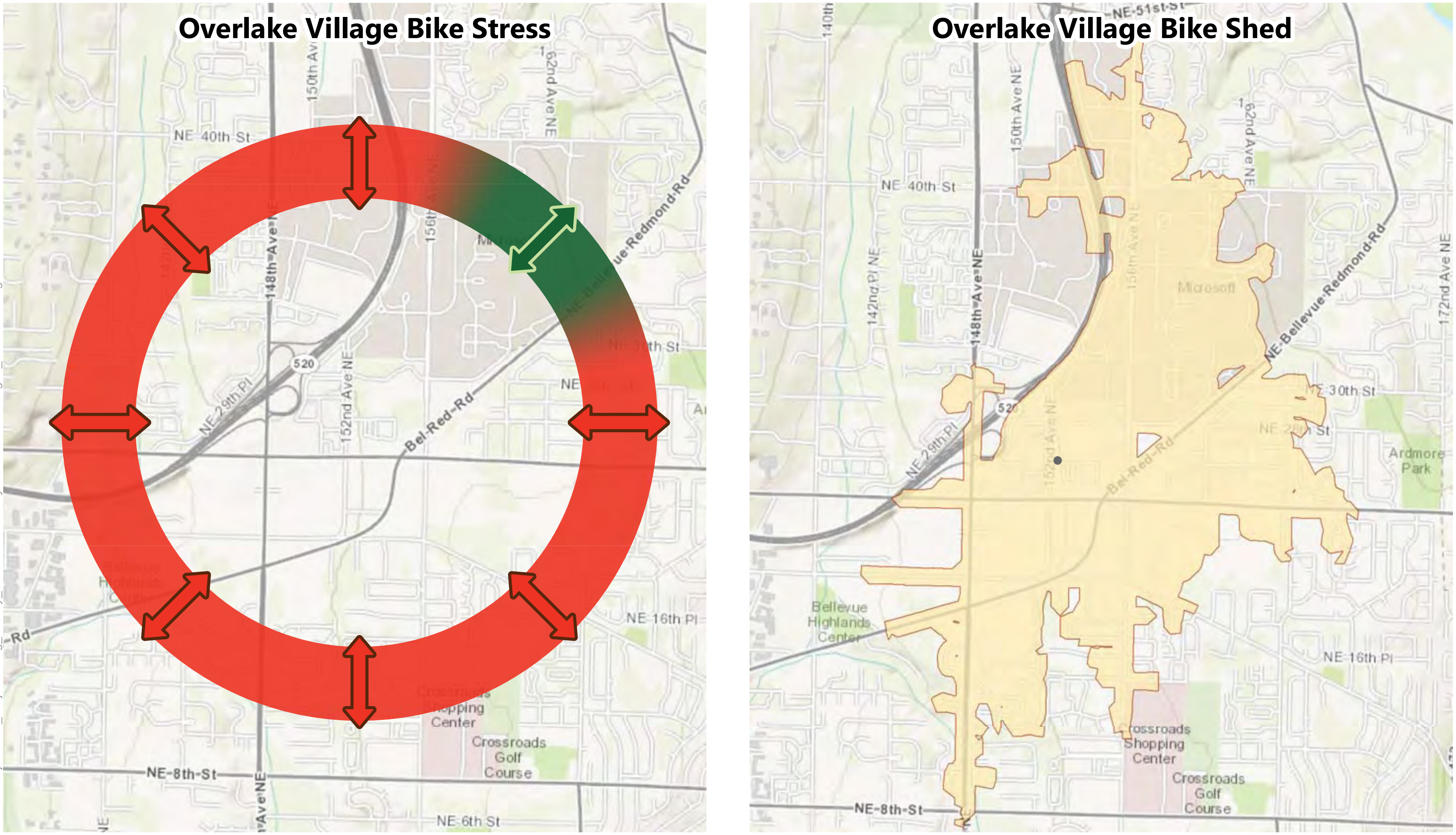


Figure 40

Overlake Village RDI and Signalized Arterial Crossing Index



N:\2013Projects\SE_Projects\King_County_NonMotorized\July2014GIS\ToPrint\fig41_OverlakeVillageP2.mxd

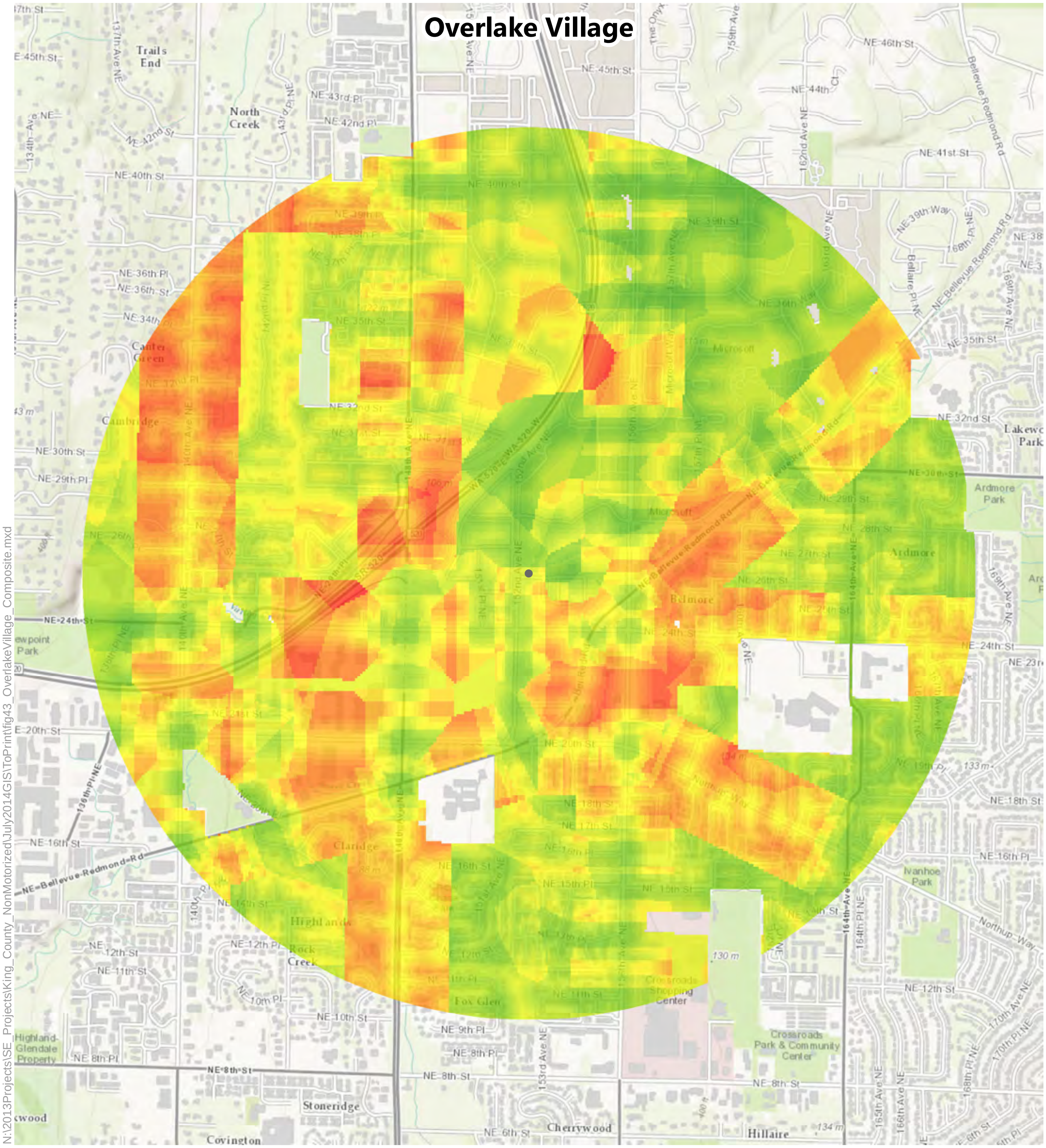
Figure 41

Overlake Village Bike Stress and Bike Shed

Figure 42

Overlake Village

Arterial Sidewalk/Walkway Density and Intersection Density



Connectivity
High
Low

Study Stations

0 0.125 0.25 0.5 Miles

Figure 43

Overlake Village
Composite Connectivity Scores

Similar to Northgate, the field observations were a close match to the GIS data in Overlake Village. Below are some general observations:

- There are additional pedestrian/bicycle connections coded in the dataset through some private parking lots that may not be obvious to some transit patrons. This could bias the existing conditions connectivity score higher than it would otherwise be.
- The high bike stress in the area was confirmed since there are few low stress routes that provide direct access to the station area. City of Redmond staff observed that bicycling through the Microsoft Campus could be higher stress than is indicated on the map since some of the private roads internal to the campus have traffic volume characteristics more similar to arterials elsewhere in the City.

Below are some pictures taken during the field visit:

Figure 44: Narrow Sidewalk along 148th Ave and Wide Sidewalks with Signalized Crossings along 156th Ave

Figure 45: Bicyclist along NE 24th St and New Bike Lanes along 152nd Ave

Below are some additional observations of factors not captured in the GIS data:

- The Microsoft Campus generally has good pedestrian and bicycle facilities; however, there is little pedestrian or bicycle activity in the area due to the homogeneity of land use on the Campus.
- The urban form of the station area south of SR-520 is very auto oriented with large blocks and parking lots along most street frontages. High levels of pedestrian and bicycle activity were observed; however, a reflection of the diversity of land uses in the area.
- Street illumination is good.
- Sidewalks are narrow in some places, but coverage and maintenance is generally good.

Mount Baker Transit Center and Link Station

Figures 46 through 49 show the connectivity surfaces calculated from the existing conditions data in the Mount Baker Transit Center area:

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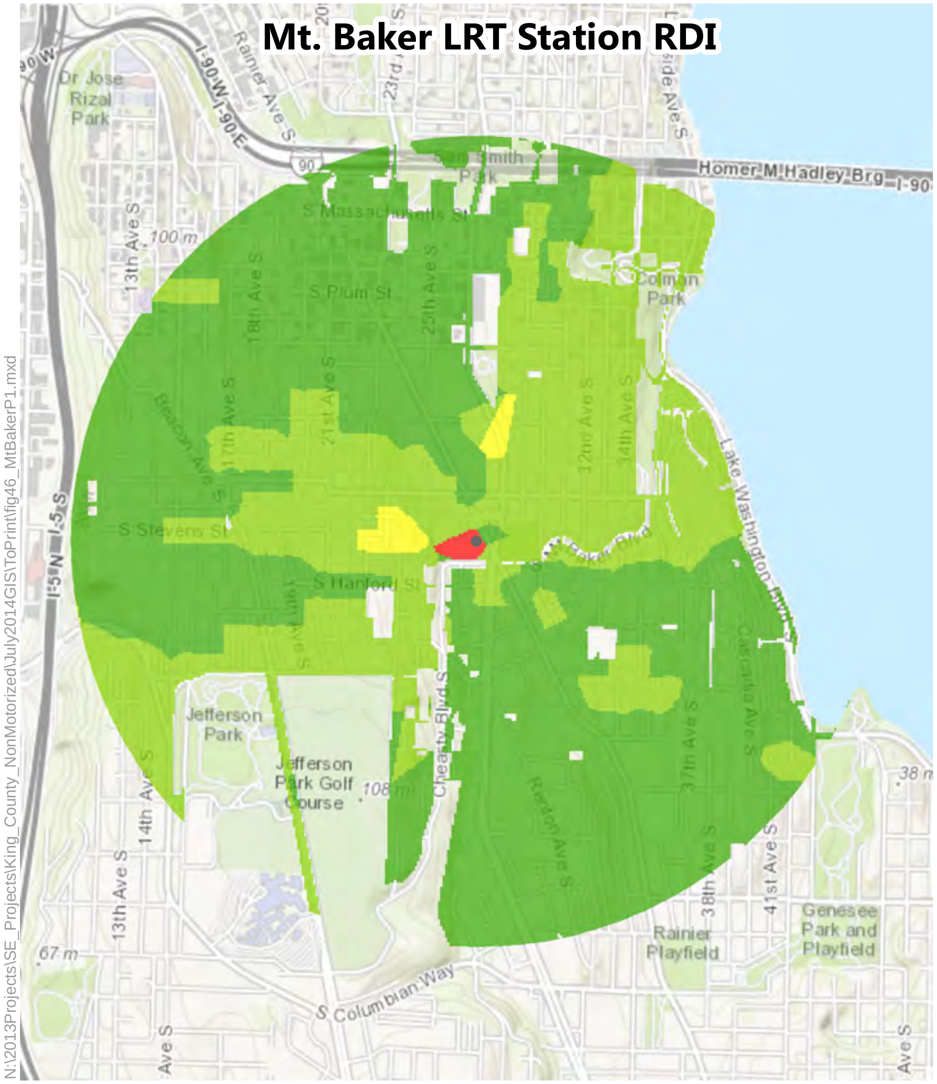
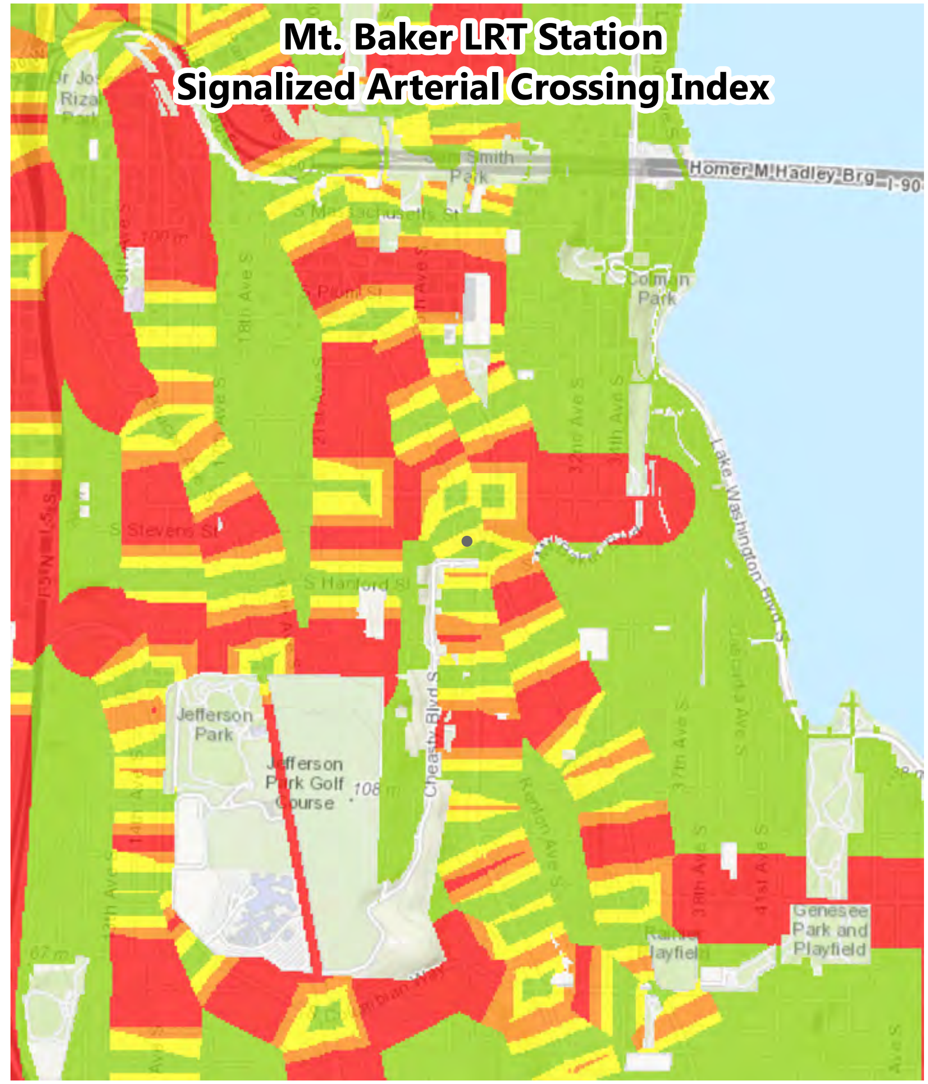




Route Directness
High
Low

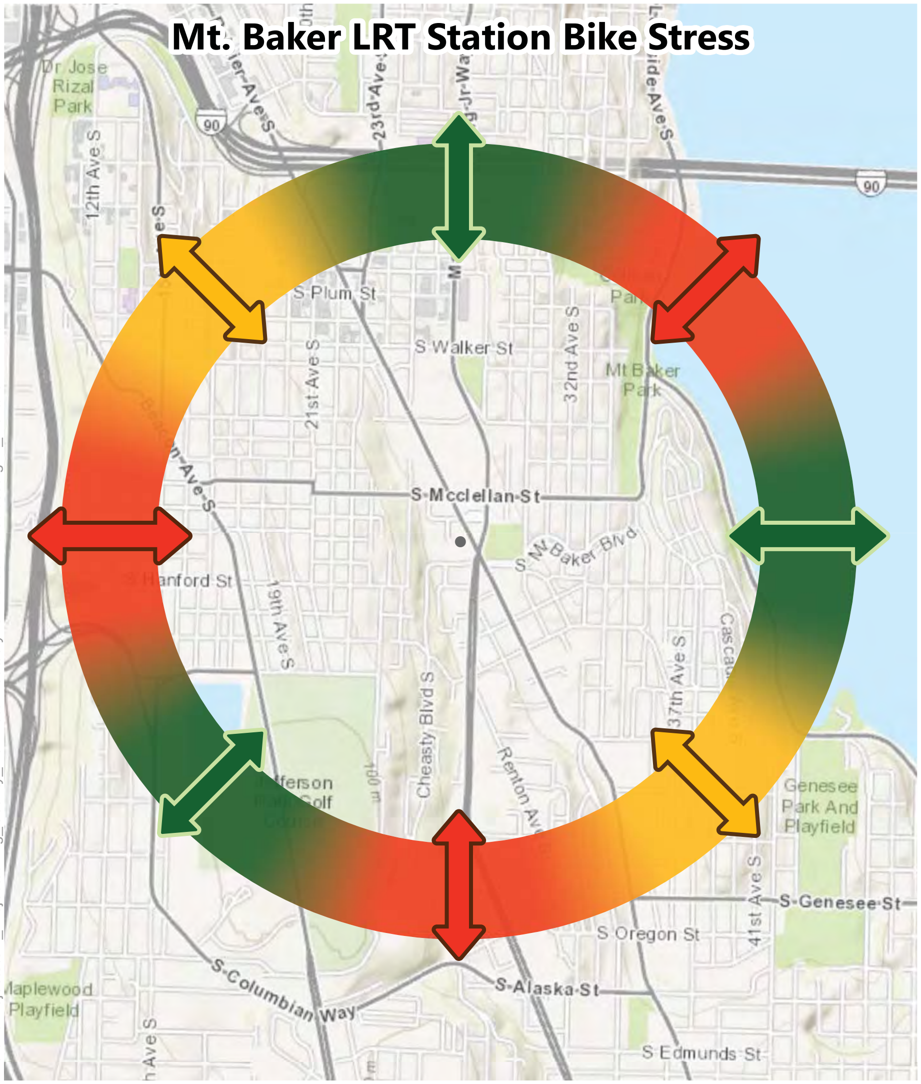
● Study Stations

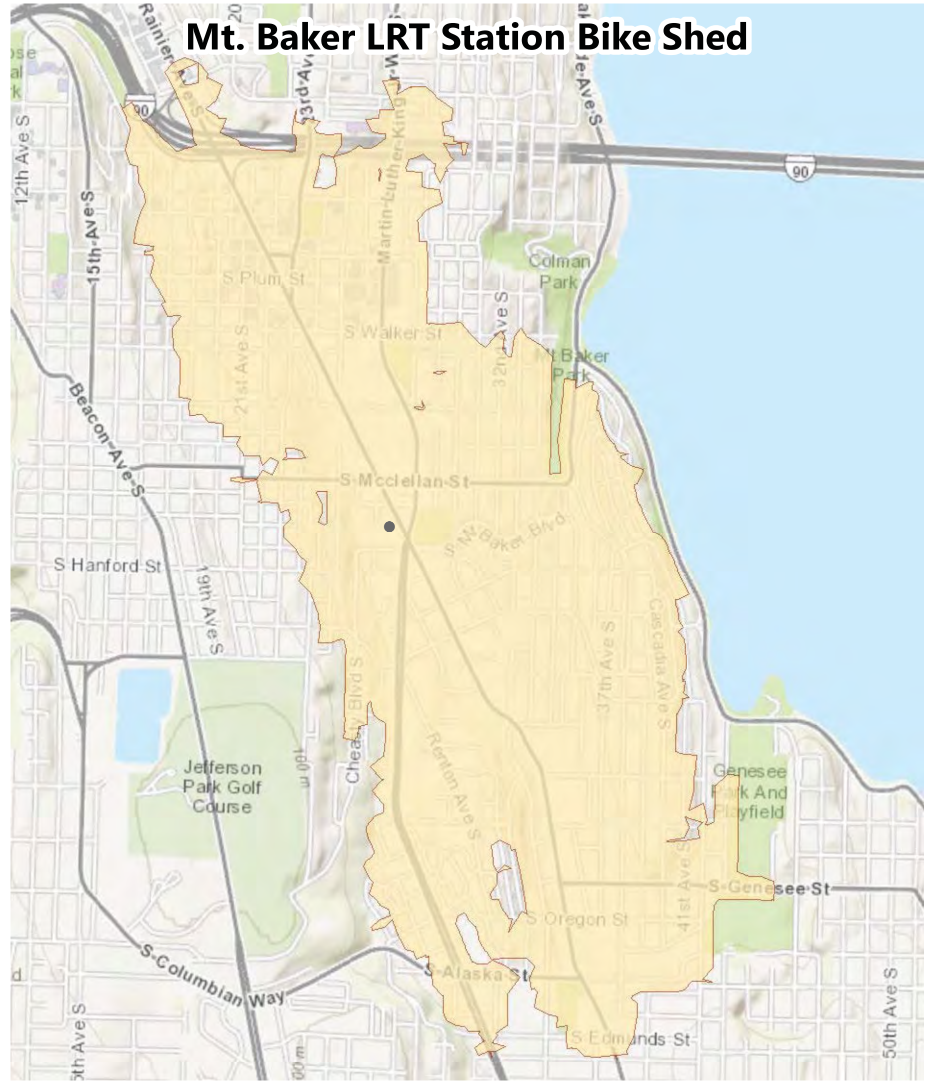
Ease of Crossing
High
Low

0 0.25 0.5 1 Miles

Figure 46

Mt. Baker LRT Station RDI and Signalized Arterial Crossing Index





Bike Stress
- Low
- Medium
- High

- Study Stations
- 15-Minute Bike Shed

0 0.25 0.5 1 Miles

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Figure 47

Mt. Baker LRT Station Bike Stress and Bike Shed

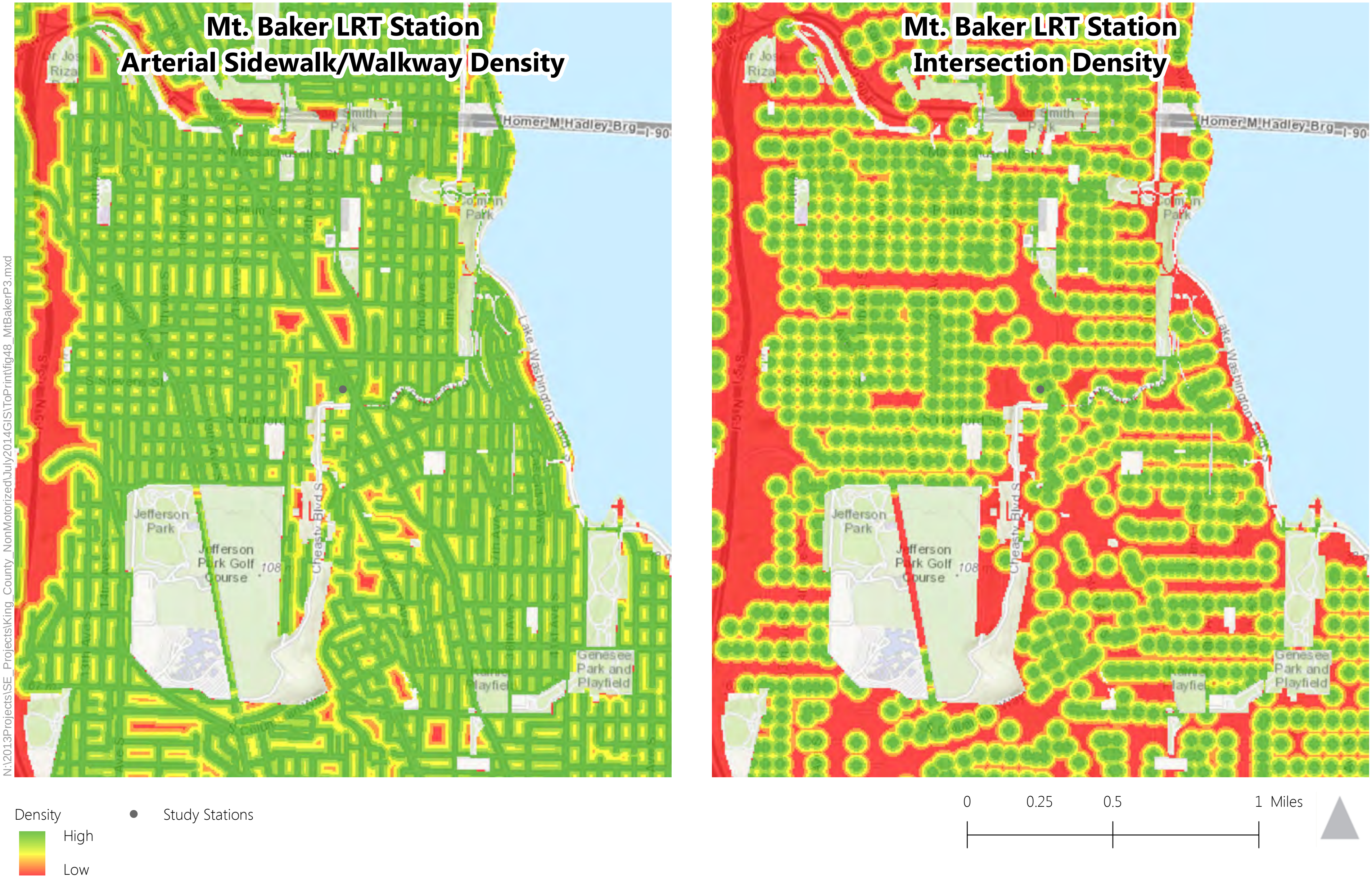


Figure 48

Mt. Baker LRT Station Arterial Sidewalk/Walkway Density and Intersection Density

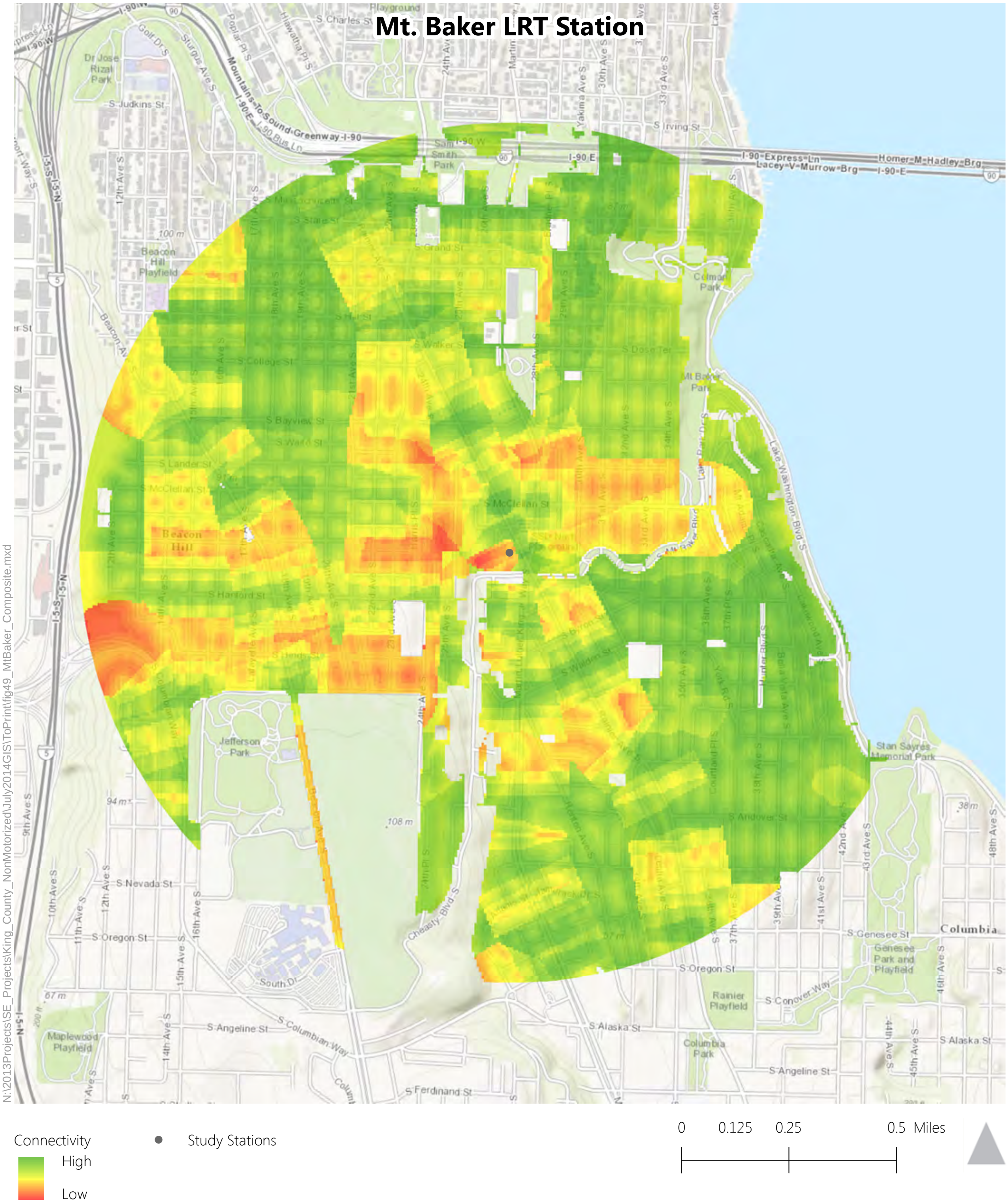


Figure 49

Mt. Baker LRT Station
Composite Connectivity Scores

Consistent with the other case study areas, the field observations were a close match to the GIS data in the Mount Baker area. Below are some general observations:

- The RDI score matches the steep terrain to the west of the Link station.
- Bike stress is generally high in the area since many bike trips would have to travel along Rainier Avenue or MLK Jr. Way to reach the station.
- The arterial crossing data is correct; however, as in other areas of Seattle, some of the arterials, such as McClellan east of MLK Jr. Way or 23rd Avenue south of Rainier Avenue are relatively narrow, low volume streets that do not present a major barrier to crossing. Four-way stops are also not included in the signalized crossing dataset.

Below are some pictures taken during the field visit:

Figure 50: Pedestrians along MLK Jr. Way and Poor Sidewalk Quality

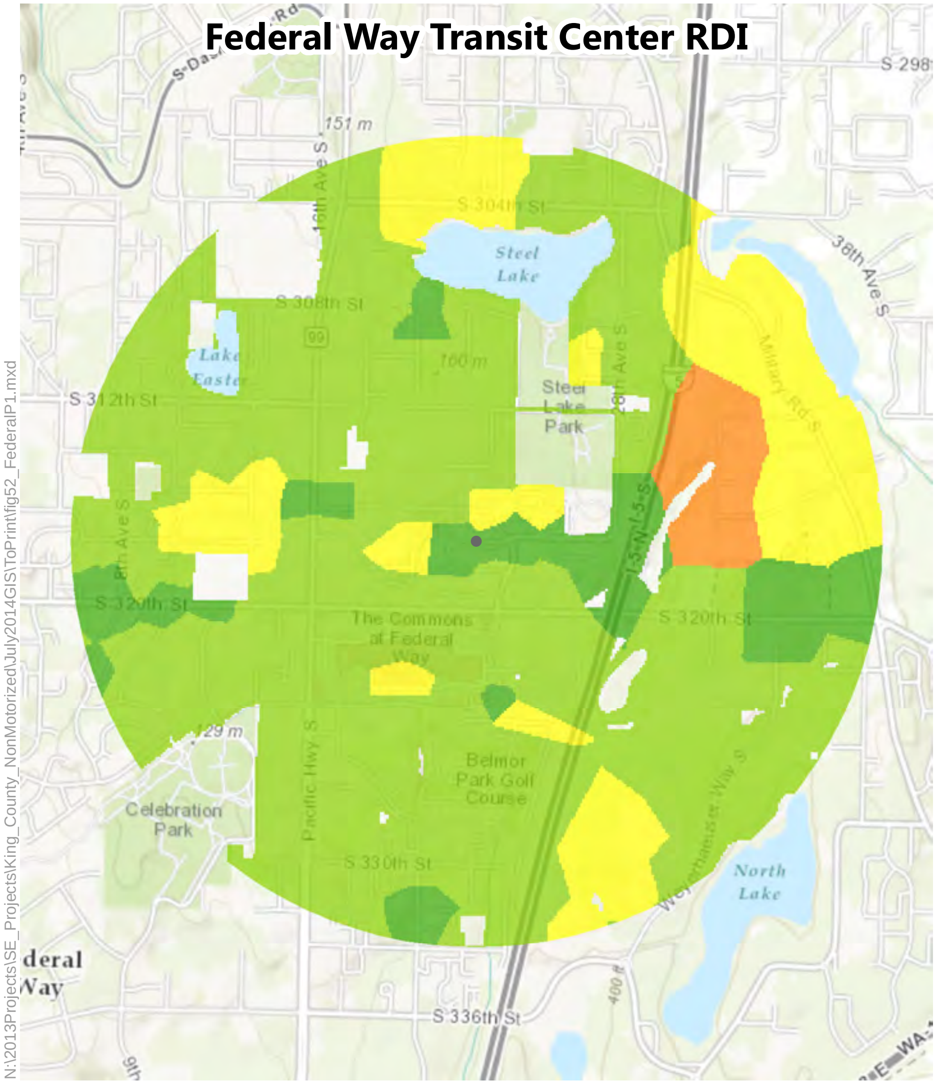
Figure 51: Bicyclist along Rainier Avenue and Steep Terrain West of the Station

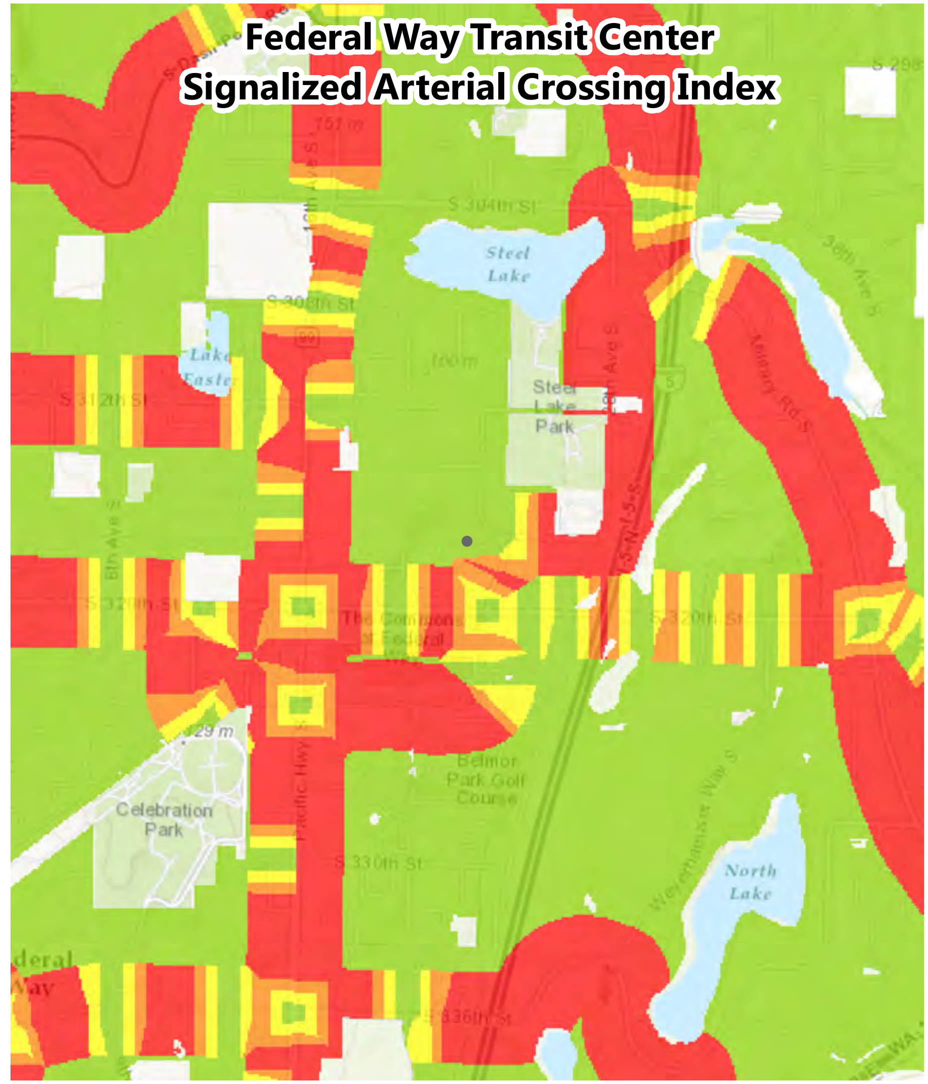
Below are some additional observations of factors not captured in the GIS data:

- The pedestrian/bicycle bridge across MLK Jr. Way and Rainier Avenue south of the station is not heavily used. The steep spiral ramps and narrow bridge width may discourage use.
- Much of the area has sidewalk coverage, but the sidewalk quality is poor in spots with broken or heaved sections. Some sidewalks near the Link station are very narrow and have poles and other obstructions.
- Perceptions about crime and safety issues may be a concern to some potential transit riders.
- There are good bicycle amenities at the Link station, but the terrain and high bike stress may discourage use.

Federal Way Transit Center

Figures 52 through 55 show the connectivity surfaces calculated from the existing conditions data in the Federal Way Transit Center area:





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Route Directness
High
Low

● Study Stations

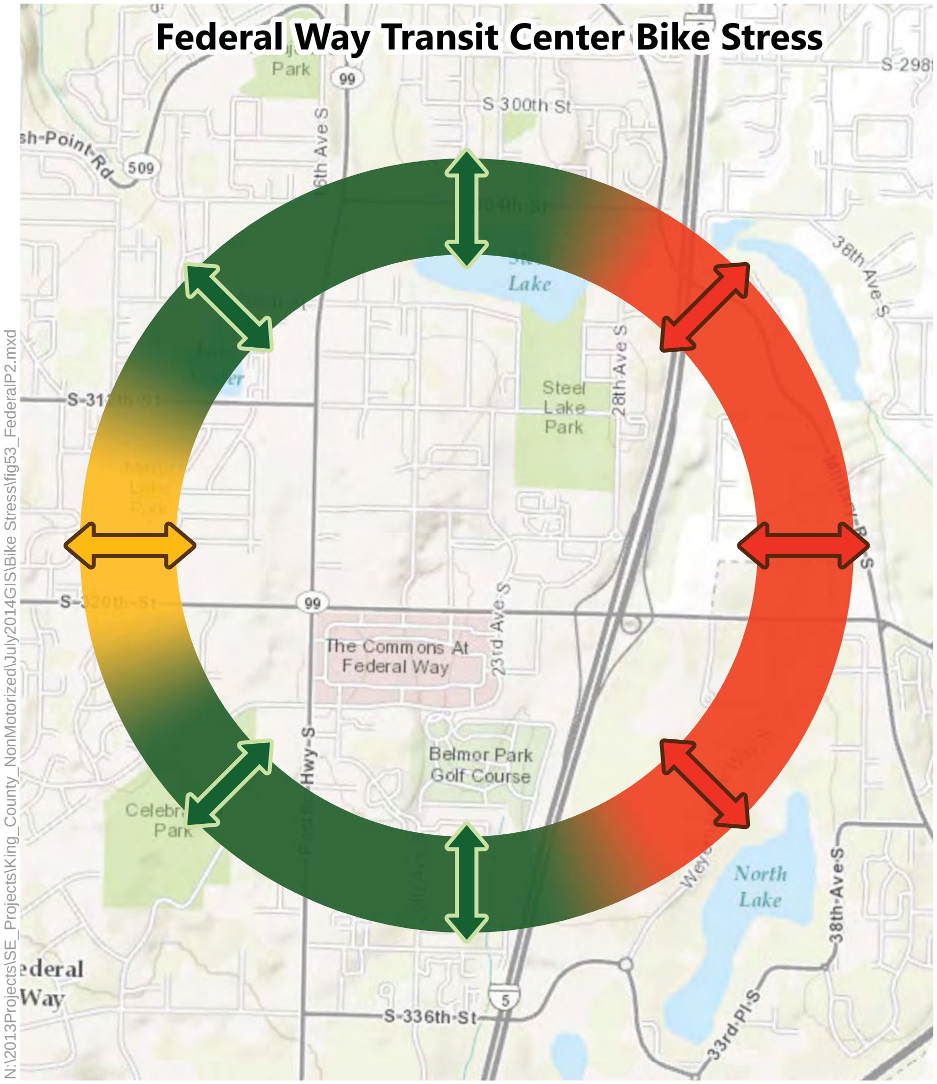
Ease of Crossing
High
Low

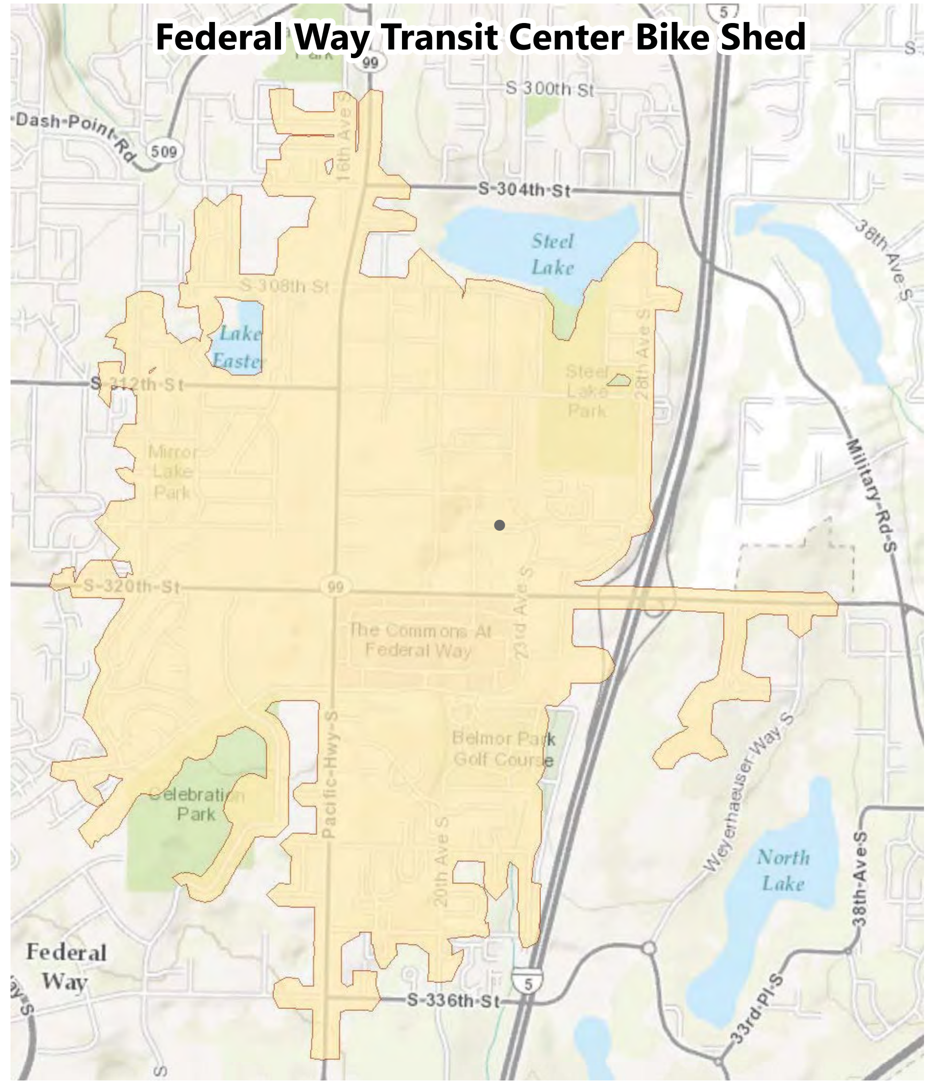
0 0.25 0.5 1 Miles

Figure 52

Federal Way Transit Center RDI and Signalized Arterial Crossing Index

N:\2013Projects\SE_Projects\King_County_NonMotorized\July2014GIS\Bike Stress\fig53_FederalP2.mxd





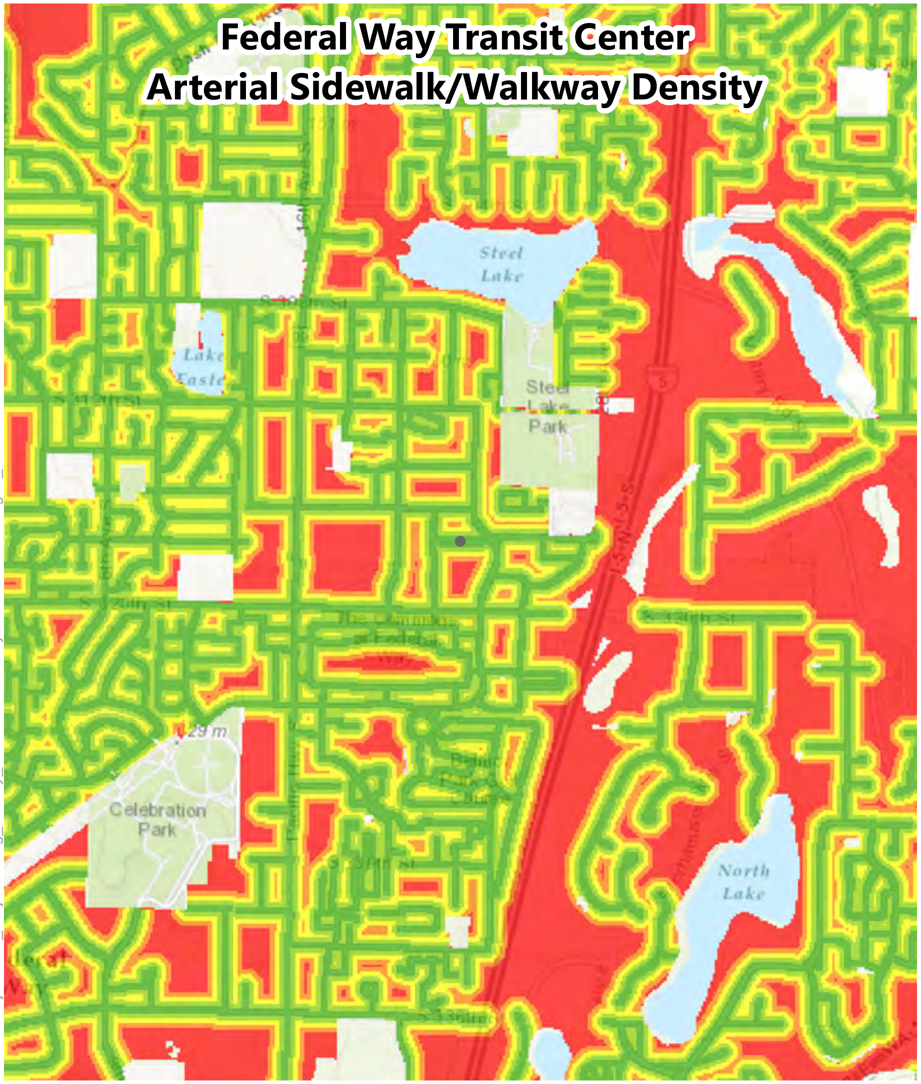
Bike Stress
- Low
- Medium
- High

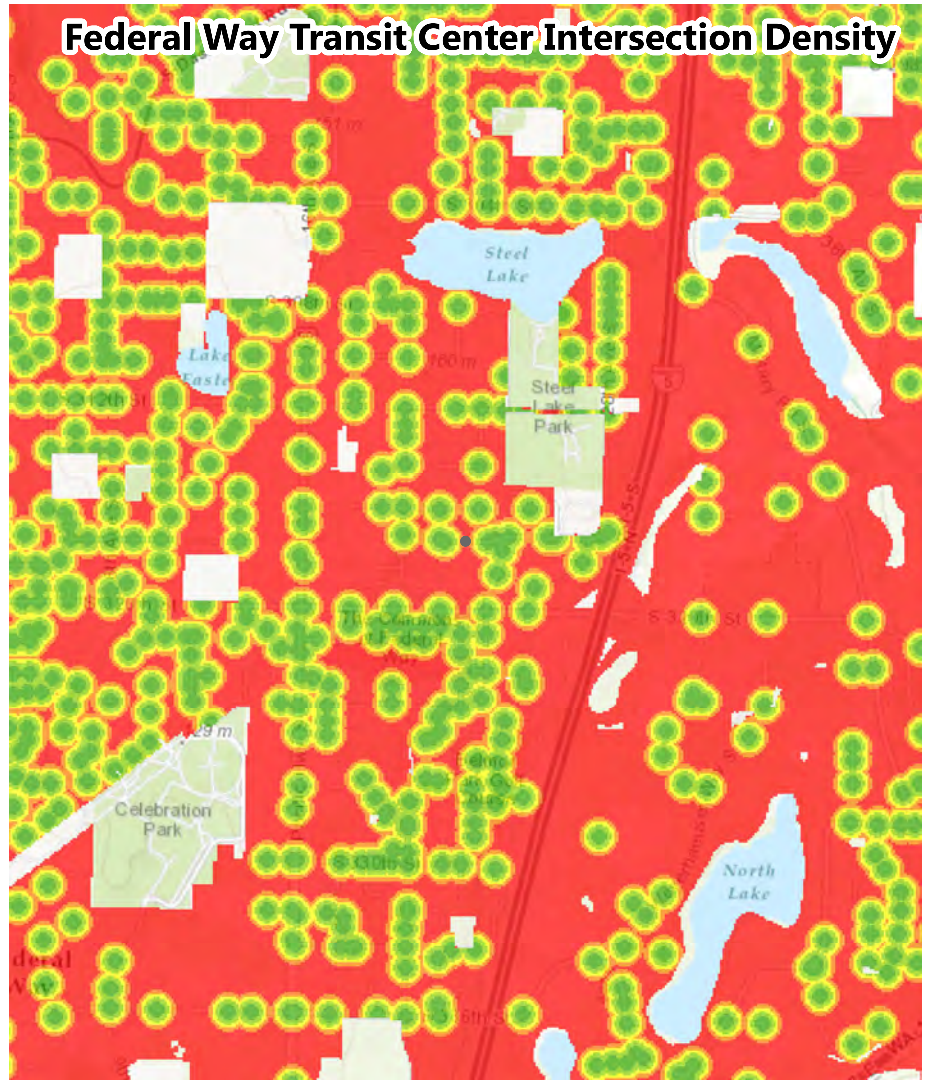
- Study Stations
- 15-Minute Bike Shed

0 0.25 0.5 1 Miles

Figure 53

Federal Way Transit Center Bike Stress and Bike Shed





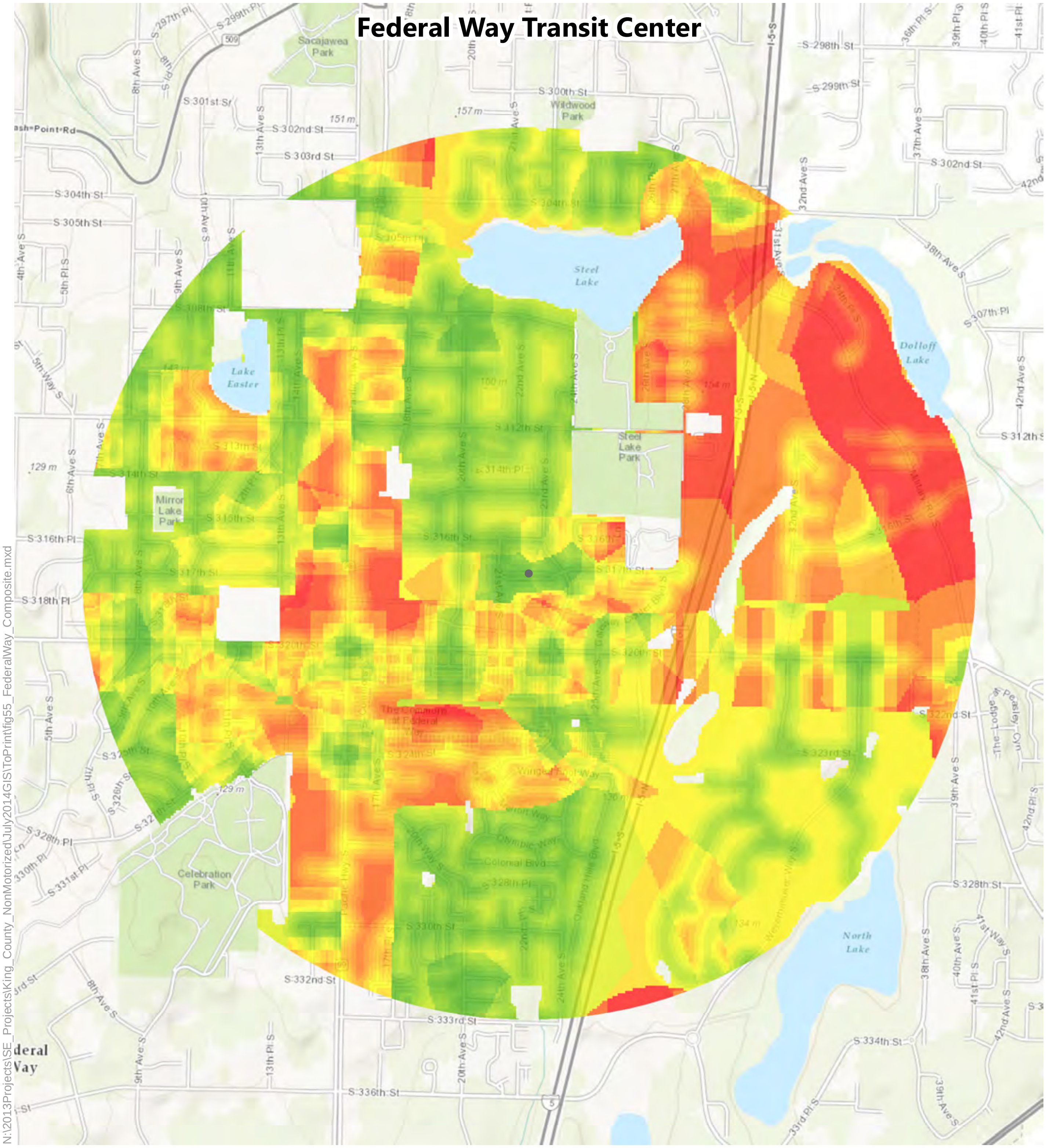
Density
High
Low

● Study Stations

0 0.25 0.5 1 Miles

Figure 54

Federal Way Transit Center Arterial Sidewalk/Walkway Density and Intersection Density



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Connectivity

High

Low

● Study Stations

0 0.125 0.25 0.5 Miles

Figure 55

Federal Way Transit Center Composite Connectivity Scores

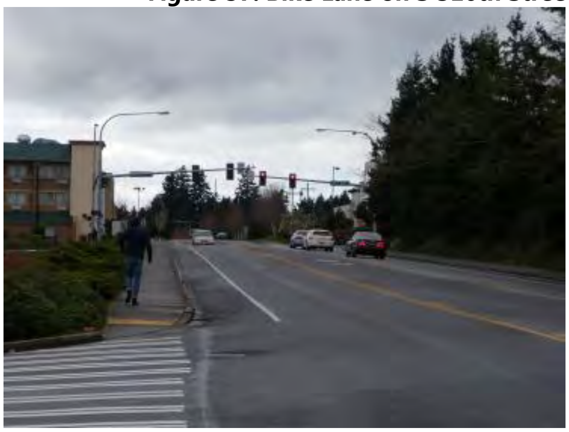
Below are observations of the Federal Way Transit Center data, which generally matched the field observations:

- The RDI score highlights the barriers created by I-5 and some of the large parcels/blocks near the transit center.
- There are some large gaps in signalized arterial crossings in the area, particularly on Pacific Highway. The map shows a stretch of S 324th that lacks crossings, but field visits indicated the presence of flashing pedestrian beacons in this segment.
- Bike stress is high to the east due to the lack of connections across I-5, but the bike shed is not extensive in that direction due to the terrain. There is moderately high bike stress approaching from due west because of the need to cross Pacific Highway at either S 312th or S 320th Streets, which are high stress routes.
- The area generally has good arterial sidewalk coverage, but as shown on the map, there are gaps along portions of S 312th Street, 28th Avenue, and S 320th Street (across I-5).
- Intersection density and street density is low due to the large block and parcel sizes.

Below are some pictures taken during the field visit:

Figure 56: Buffered Sidewalks with Strip Commercial and Flashing Pedestrian Crossing

Figure 57: Bike Lane on S 316th Street and Bike Parking at the Transit Center



Below are some additional observations of factors not captured in the GIS data:

- While the area around the transit center generally has good sidewalk coverage, the urban form is very auto-oriented with large streets and parking lots adjacent to the sidewalks.
- Some streets in the area lack street lights, although lights from adjacent parking lots may provide some level of illumination. The streets lacking lighting include S 316th Street between 21st Avenue and Pacific Highway, and S 317th Street between 23rd Avenue and 25th Place.
- The bike racks in the transit center are well utilized.

GIS DATA BLIND SPOTS

As described above, the jurisdiction GIS data matched field conditions well. However, the project team identified several "blind spots" where the GIS data were either not available across the entire region or where the GIS data were too general. Based on the research and the team's observations, these blind spots are important to consider when applying the connectivity tools to evaluate non-motorized access to transit. The key blind spots are listed below:

- Low volume/speed arterial streets: Since general functional class information was used to identify arterials, some cities like Seattle include low volume/speed arterial streets that would be classified as collector streets in other jurisdictions. These streets may be easier to cross, so the lack of signalized arterial crossings may be less of an impediment to accessing transit.

- Sidewalk width and quality: Only a handful of jurisdictions keep information on sidewalk quality, and the data do not appear to be comprehensive. About half of the jurisdictions had sidewalk width and presence of planter strip data.
- Illumination: Most cities have GIS data on where city-owned street lights are, but in many cities Puget Sound Energy owns most of the street lights and this information was not generally available.
- All-way stop signs and flashing crossing beacons: All-way stop signs and flashing crosswalk beacons can make it easier to cross arterial streets. Only a handful of cities have these types of signs/crossing treatments identified in their GIS data.
- Urban form: There is no uniform method to measure and code the quality of the urban form along a street or bikeway. Research shows that traveling along a street that is fronted by parking lots or that is adjacent to the side of a warehouse is less appealing than a street with smaller-scale street oriented businesses or homes[16].

[16] "Evaluating Transportation Land Use Impacts". Litman, T,. June 11, 2014.

USING THE TOOLS TO EVALUATE 2035 CONDITIONS

This section presents how the project team used the connectivity tools and regression model to evaluate 2035 conditions at each of the case study locations. In each case, the following changes were considered in the evaluation:

- 2035 population and employment growth from either the PSRC regional travel model or local travel model
- Changes to the transportation system from city and regional plans, including the following types:
  - Roads
  - Transit service
  - Off-street trails or cycletracks
  - Sidewalks
  - Bike lanes
  - Greenways
  - Signalized arterial crossings

To obtain accurate information, the project team met with Seattle, Redmond, and Federal Way planning staff. Based on these meetings, the team collected detailed information such as Urban Design Frameworks, subarea plans, and the most up-to-date bicycle and pedestrian plans. Using this information, the 2035 transportation system information was coded into GIS and the connectivity tools were run[17]. The connectivity tool results were combined with updated land use and transit service characteristics in the regression model and new ridership estimates were generated.

Table 28 shows the change in population and employment expected under 2035 conditions and **Figures 58 through 61** show the new transportation projects coded into GIS for each of the case study areas.

[17] It is important to keep in mind that many of the projects in the pedestrian/bicycle plans are not currently funded and may or may not be implemented under 2035 conditions.

Table 28: 2035 Employment and Population in Case Study Locations

Case Study	Employment			Population		
	Existing	**Future**	**% Diff**	**Existing**	**Future**	**% Diff**
Northgate TC	10,050	12,250	22%	9,140	11,320	24%
Overlake Village	23,420	36,470	56%	4,040	10,300	155%
Mt Baker	4,450	5,440	22%	6,760	8,450	25%
Federal Way TC	4,180	6,470	55%	4,740	6,690	41%

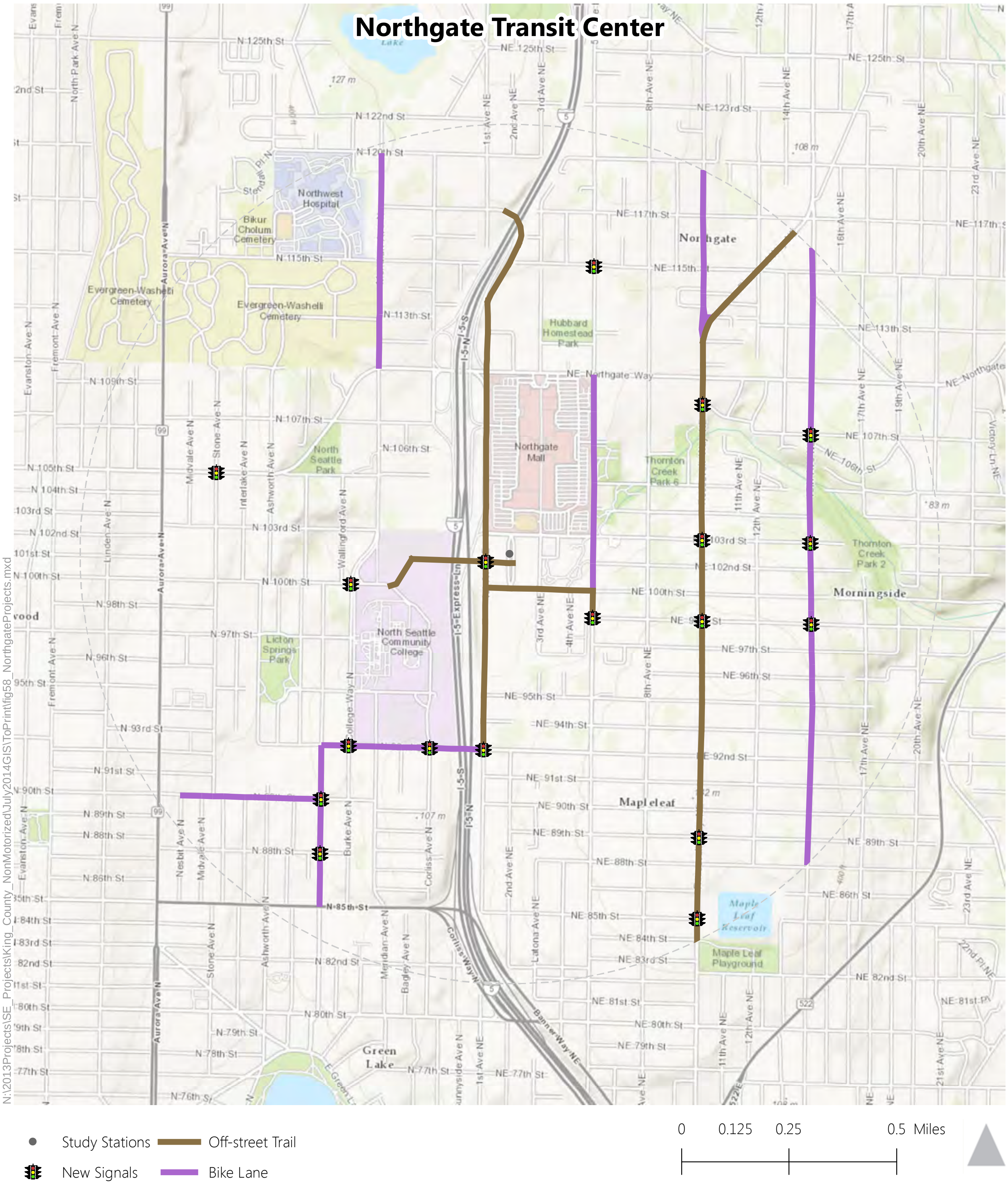


Figure 58

Northgate Transit Center
New Transportation Projects

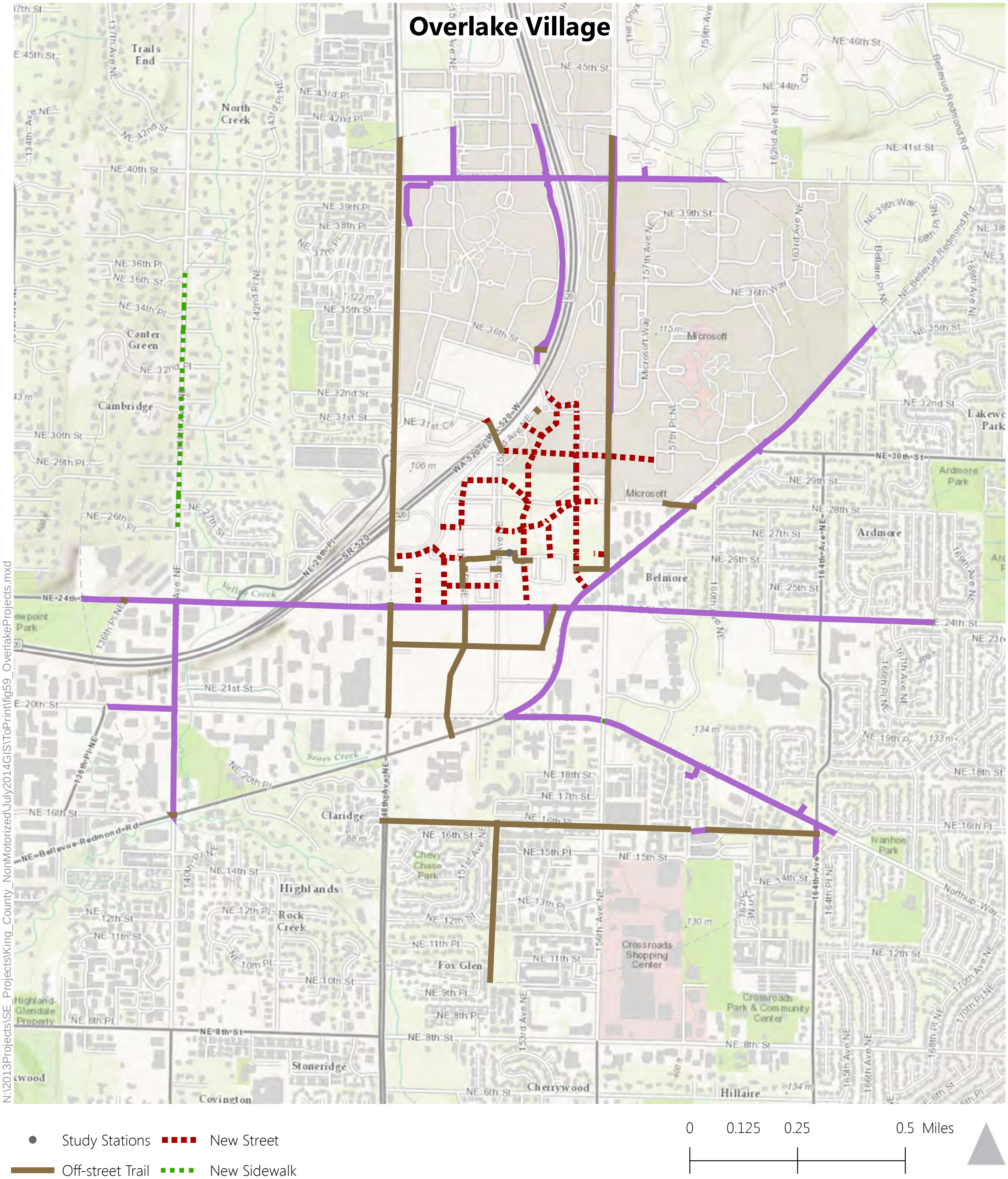


Figure 59

Overlake Village
New Transportation Projects

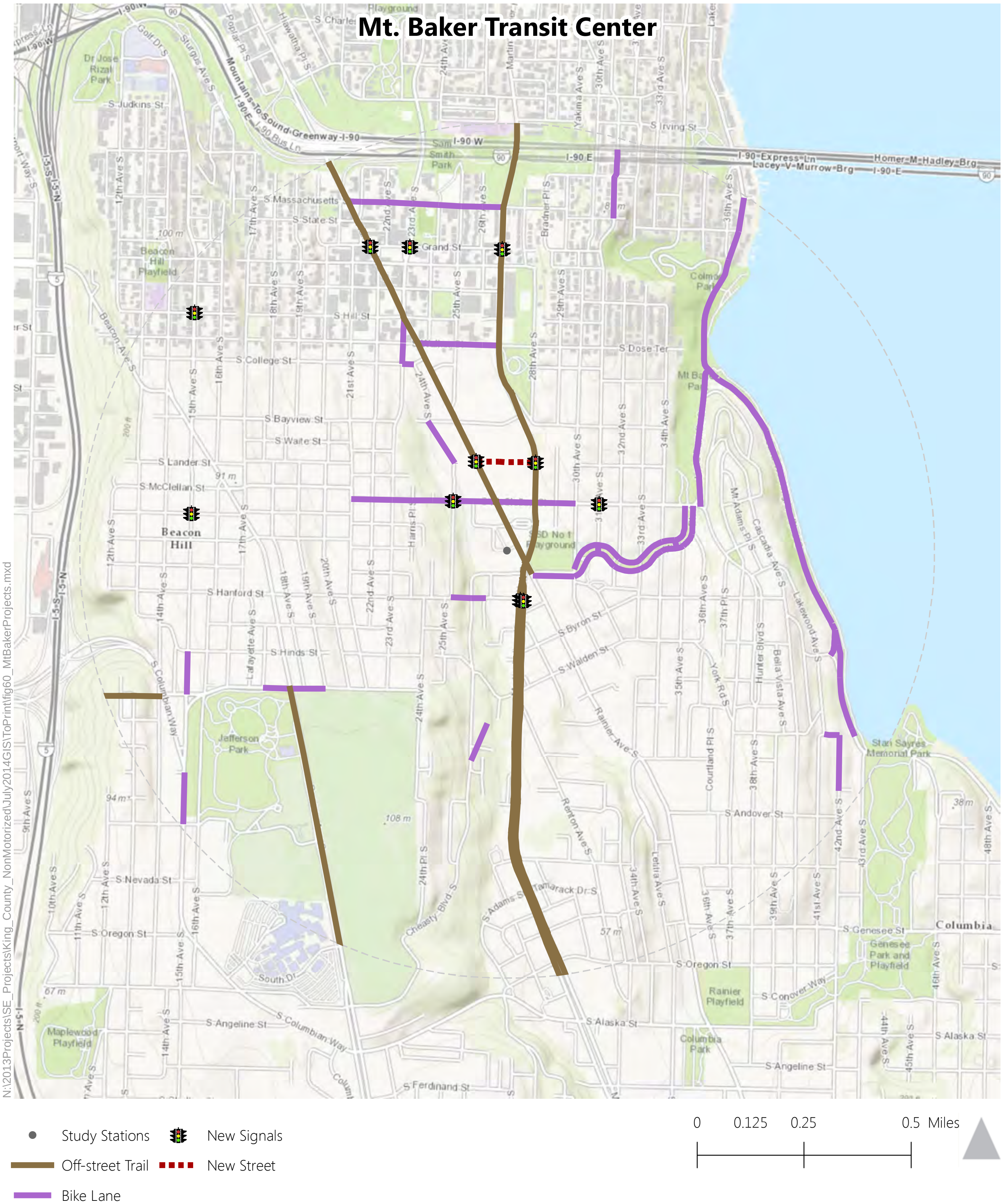
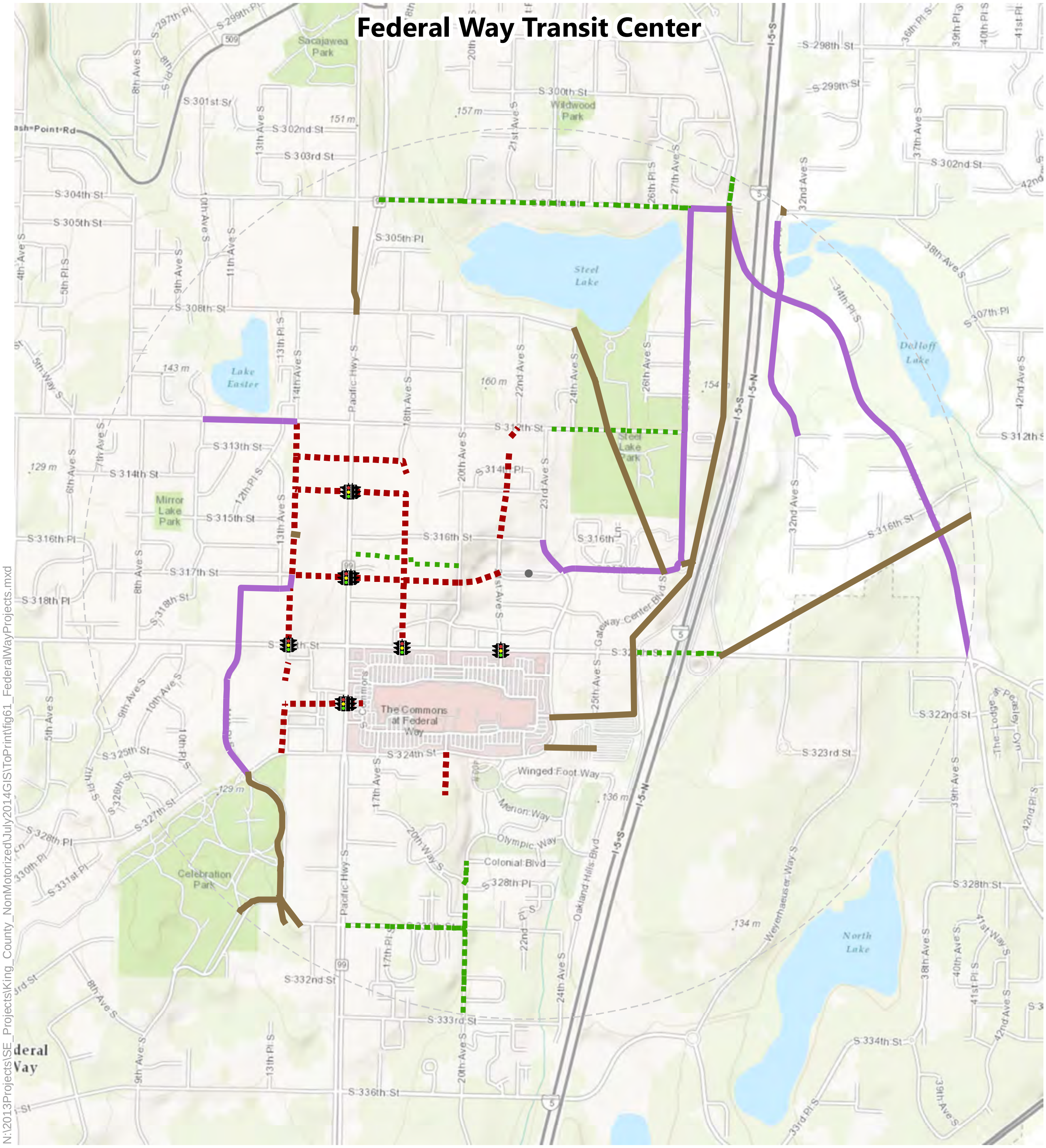


Figure 60

Mt. Baker Transit Center
New Transportation Projects



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- Study Stations
- New Signals
- Off-street Trail
- New Street
- Bike Lane
- New Sidewalk

0 0.125 0.25 0.5 Miles

Figure 61

Federal Way Transit Center New Transportation Projects

Below is a list of some of the more significant changes at each of the case study locations:

- Northgate Transit Center:
  - Link light rail extension
  - Pedestrian and bicycle bridge across I-5
  - Cycletrack/major separated bicycle facility along 1st Avenue and Roosevelt Way
  - New bicycle lanes and signalized arterial crossings at proposed greenways throughout the study area
- Overlake Village
  - Link light rail
  - New pedestrian bridge across SR-520
  - New street grid in Overlake Village redevelopment area
  - Off-street trails/cycletracks on 148th Avenue and 156th Avenue
  - Bicycle lanes on NE 24th Street and Bel-Red Road
- Mount Baker TC and Link Station
  - New cycletrack/major separated bicycle facility on Rainier Avenue north of MLK Jr. Way and on MLK Jr. Way
  - Bicycle lanes on McClellan Street, S Mt. Baker Boulevard, and Lake Washington Boulevard
  - New street through the Lowes site
- Federal Way TC
  - Link light rail
  - New street grid in the Town Center area
  - New signalized arterial crossings of Pacific Highway and S 320th Street
  - New bicycle lanes and off-street trails throughout the study area

In addition to the new transportation infrastructure planned, each of the case study areas is expecting substantial growth in population and employment between now and 2035.

Given relatively up-to-date urban design guidelines in each of the cities, as new development progresses, the overall urban form of the case study areas is likely to become more conducive to walking and biking. These urban form improvements will complement the non-motorized improvements described above.

Results

The results of the regression model run on 2035 conditions are shown in **Table 29**[18] below. The new composite connectivity index surfaces are shown in **Figures 62 through 65**.

Table 29: Daily Ridership Estimates

Case Study	***Existing***	***Future without non-motorized improvements***	***Future with non-motorized improvements****	***Ridership attributable to non-motorized improvements***
Northgate TC	6,469	18,410	20,239	1,829
Overlake Village	392	946	998	52
Mt Baker	4,300	4,460	4,839	379
Federal Way TC	2,341	6,305	7,006	701

* Non-motorized improvements include new street grid projects, but not new Link light rail extensions. Ridership includes all bus and light rail service

[18] In 2013, Sound Transit performed an analysis of the potential new transit riders that would access the Northgate Transit Center via the proposed pedestrian bridge over I-5. This analysis was performed using the best data available at the time, as summarized in TCRP Report 153. There are several important differences between the 2013 study and this new analysis. The key differences are:

- it used fewer and less-detailed connectivity variables;
- it had a 2030 analysis horizon (rather than 2035);
- it used national data on travel and access to transit, along with local population and employment data to assess station typologies; and
- it evaluated bridge users based on light-rail boardings only (as opposed to rail and bus boardings).

Given these differences, it is not surprising that this new analysis indicates that the I-5 Bridge may attract additional people accessing transit. To provide a more direct comparison to the prior study, the project team applied the new model to only the light rail boardings and estimated a result that was within 8 percent of the 2013 study, which is comparable given the difference in analysis horizons (2030 versus 2035). A similar analysis using the TCRP Report 153 analysis methods was also performed for Sounder stations (Sounder Station Access Study). Similar differences should be expected the new tool is used to analyze Sounder access/boardings as well.

As shown in the table above, much of the ridership gains expected between 2014 and 2035 stem from increased land use growth and major transit investments, like Link light rail extensions. However, the non-motorized connectivity improvements do have a meaningful impact on helping to achieve overall ridership. Note that the future ridership forecasts shown in **Table 29** are based on the model developed for this project. Given the model's limitations mentioned above, more sophisticated ridership models may be appropriate to use for "base" future ridership forecasting, if the data are available. Using these base ridership data, the percent change in ridership estimated by the connectivity tools and model can be applied to calculate a refined estimate of ridership associated with improved pedestrian and bicycle infrastructure.

With this in mind, the Sound Transit Incremental Travel Model's 2035 forecasts were evaluated at each of the study locations. In each case (except for Mt. Baker, as noted in the footnote for **Table 30** below), the Sound Transit's model estimated daily boardings for both rail and buses were extracted and the connectivity model results were applied to the combined rail/bus boardings. The results are shown in **Table 30**.

Table 30: Daily Ridership Estimates Based on Sound Transit Model Forecasts

Case Study	Existing	Future without non-motorized improvements	Future with non-motorized improvements	Ridership attributable to non-motorized improvements
Northgate TC	6,469	27,000	29,700	2,700
Overlake Village	392	2,600	2,900	300
Mt Baker	4,300	4,500*	4,800	300
Federal Way TC	2,341	18,500	20,600	2,100

*Note the ST model did not assume the planned rezoning at the Mt. Baker station area and there was no increase in ridership over 2014 existing conditions. Therefore, the results of the connectivity analysis model were used for this location.

In general, Sound Transit's model estimated higher bus/rail boardings than did the non-motorized connectivity model. These higher future year ridership estimates translate into higher estimates of boardings attributable to the planned non-motorized investments in the areas. In general, it is the project team's recommendation that the most accurate base ridership information be used when applying the results of the connectivity tools and model. In the Project Prioritization chapter, the connectivity model was applied to observed boardings, which are clearly more accurate than the basic connectivity model's estimate of ridership. For future conditions, using Sound Transit's Federal Transit Administration approved model may be most appropriate[19], except when this model is not applicable or results are not available.

CASE STUDIES: FINAL CONNECTIVITY MAPS AND TRAVEL SHEDS

The following maps highlight the 2035 conditions for the four case study locations, including the future connectivity index along with the 15-minute bike and walk travel sheds.

[19] Sound Transit's ridership model covers all of urban Snohomish, King, and Pierce County; even areas outside of the Sound Transit taxing district and is generally a good source for accurate transit ridership data.

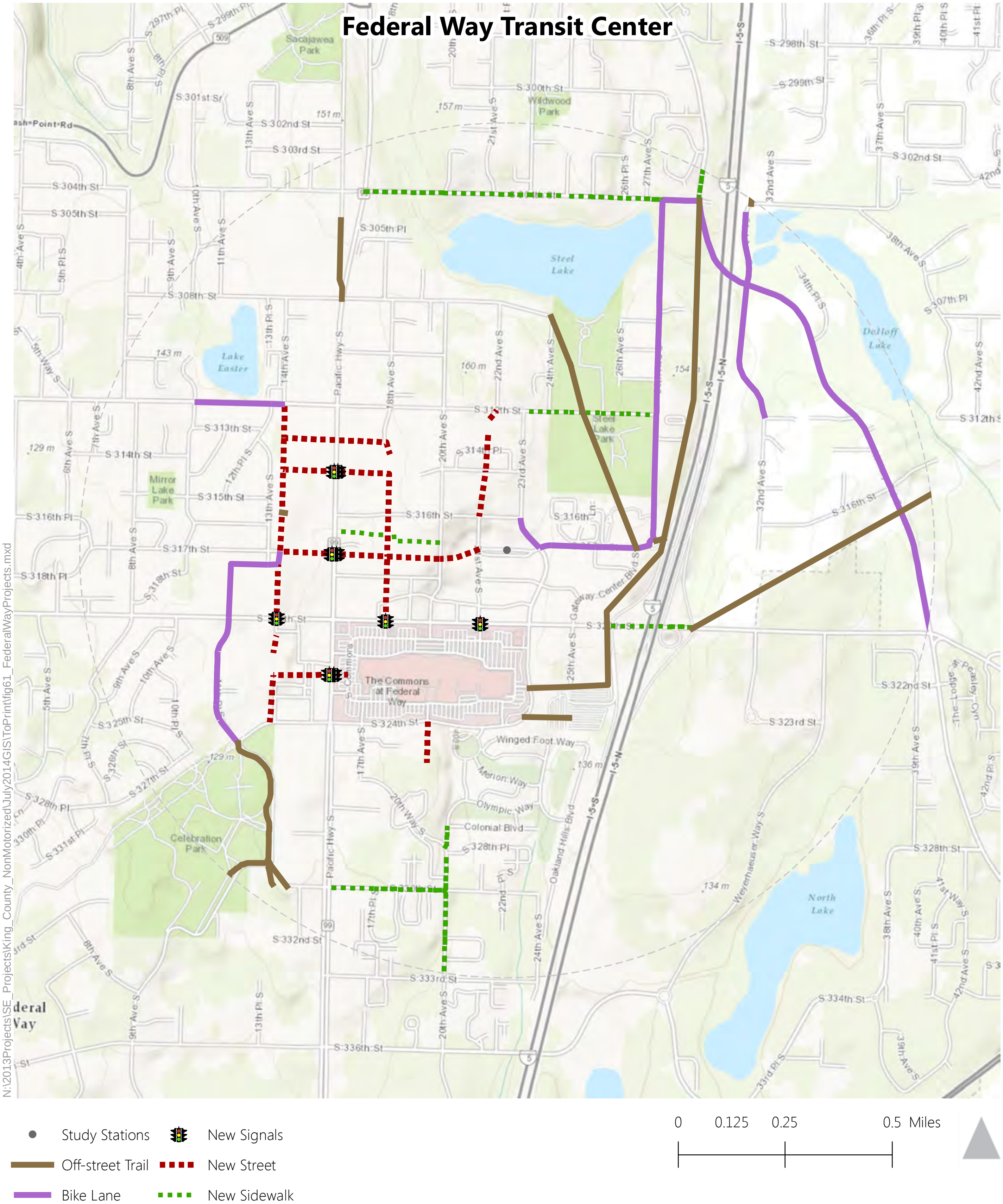

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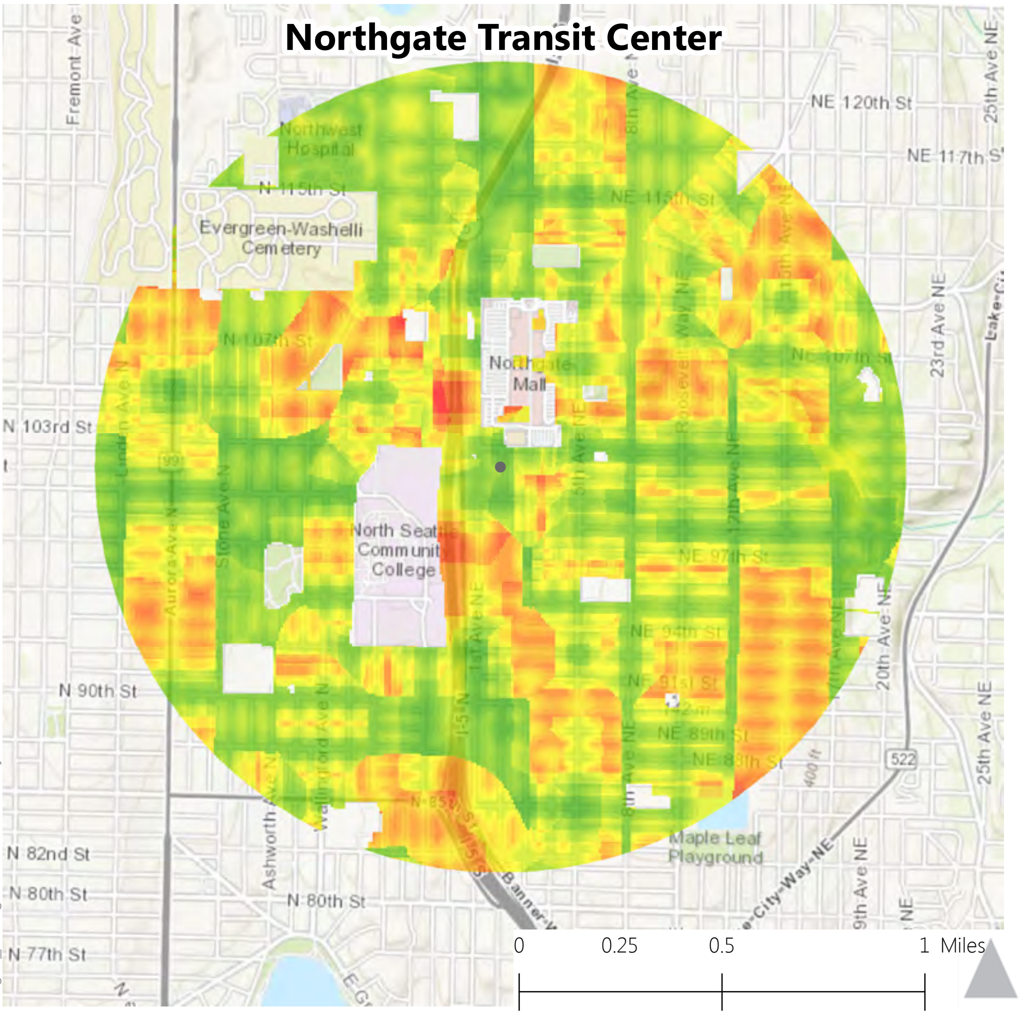
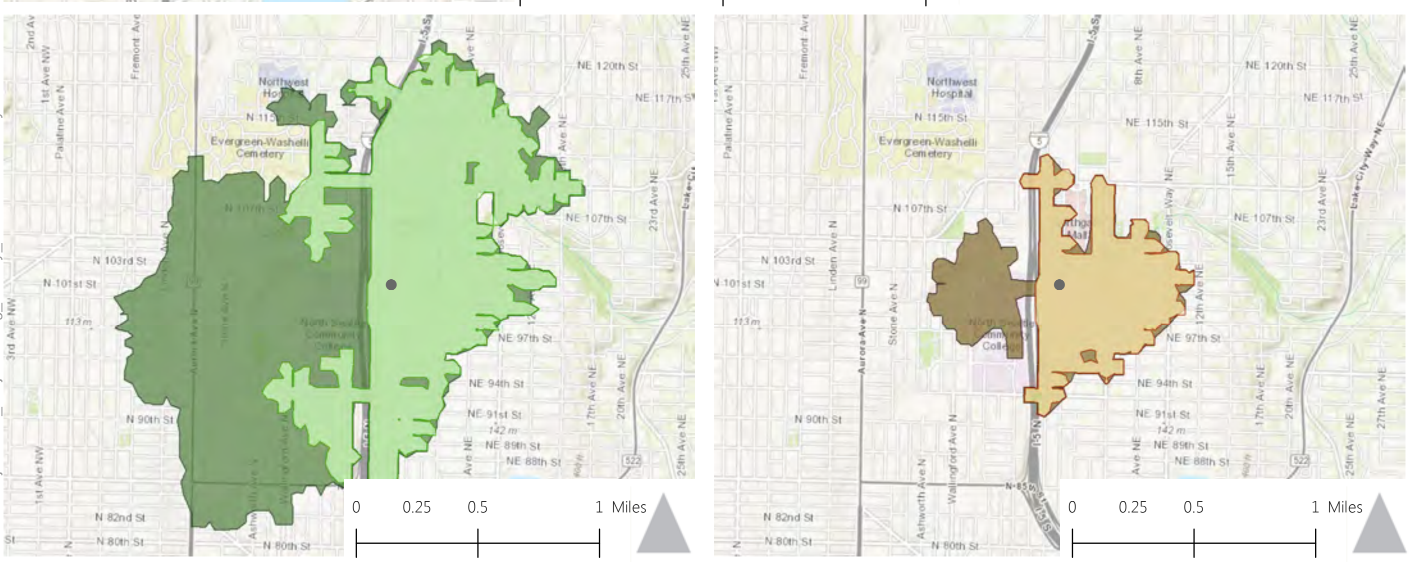
Figure 61

Federal Way Transit Center
New Transportation Projects



Connectivity Improvements

The primary improvement in connectivity in the Northgate area was due to the non-motorized bridge across I-5. Additionally, the greenway signals and cycle tracks proposed in the area helped improve the arterial crossing score and the bicycling stress environment. The impact of the bridge can be seen in the large increase in both the 15-minute walk and bike sheds from the station.



Connectivity High Low | Study Stations | Existing 15-Minute Bike Shed | Future 15-Minute Bike Shed | Existing 15-Minute Walk Shed | Future 15-Minute Walk Shed

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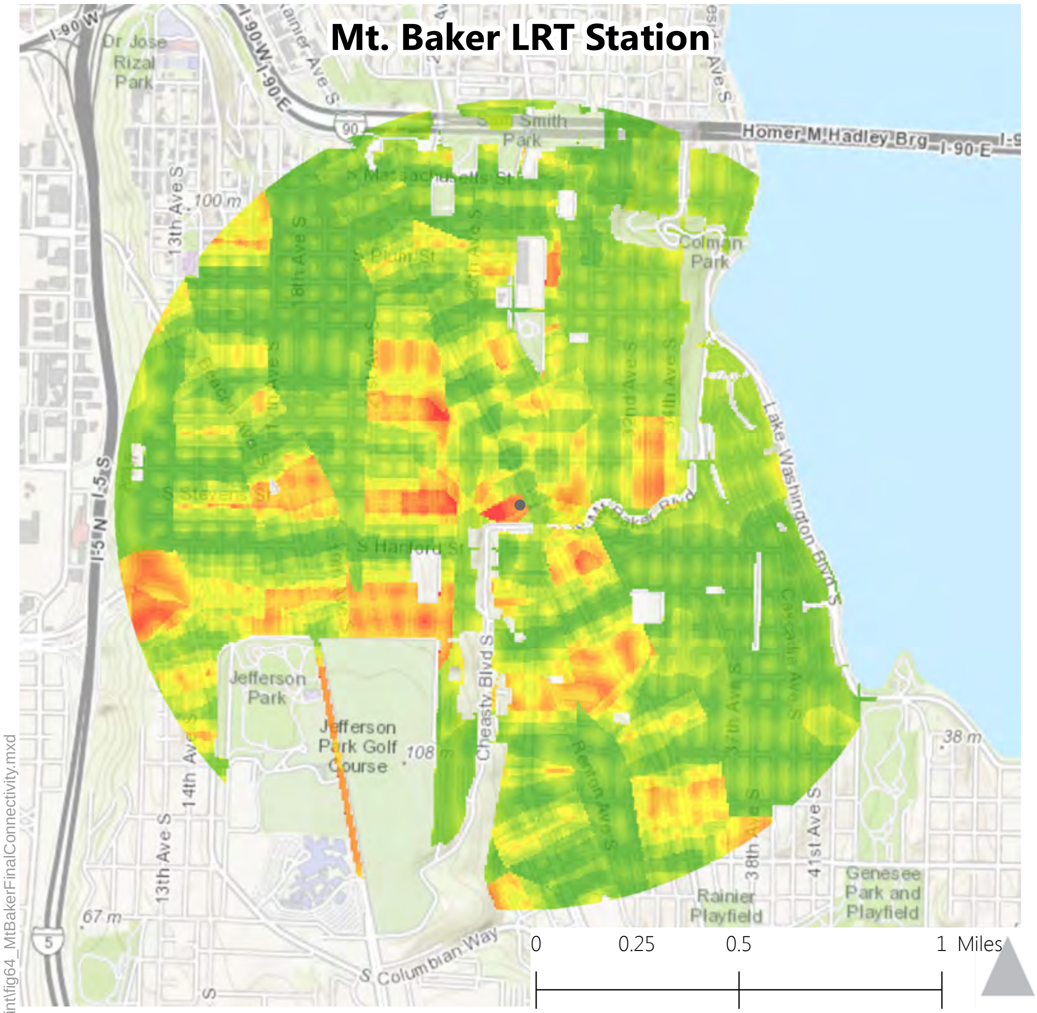
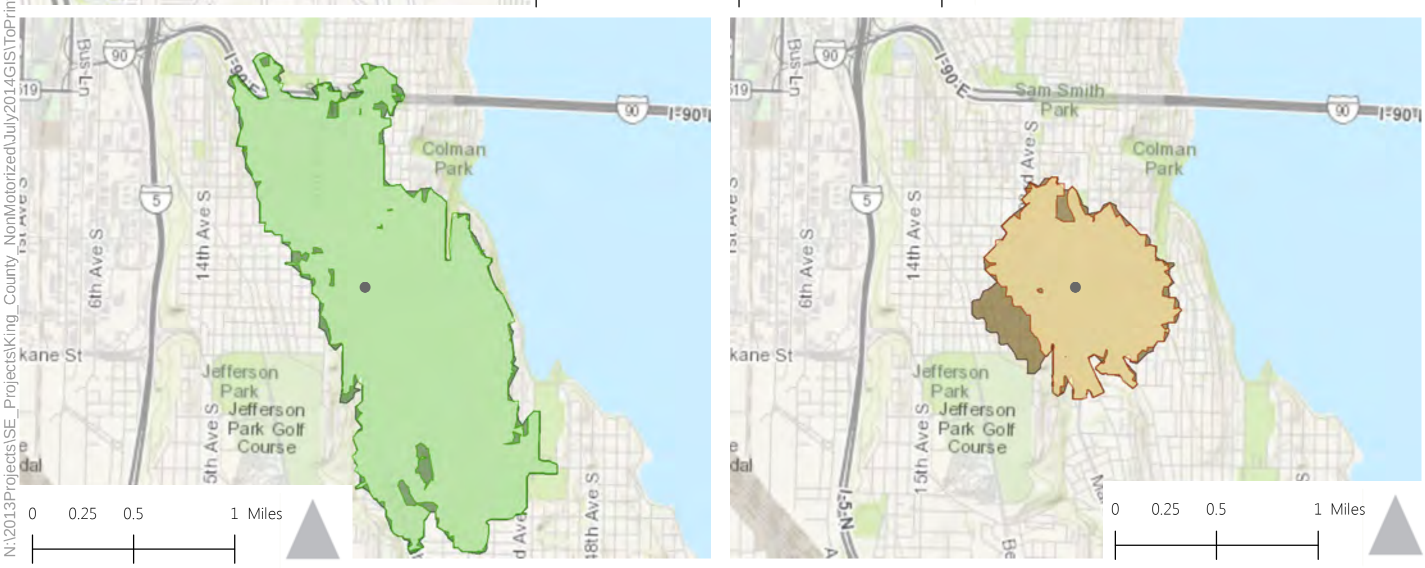
Figure 62

Northgate Transit Center Future Connectivity Map and 15-Minute Travel Sheds



Connectivity Improvements

Connectivity around the Mt. Baker LRT station area improved primarily due to cycletrack installations and new greenway signals. This improved both the bike stress and arterial crossing feasibility in the area while there were limited gains in the 15-minute travel sheds due to the present density of the street network.



Connectivity
High
Low

Study Stations

Existing 15-Minute Bike Shed

Future 15-Minute Bike Shed

Existing 15-Minute Walk Shed

Future 15-Minute Walk Shed

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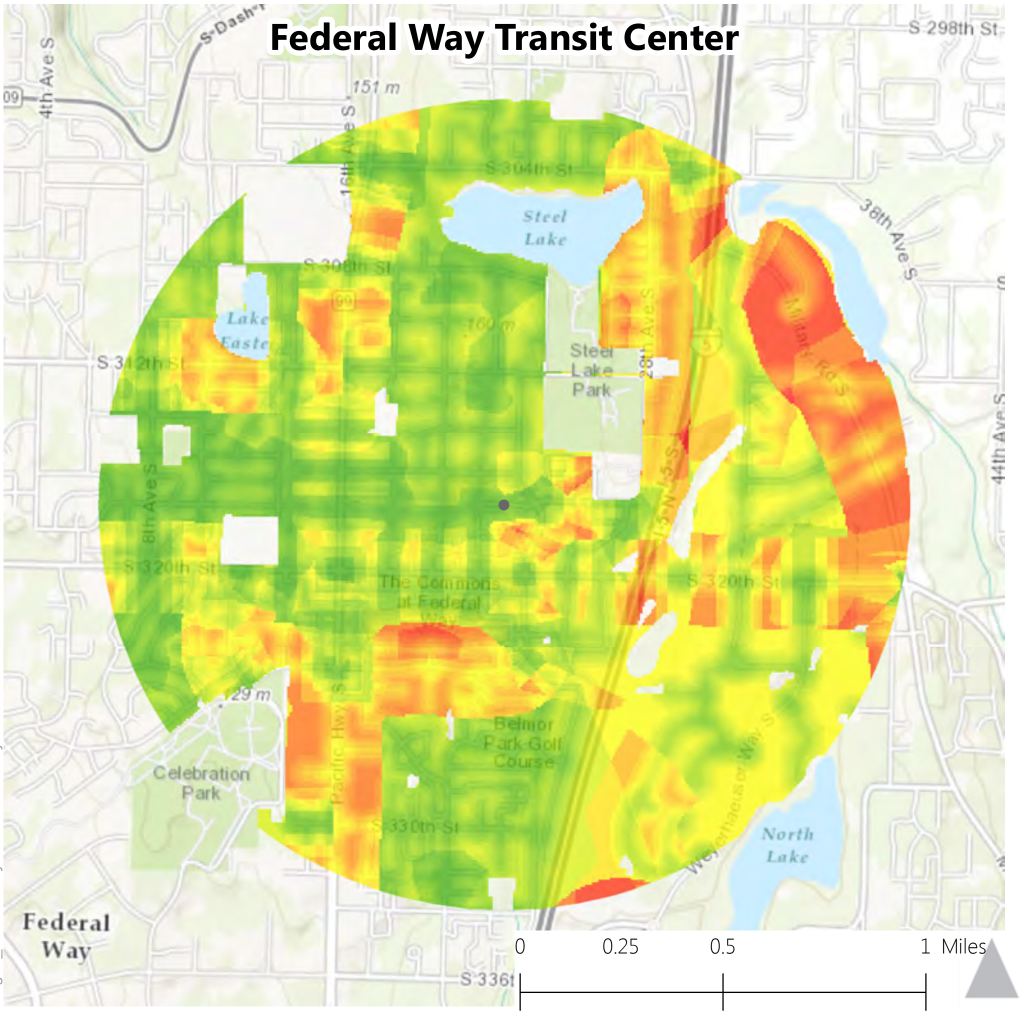
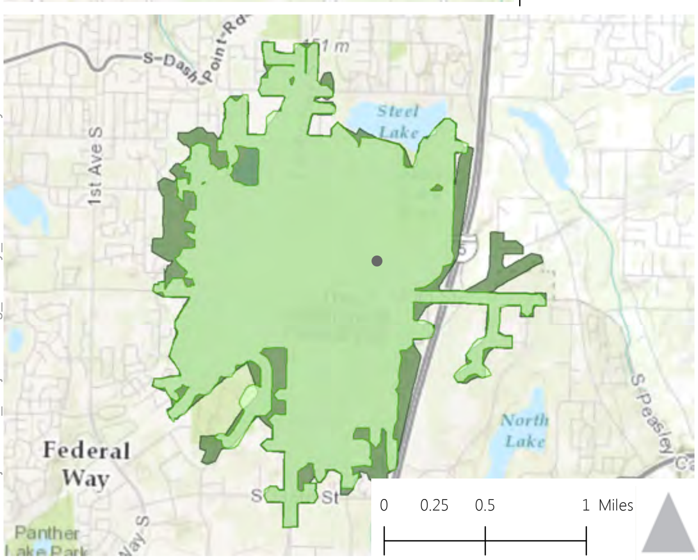
Figure 64

Mt. Baker LRT Station Future Connectivity Map and 15-Minute Travel Sheds



Connectivity Improvements

Connectivity in the Federal Way Transit Center area improved primarily from the new Federal Way Commons street grid and enhanced pedestrian crossings of arterials, particularly Pacific Highway and S 320th Street. These improvements provided a moderate expansion to the walk and bike sheds and helped enable a lower bicycling stress environment.



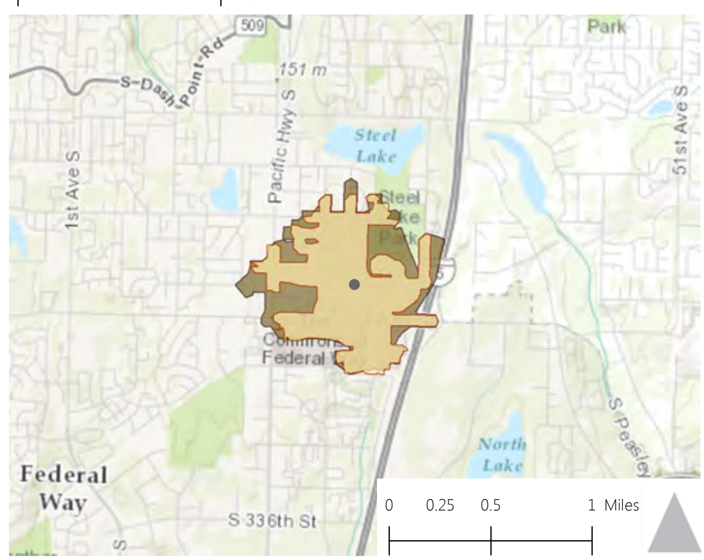


Figure 65

Federal Way Transit Center Future Connectivity Map and 15-Minute Travel Sheds

PRIORITIZING PROJECTS WITHIN THE CASE STUDY AREAS

An earlier chapter presented a methodology to prioritize projects within station areas across the entire region. This generalized analysis of project types was performed for the four case study locations and the results are shown in **Appendix B**. While the generalized project ranking is valuable to consider, the case studies give us the opportunity to evaluate some types of projects more specifically. Therefore, several projects were broken out from the generalized categories and evaluated/prioritized separately as part of the case study analysis. The projects were chosen utilizing the following steps:

- The existing surfaces were evaluated to identify poor scoring areas such as portions of a station area with low RDI scores or poor bike stress
- Within these poor scoring areas, the future projects were reviewed to determine if any would provide a substantial improvement to the existing poor connectivity

These projects include:

- Northgate Transit Center
    - I-5 pedestrian and bicycle bridge
    - 1st Avenue cycletrack
- Overlake Village
    - SR-520 pedestrian and bicycle bridge
    - New street grid
- Mount Baker Transit Center and Link Station
    - Cycletracks Rainier Avenue north of MLK Jr. Way and on MLK Jr. Way
- Federal Way Transit Center
    - New street grid in the Town Center area

The results of the connectivity analysis, along with the total project costs are shown in **Table 31**.

Table 31: Case Study "Selected Projects" Evaluation Results

Project	Area	2035 Daily Boardings	Connectivity Score Change	Change in Daily Boardings from Connectivity	Total Project Cost	Annual Cost per Rider
I-5 Pedestrian Bridge	Northgate	27,000	0.27	1,800	$ 25 M	$4
1st Avenue Cycletrack	Northgate	27,000	0.05	340	$ 1.1 M	$1
SR520 Pedestrian Bridge	Overlake	2,600	0.21	140	$ 13 M	$25
Overlake Village Street Grid	Overlake	2,600	0.30	200	$ 10.9 M	$15
MLK and Rainier Ave. Cycletrack	Mt. Baker	4,500	0.07	80	$ 3.2 M	$11
Federal Way Street Grid	Federal Way	18,500	0.42	1,900	$ 12.4 M	$2

As shown above, the I-5 Pedestrian Bridge at Northgate and the new street grid at Federal Way are expected to result in the most new daily transit riders. This result is due to the large increase in connectivity scores generated by these projects combined with the high future ridership levels expected at these station areas. The Overlake Village street grid results in a large connectivity change as well, but the ridership levels at the Overlake Village are expected to be lowest amongst the case studies.

When considering cost per new rider, the Northgate cycletrack rates the highest, while the street grid in Federal Way rates second best.

A review of **Table 22**, which summarized the demographic and transit service proximity rating, shows that only the Federal Way Transit Center was rated within the top 25 of the demographic and transit service metric developed for the entire study area project prioritization. Given the Federal Way street grid's strong performance with respect to cost per rider, this project would rate best when considering the aggregate performance measure developed earlier.

Other Projects to Enhance Non-Motorized Transit Access in the Case Study Locations

In addition to evaluating the non-motorized projects planned by local jurisdictions, the connectivity tool allows users to identify additional projects that could benefit access to transit. This project identification method is typically a two-step process:

1. Identify areas within a station that exhibit poor connectivity scores.
2. Determine the reason for the poor scores (RDI, signalized crossing, bike stress, sidewalk gaps, etc.)
3. Test various project type and project locations within the station-area to improve the score (For example, if a clear barrier is causing a poor RDI score for an area, test the result of adding a link across that barrier)

As part of the case study applications, the project team performed this analysis at two levels. 1) Evaluating the future 2035 composite connectivity score and individual connectivity surfaces to look for poor scoring areas that could be addressed through additional projects, and 2) identifying smaller-scale projects and other projects that cannot be readily evaluated with the connectivity tools. The findings of the team are listed below and summarized in **Table 32**.

Northgate Transit Center

A review of the final composite connectivity score map shown in **Figure 62** shows that that many of the remaining low-scoring areas in the Northgate Transit Center area are due to gaps in signalized arterial crossings (note the "corridors" of orange/red colors along streets such as Roosevelt Avenue and 92nd Street). However, as discussed earlier, these streets are relatively low volume/low speed streets and feature other crossing amenities such as marked (but unsignalized) crosswalks and four-way stops. Considering this limitation of the data, the project team identified the following improvements in the area:

- If the Northgate Mall parcel were ever to redevelop, additional street grid or pedestrian/bicycle pathways through the redeveloped site could improve access between the transit center and the dense uses along Northgate Way. This improvement would have a moderate benefit on improving the connectivity score and generating potential new transit riders.
- Field observations revealed that the pedestrian environment on Northgate Way under I-5 is poor. There are high-speed ramps on either side of the underpass, the sidewalk is adjacent to the traffic lanes (no buffer), and despite the presence of lights, it feels dark. Even with a new pedestrian/bike bridge to the south, the project

team expects Northgate Way to continue to be heavily traveled by pedestrians wishing to access the transit center from the northwest. The pedestrian (and to a lesser extent bicycle) environment could be substantially improved if these issues were addressed. These sorts of detailed improvements cannot be evaluated by the connectivity model, but they are complementary to the other improvements the model was able to evaluate.

- Given the large increase in non-motorized access forecasted under 2035 by this analysis and Sound Transit's Link light rail ridership forecasts, it will be important to monitor and meet the demand for bicycle parking. There are provisions for high-capacity bicycle parking in the Sound Transit station design. This analysis suggests that high-capacity bicycle parking will be important, along with good wayfinding so that potential users know where the parking is located.

Overlake Village

Based on plans obtained from the City of Redmond, the Overlake Village area is expected to change dramatically over the next 20 years. With the arrival of East Link, the City envisions the area transforming from the existing auto-oriented retail/office development form to more traditional transit-oriented development. To support this change, the City has developed a robust plan that includes new street connections, standards for wide sidewalks, and low-stress bicycle links to the station. The final composite connectivity score map shows relatively good scores throughout much of the station, however gaps still exist within the southeast portion of the station-area that is located in the City of Bellevue. With this in mind, the project team identified the following types of improvements for non-motorized connectivity in the area:

- Extend the off-street trails along 148th and 156th Avenues south into Bellevue to extend the low-stress bicycle catchment area of the station. As shown in **Table 32**, this improvement would provide a substantial boost to the connectivity score and a credible increase in ridership.
- If the City of Bellevue were to adopt similar pedestrian design standards as Redmond, then there would be a consistent and high quality pedestrian

environment in both cities. This would improve the overall pedestrian access to the station.

Mt. Baker

Amongst the case studies, Mt. Baker is expected to experience the least amount of change over the next 20 years, in large part because it already has Link light rail. The City of Seattle is pursuing a modest rezone of the area, but nothing on the scale of the other three case study areas. A review of the final composite connectivity score map shows that the planned improvements in the area results in good overall connectivity. Given this background, the project team focused more on small-scale improvements that were revealed through the field visits and our earlier work in the area:

- Some gaps in signalized crossings of Rainier Avenue continue to exist, particularly south of the transit center. Providing additional crossing opportunities will aid pedestrians and cyclists accessing the Link station and transit center.
- As mentioned earlier, while the Mt. Baker area generally has good sidewalk coverage, the sidewalks are old and are not constructed to a standard one would now expect in a Hub Urban Village. Additionally, sidewalk maintenance is an issue with many sidewalks in a state of poor repair. The City of Seattle will likely require new development to upgrade the sidewalks in the area and these types of improvements will improve the walking environment in the area and address some existing challenges for people with limited mobility.
- A long-standing critique of the Mt. Baker Transit Center and Link station is the difficult connections between buses and rail. For example, the busy southbound Route 7 stop is located a couple of blocks north of the Link station. While this is not a simple problem to address, the project team feels that additional ridership benefits could be gained by more closely linking the connections between bus and rail.
- The field visits found that there are pedestrian connections up the hill to the west of the Link station, which provides access to the neighborhoods to the west. However, many of these paths are heavily vegetated and the street lighting is obscured by trees. Given these conditions, some people may hesitate to use these paths. Better

landscaping or vegetation maintenance could help to address these issues and make these areas more attractive to a greater pool of users.

Federal Way Transit Center

Similar to Overlake Village, a major transformation of urban form and transportation is being planned for around the Federal Way Transit Center. The City of Federal Way has developed a robust plan to increase densities add street grid connections, and improve bicycle access to the Transit Center area. A look at the final composite connectivity score map shows good non-motorized access immediately around the station area. There are low-scoring areas east of I-5, but as noted earlier, low population/employment densities and steep terrain limit the utility of providing additional infrastructure in that area. The team's suggestions for additional connectivity improvements are listed below:

- The Commons at Federal Way Mall is a barrier to accessing the residential areas south of the mall. If this mall were ever to redevelop, extending the City's planned street grid south of 320th Street would improve access to the station.
- The field work indicated that several streets around the transit center lack street lighting. While it is likely that this lighting will be added in conjunction with adjacent redevelopment, the research indicated that adequate lighting is important in encouraging non-motorized access to transit.
- Similar to Northgate, the large increase in transit ridership forecast at the Federal Way Transit Center may spur the need for high-capacity bicycle parking facilities and wayfinding signage. The existing facilities were well utilized. This analysis suggests that bicycle parking will be important to meeting the overall non-motorized access needs at this station.

Table 32: Case Study Project Evaluation

Project	Area	Additional Connectivity Score Change	Additional Daily Ridership
Grid through Northgate Mall parcel	Northgate	0.007	50
Southerly extension of proposed off-street trails along 148th and 156th Avenue	Overlake Village	0.120	80

Table32: Case Study Project Evaluation (cont'd)

Project	Area	Additional Connectivity Score Change	Additional Daily Ridership
Additional Signal Crossings along Rainier Ave	Mt. Baker	0.051	60
Grid through Federal Way Commons	Federal Way	0.017	80
Improved lighting/sidewalks along Northgate Way underneath I-5	Northgate	*	*
Additional bicycle parking; bicycle wayfinding	Northgate	*	*
Wider sidewalks in City of Bellevue	Overlake Village	*	*
Wider sidewalks, sidewalk repairs	Mt. Baker	*	*
Direct connection between bus bays and Link light rail station	Mt. Baker	*	*
Vegetation control/new landscaping along hillclimbs	Mt. Baker	*	*
Fill gaps in street lighting	Federal Way	*	*
Additional bicycle parking; bicycle wayfinding	Federal Way	*	*

*The connectivity model is not able to evaluate these types of projects

Sidewalk Gap Evaluation

While not an issue for the case study locations, the project team recommends that any detailed analysis of stop/station areas begin with a search of sidewalk gaps within 200 feet of a stop location. This is important because these gaps could be missed in an area with generally good sidewalk coverage but no sidewalks immediately near the transit stop.

13. MODEL LIMITATIONS AND THOUGHTS ON FUTURE IMPROVEMENTS

The non-motorized connectivity tools and model developed as part of this project provide a new set of resources for transportation planners in the region to understand how pedestrian and bicycle improvements can positively affect transit. As noted earlier, the tools and model were developed using data from frequent transit stops and major transit centers in the Central Puget Sound Region. The tools have been calibrated and applied to a variety of transit stops and stations in the region including frequent bus stops, Link light rail, and Sounder commuter rail stations.

However, given the data sources used to develop the regression model in particular, the project team advises caution on applying the results to low-ridership stops in low-density areas. The model may tend to over-state the percent change in ridership in more auto-dependent and exurban areas with more limited transit service. The logarithmic nature of the model helps to reduce the tendency to overstate ridership gains, but caution should be used in these areas. The connectivity tools and maps should be equally applicable throughout the region and in other areas.

Another limitation to reiterate is the regional nature of the model. Given the need to unify data from more than 20 jurisdictions, some of the more detailed non-motorized data, such as sidewalk width, pavement condition, and street lighting could not be included in the model. Additionally, in order to ensure accuracy across the entire study area, the model tends to be sensitive to larger-scale changes in connectivity. Research indicates that some smaller-scale projects could be important in terms of how people access transit. The case study examples above described some recommended practices to identify these smaller-scale improvements, particularly those that would complement major non-motorized investments.

Looking forward, the project team has identified several items that could enhance both this effort and other non-motorized access evaluations in the region:

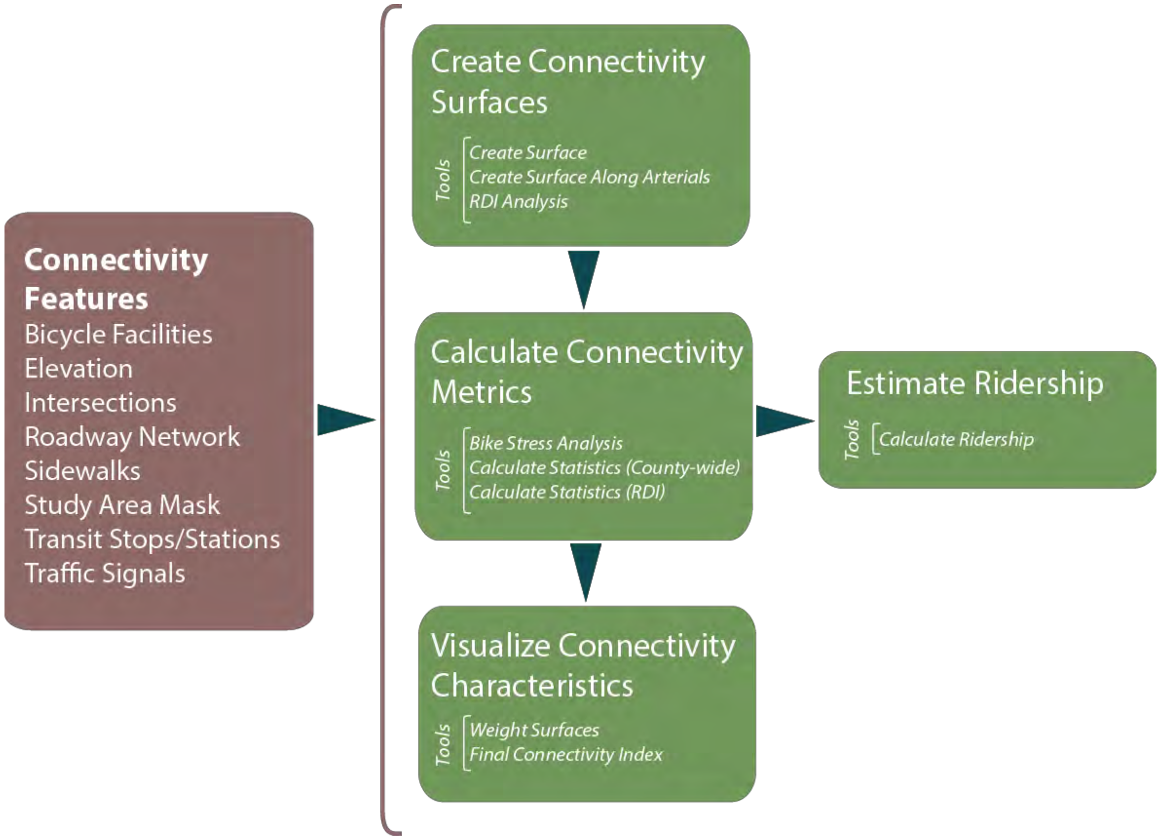
- Develop a uniform non-motorized GIS dataset: As noted earlier, the primary challenge to this project was collecting and organizing data from more than 20 jurisdictions in a form that was usable for this study. The need to run a network analysis (to understand the paths of travel to/from a transit station) was key to this study. This requires that a complete and connected network of facilities be developed. None of the jurisdictions in the study area had non-motorized datasets that lent themselves to a network analysis. The project team recommends that a road/non-motorized centerline file be developed for the region to aid in this type of analysis. Each jurisdiction can update the centerline file as they see fit, but a uniform starting point will make the combination of data much easier.
- Include additional non-motorized facility data: As more jurisdictions collect more detailed non-motorized data in the future, these data can be incorporated into the connectivity analysis. Many of the tools developed for this project are generic and could be easily updated to summarize additional information like sidewalk width or presence of a landscape buffer. New regression modeling will have to be performed to understand the significance of these variables to transit ridership.

APPENDIX A. CONNECTIVITY TOOLBOX USER GUIDE

INTRODUCTION

The Connectivity Analysis Toolbox is a suite of custom planning tools created to help King County Metro (KC) and Sound Transit (ST) analyze the relationships between connectivity, non-motorized access to transit, and ridership. The tools are designed for use in the ArcMap environment using the following inputs: 1) existing conditions transportation network data developed by Fehr & Peers containing data collected from multiple jurisdictions and agencies, and 2) new/updated transportation network data developed by KC and ST[20]. The Connectivity Analysis Toolbox is intended for use by analysts with advanced GIS knowledge to assess existing and future connectivity conditions and to better understand how changes in connectivity may affect transit ridership. The flow chart below outlines the Connectivity Analysis workflow and associated tools.

[20] The final section of this document provides guidance about developing and updating new transportation network data. The companion report on the Non-Motorized Access Study describes the process that Fehr & Peers used to obtain and prepare the transportation network data as well.



This User Guide is an introductory manual for the Connectivity Toolbox, and includes descriptions of Connectivity Tools with examples of tool inputs and results. An accompanying geodatabase containing sample GIS data is included with this document. Fehr & Peers provides this sample data for use in tutorials as well as gaining familiarity with the toolbox prior to running a full analysis. A more extensive countywide database reflecting with the most current data applied in the connectivity analysis is also included. The following sections describe the tools included in the Connectivity Toolbox and the sample data provided.

ABOUT THE CONNECTIVITY TOOLBOX

The Connectivity Toolbox contains nine tools for calculating connectivity metrics. The tools were built using ArcGIS and the Python programming language. The tools included are designed to 1) produce connectivity "surfaces" that graphically represent the non-motorized connectivity metrics utilized in the King County Non-Motorized Access to

Transit study, 2) calculate metrics for use in regression analysis, 3) visualize connectivity characteristics, and 4) estimate potential changes in ridership.

The surface creation tools include “Create Surface”, “Create Surface Along Arterials”, “Bike Stress Analysis”, and “RDI Analysis”. Surface outputs from these tools contain connectivity scores ranging from 1 (low connectivity) to 5 (high connectivity). Surfaces are “masked” using a polygon feature class that represents those areas to be included in the analysis. Please refer to the project report for more information on the role of the mask layer in the connectivity analysis.

Connectivity surfaces are weighted to incorporate regression coefficients using the “Weight Surface” tool. The output-weighted surfaces are used as inputs to the “Final Connectivity Index” tool, which creates a composite connectivity index for each study location analyzed. In addition to the surface tools, the Connectivity Toolbox includes tools to calculate metrics for the areas surrounding study locations.

- The “Calculate Statistics (Countywide)” tool produces statistics for each study feature (e.g., transit stop location) using surfaces that represent connectivity at the countywide scale (for example, sidewalks and intersections).
- The “Calculate Statistics (RDI)” tool generates statistics for each study feature using surfaces that represent connectivity at the study-feature scale.
- Along with bike stress surfaces, the “Bike Stress Analysis” tool also produces bike stress statistics at the study-feature scale.
- The “Calculate Ridership” tool can be used to estimate ridership based on weighted connectivity scores for existing and future conditions.

The screen capture below shows the Connectivity Toolbox and associated tools as viewed in ArcGIS Desktop.

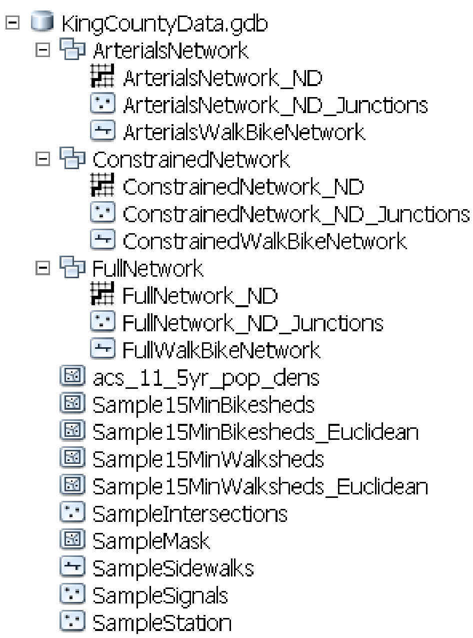
CONNECTIVITY TOOLBOX

- Connectivity Toolbox.tbx
  - 1. Create Surface
  - 2. Create Surface Along Arterials
  - 3. Bike Stress Analysis
  - 4. RDI Analysis
  - 5. Calculate Statistics (County-wide)
  - 6. Calculate Statistics (RDI)
  - 7. Calculate Ridership
  - 8. Weight Surfaces
  - 9. Final Connectivity Index

ABOUT THE SAMPLE DATA

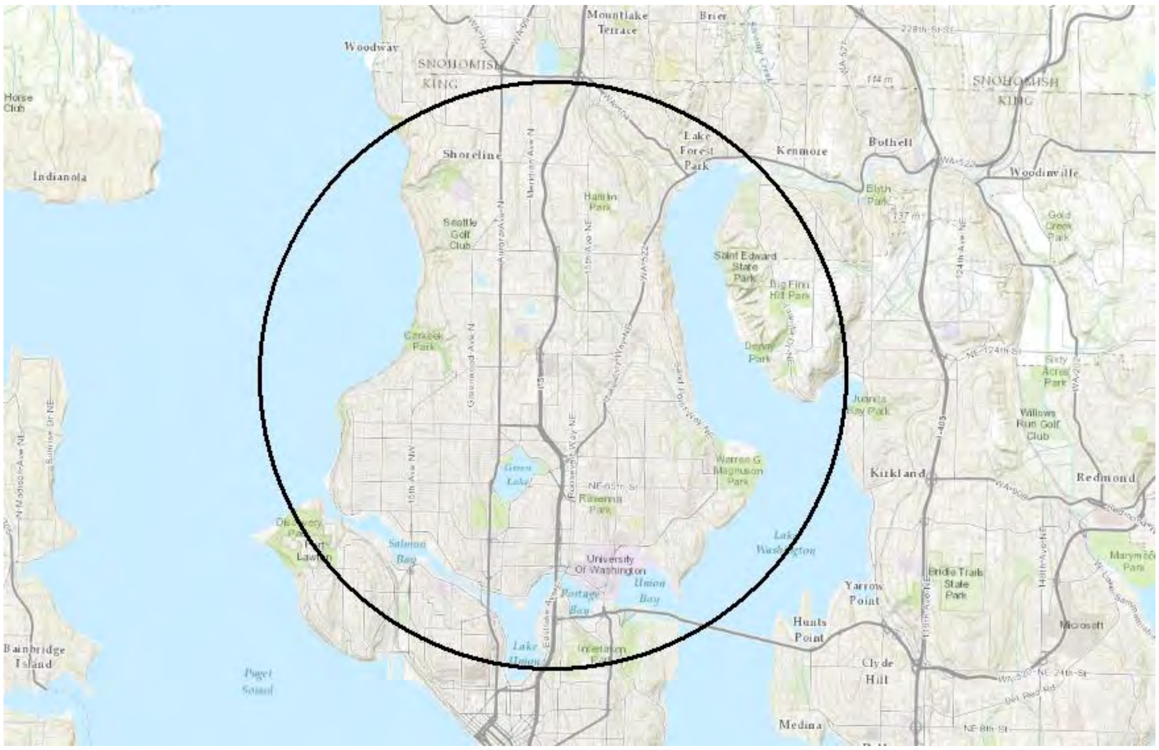
The screen capture below shows the file geodatabase containing a sample dataset prepared for the King County Connectivity Toolbox training session. The geodatabase contains network datasets and feature classes representing key non-motorized infrastructure/built environment features that are correlated with transit usage, such as sidewalks, intersections, and traffic signals. For more information on the relationships between these feature classes and transit usage, as well as an account of data collected for this project, please refer to the project report.

FILE GEODATABASE SHOWING SAMPLE DATA



The sample data represents three transit stations in the Northgate area and non-motorized infrastructure/built environment features in a 5-mile vicinity. Below is a map showing the study area covered by the sample data.

SAMPLE DATA STUDY AREA



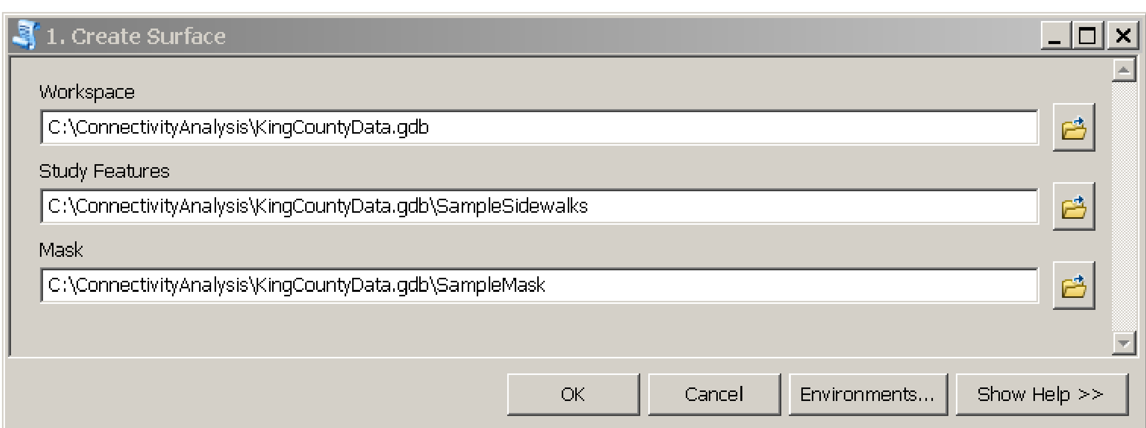
WORKING WITH THE CONNECTIVITY TOOLBOX

CREATE SURFACE

Summary:

The Create Surface tool creates a scored raster surface for a user-defined feature class. Raster cells are assigned a score based on proximity to study features. For example, if the user provides a feature class representing sidewalks, the raster cells closest to the sidewalk will be assigned the highest score. The score for raster cells will decrease with distance from the input features (e.g., sidewalks). Surfaces created from this tool are intended to visualize feature coverage and to be used as input to the Calculate Statistics (Countywide) and Final Connectivity Index tools. Fehr & Peers applied this tool as part of the King County Non-Motorized Connectivity Study using feature classes representing sidewalks and intersections, two factors known to contribute improved non-motorized access in an area. For more information on the research regarding sidewalks and intersections as they relate to access and transit ridership, as well as the role of sidewalk and intersection metrics in the connectivity study please refer to the project report. This tool can also be used to produce surfaces for other feature classes as the discretion of the analyst (e.g., distance from transit stops).

This tool requires the Spatial Analyst extension.



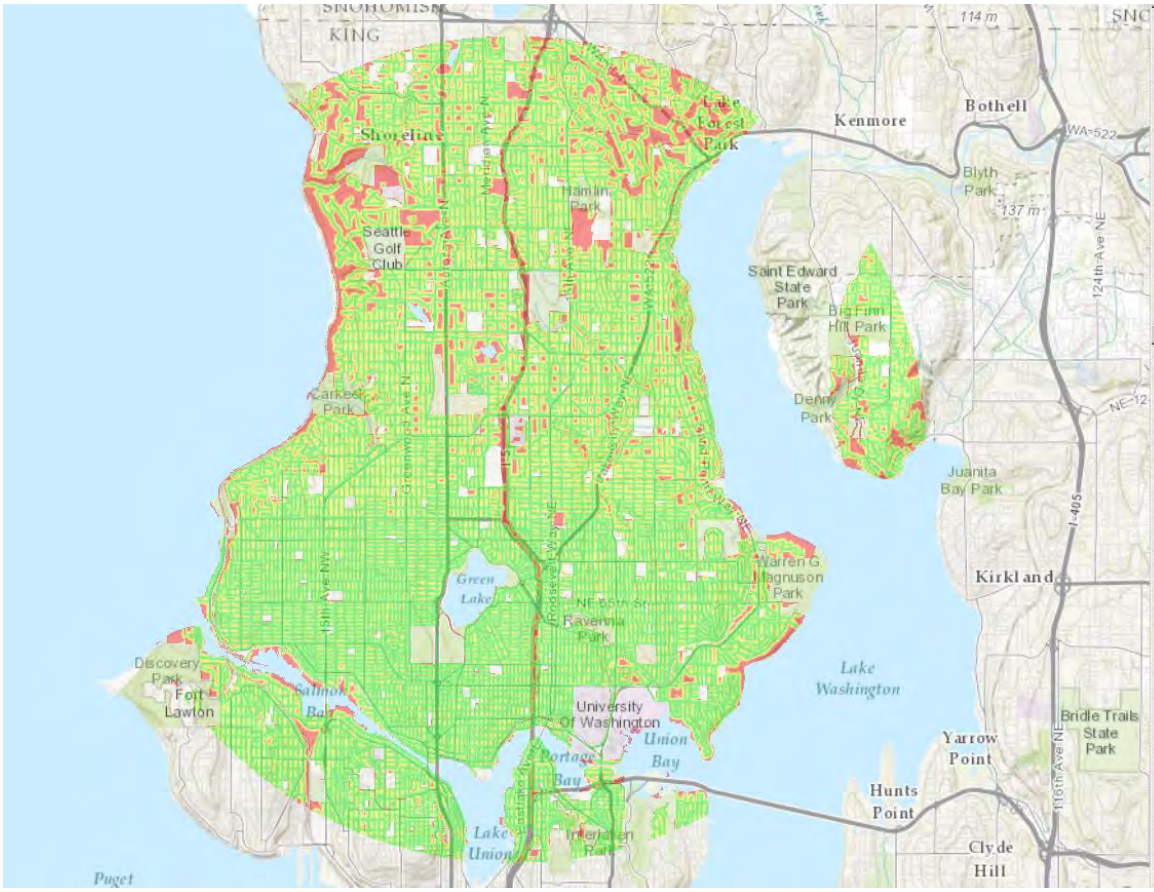
Parameters:

- Workspace
  - Enter the file geodatabase (.gdb) to which output data will be written.
- Study Features
  - Enter a point or line feature class. A scored surface (raster) will be created for this feature class.
- Mask
  - Enter a polygon feature class representing the study area and omitting regions not to be included in the analysis (ex: water features, parks, cemeteries).

Results:

The Create Surface tool produces a raster surface showing the connectivity score for the study features, with 1 being the lowest score (coverage farthest from the study features) and 5 being the highest score (coverage closest to the study features). The screen capture below shows a sidewalk/walkway[21] score surface in the sample data study area. The highest score is shown in green, and the lowest in red.

[21] As described in the full report, local streets that lack sidewalks are still defined as being "good" walking routes to transit stops. Therefore, there is not a gap in sidewalk and walkway coverage shown north of 85th Street.

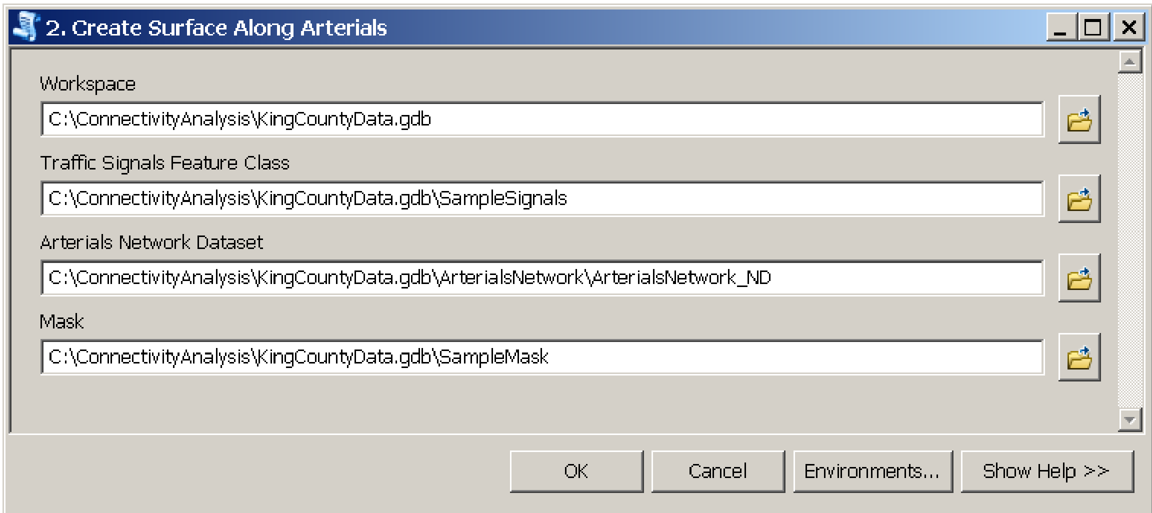


CREATE SURFACE ALONG ARTERIALS

Summary:

The Create Surface Along Arterials tool produces a scored surface for a user-defined traffic signals feature class. The scores are assigned relative to locations along a network. The input network should be a subset of the full network containing only arterial network features. Surfaces created from this tool are intended to visualize feature coverage along a roadway network representing only arterials and to be used as input to the Calculate Statistics (Countywide) and Final Connectivity Index tools.

This tool requires the Network Analyst, 3D Analyst, and Spatial Analyst extensions.

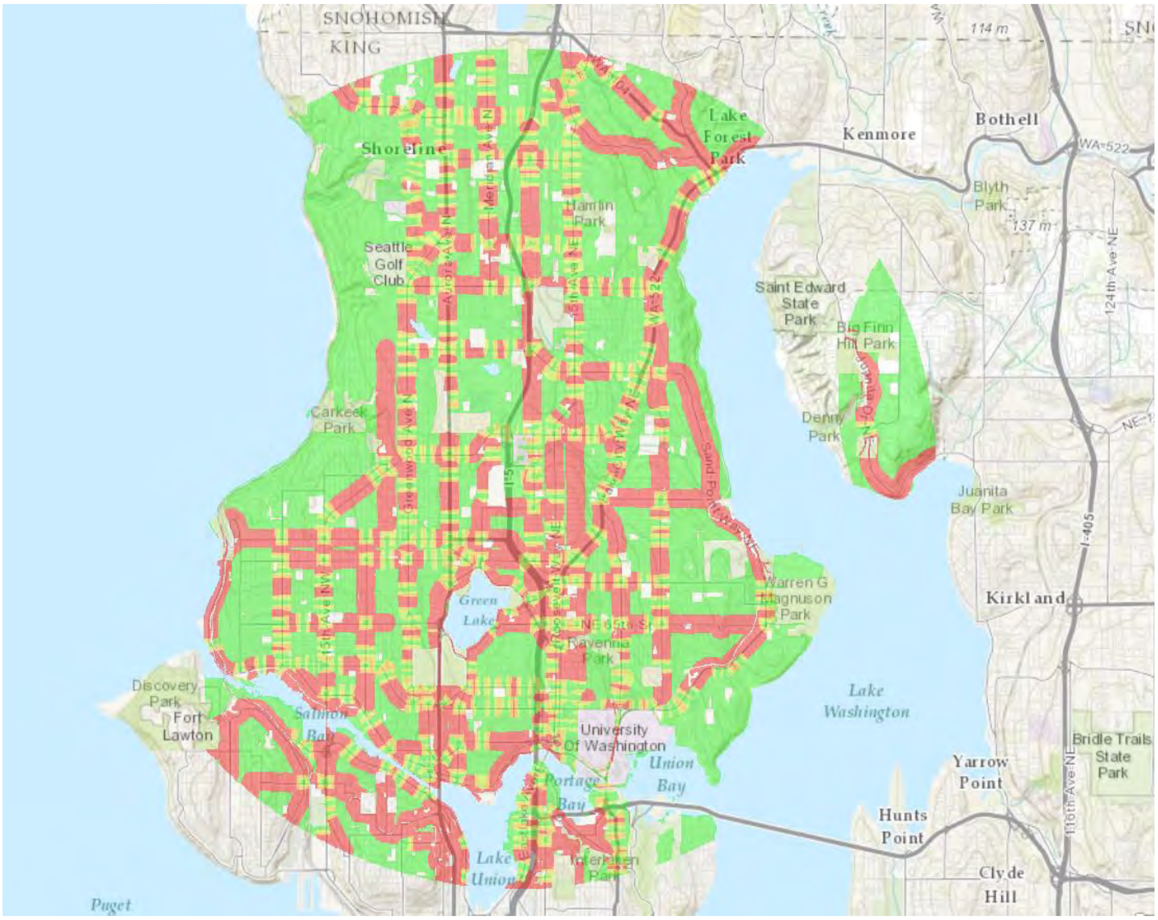


Parameters:

- Workspace
    - Enter the file geodatabase (.gdb) to which output data will be written.
- Traffic Signals Feature Class
    - Enter a point feature class representing traffic signals. A scored surface will be created for this feature class.
- Arterials Network Dataset
    - Enter a network dataset that represents the network features along which the Traffic Signals Feature Class will be assessed. For example, if analyzing traffic signals only along arterial roadways, enter a network dataset containing only arterials.
- Mask
    - Enter a polygon feature class representing the study area and omitting regions not to be included in the analysis (ex: water features, parks, cemeteries).

Results:

The Create Surface along Arterials tool produces a raster surface showing the connectivity score for the traffic signal features, with 1 being the lowest score (coverage farthest from the study features) and 4 being the highest score (coverage closest to the study features). The screen capture below shows a traffic signals score surface in the sample data study area. The highest score is shown in green, and the lowest in red.



BIKE STRESS ANALYSIS

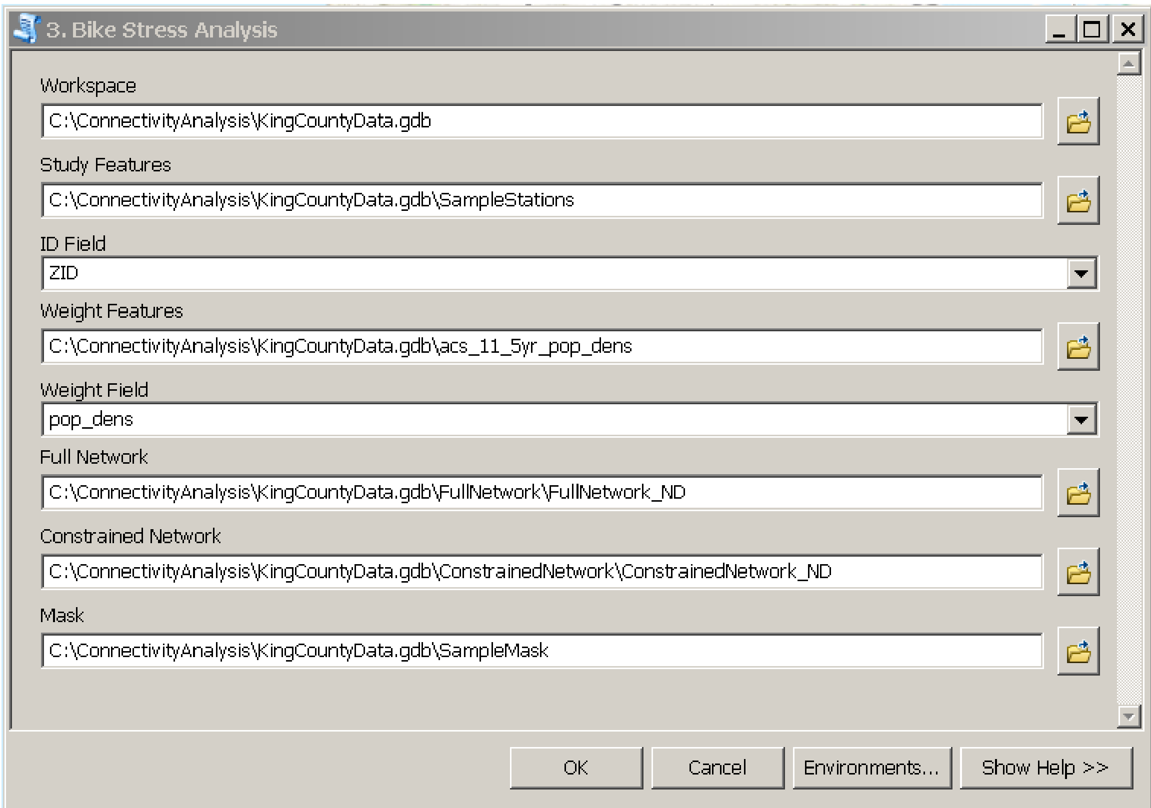
Summary:

The Bike Stress Analysis tool compares full-network and constrained-network (limited to low-stress facilities only) routes to study locations from eight starting points surrounding each location[22]. The eight starting points are established one-mile from each location in the eight cardinal (N/S/E/W) and intermediate (NE/SE/NW/SW) directions. Once the route comparisons are completed, each study location is assigned a bike stress score based on the ratio of the full-length to constrained-length routes. Bike stress raster surfaces are created to visualize the results in a three-mile radius surrounding each study location.

The Bike Stress Analysis tool receives study features from the user as well as data used to weight the output bike stress scores for each study location. As part of the Non-Motorized Connectivity Study, scores are weighted using population density values derived from the American Community Survey. The user also provides full and constrained network datasets (prepared prior to running the tool). The outputs of the tool include a point feature class containing the eight cardinal location points surrounding each station, a summary table with the weighted bike stress score for each study feature, and bike stress raster surfaces for a three-mile area around each study feature.

This tool requires the Network Analyst and Spatial Analyst extensions.

[22] The full report describes the research and methodology behind bike stress. Full and constrained networks are also defined in the full report.



Parameters:

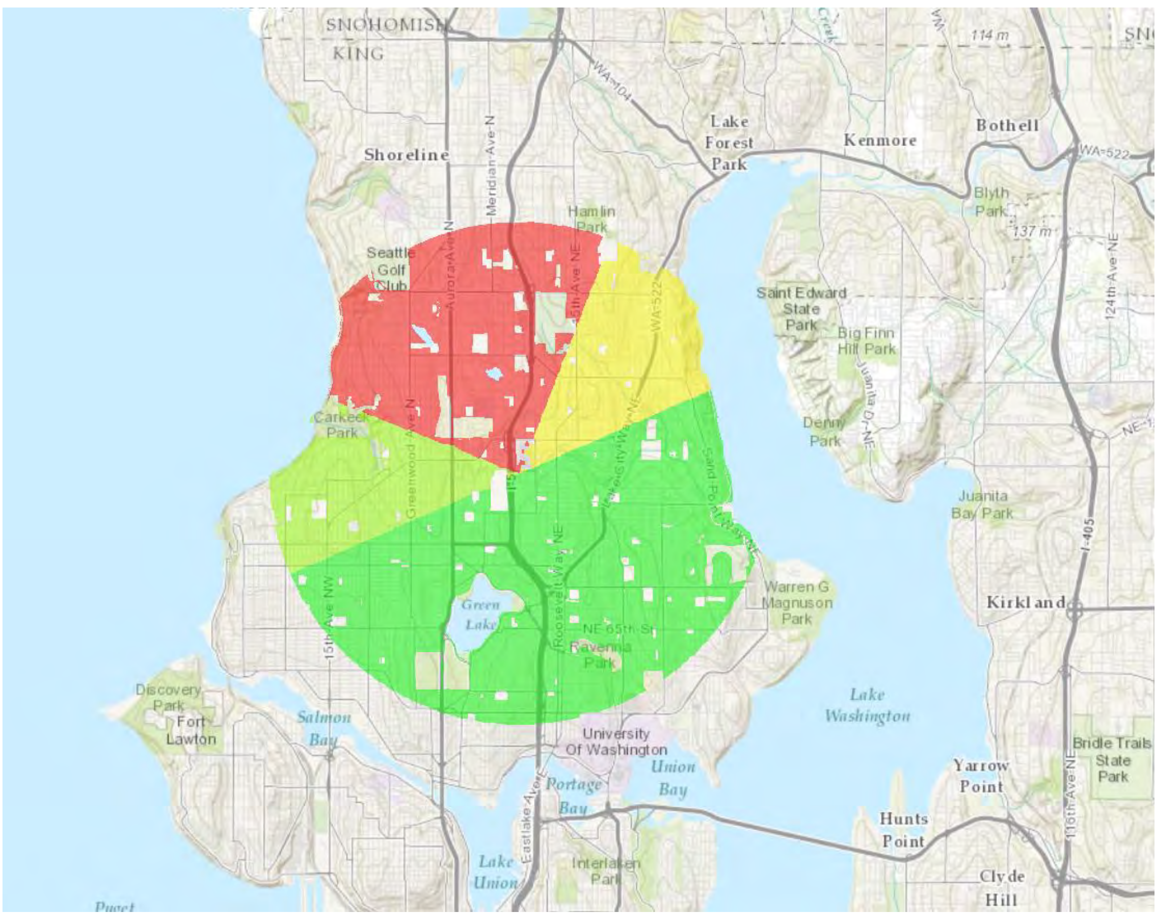
- Workspace
  - Enter the file geodatabase (.gdb) to which output data will be written.
- Study Features
  - Enter a point feature class (ex: station locations). Bike stress will be calculated for each feature in the input Study Features feature class. The feature class must have a field containing a unique identifier for each point feature.
- ID Field
  - Select the ID field from the about Study Features feature class that contains a unique identifier for each point feature.
- Weight Features
  - Enter a polygon feature class containing data that will be used to weight the final bike stress score applied to each input study feature (ex: population density).
- Weight Field

- Select the field from the above Weight Features feature class that contains the values used to weight the final bike stress score.

- Full Network
  - Enter a network dataset that represents the full study area network. The routes along this network will be compared with those of the constrained network.
- Constrained Network
  - Enter a network dataset that represents the constrained study area network. The routes along this network will be compared with those of the full network.
- Mask
  - Enter a polygon feature class representing the study area and omitting regions not to be included in the analysis (ex: water features, parks, cemeteries).

Results:

The Bike Stress Analysis tool produces a summary table of bike stress results by station and one raster surface per station visualizing the bike stress index within a three-mile radius surrounding each station. The surface is created through an interpolation process using the eight cardinal locations surrounding each station. The screen capture below shows bike stress analysis results for one sample station (ZID = 261). The lowest score is represented by a value of 1 (shown in red), and the highest score is represented by a value of 5 (shown in green).

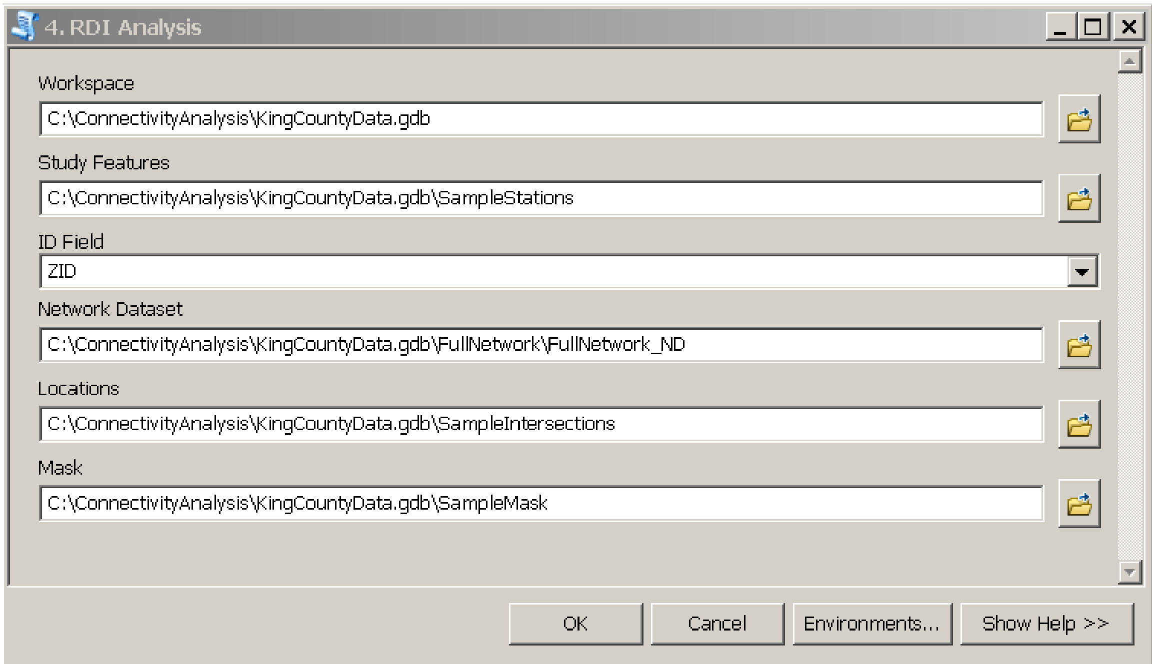


RDI ANALYSIS

Summary:

The RDI Analysis tool produces a unique surface for each record in a point-based feature class. RDI or "Route Directness" is a metric that describes the relationship between distance traveled along a network and the respective "as the crow flies" distance. Typically the distance traveled along a network between two locations is greater than the direct, "as the crow flies" distance between the same two points. The closer these two distance measurements are between a given set of locations, the higher the RDI score. Circuitous paths based on a minimum-cost solution will increase the difference between the two distance measurements and lower the RDI score. This tool uses a set of origin points (transit stop locations) and destination points (intersections) to create a surface that reflects the Route Directness for all destinations within a three-mile radius around each origin. Although transit stop locations and intersections are used as the origin and destination locations as part of the Non-Motorized connectivity study, any set of point locations can be used as inputs to the tool.

This tool requires the Network Analyst and Spatial Analyst extensions.



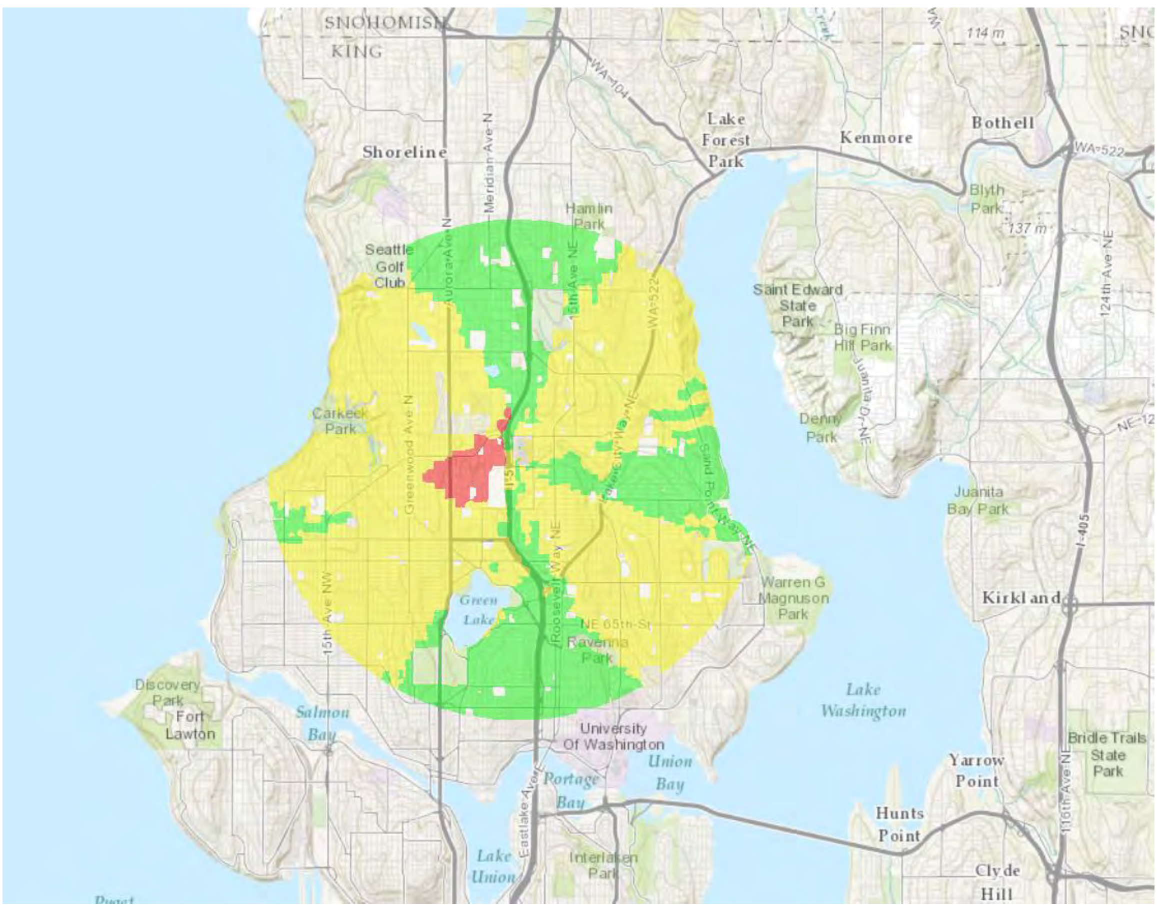
Parameters:

- Workspace
    - Enter the file geodatabase (.gdb) to which output data will be written.
- Study Features
    - Enter a point feature class (ex: station locations). An RDI surface will be created for this feature class.
- ID Field
    - Select the ID field from the about Study Features feature class that contains a unique identifier for each point feature.
- Network Dataset
    - Enter a network dataset that represents the network features along which the Study Features feature class will be assessed for Route Directness.
- Locations
    - Enter a point feature class that represents locations to/from which people might be traveling to the study features (ex: intersections). Route Directness will be assessed between each of these locations and nearby Study Features.
- Mask

- Enter a polygon feature class representing the study area and omitting regions not to be included in the analysis (ex: water features, parks, cemeteries).

Results:

The RDI Analysis tool produces one raster surface per station visualizing the route directness in a three-mile radius surrounding each station. The surface is produced through a spatial interpolation process using the RDI scores of the input locations surrounding each station. The screen capture below shows RDI analysis results for one sample station (ZID = 261). The lowest score is represented by a value of 1 (shown in red), and the highest score is represented by a value of 5 (shown in green).



CALCULATE STATISTICS (COUNTY-WIDE)

Summary:

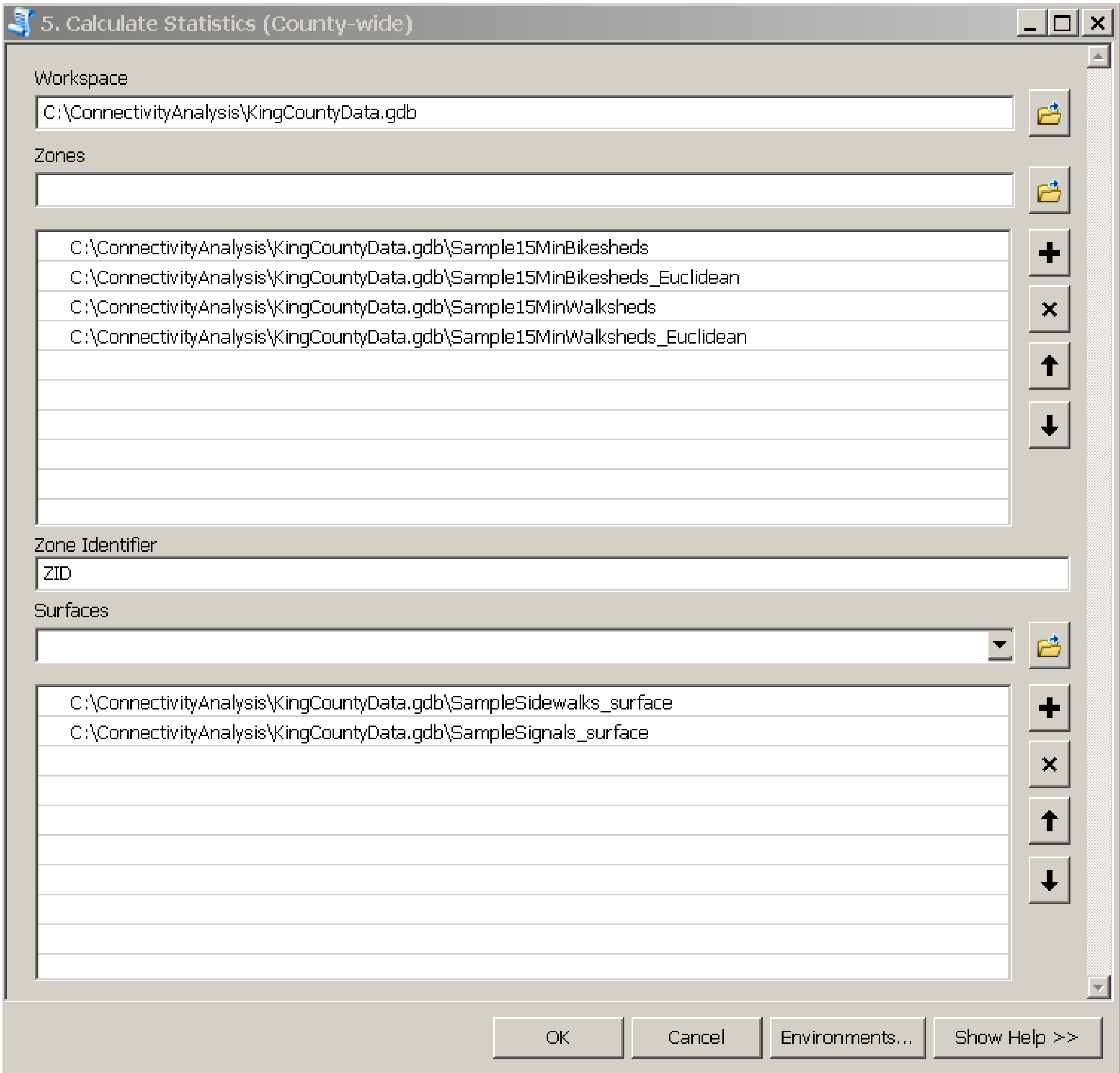
The Calculate Statistics (Countywide) tool uses ArcGIS Zonal Statistics to summarize surfaces created using the Create Surface tool. The results can be examined in tabular format and applied in analyses such as linear regression. The Zonal Statistics geoprocessing tool in ArcGIS uses the Spatial Analyst extension. It calculates statistics on values of a raster within the zones of another dataset. The statistics types are described in the list below. The Calculate Statistics tool calculates zonal statistics for each zone record in a feature class or a list of feature classes. It can be used to produce connectivity surface summary values for each station. The zones being analyzed may include bike sheds and walk sheds surrounding each KCM transit station.

This tool requires the Spatial Analyst extension.

Zonal Statistics Calculated by ArcGIS:

- MEAN — Calculates the average of all cells in the value raster that belong to the same zone as the output cell.
- MAJORITY — Determines the value that occurs most often of all cells in the value raster that belong to the same zone as the output cell.
- MAXIMUM — Determines the largest value of all cells in the value raster that belong to the same zone as the output cell.
- MEDIAN — Determines the median value of all cells in the value raster that belong to the same zone as the output cell.
- MINIMUM — Determines the smallest value of all cells in the value raster that belong to the same zone as the output cell.
- MINORITY — Determines the value that occurs least often of all cells in the value raster that belong to the same zone as the output cell.
- RANGE — Calculates the difference between the largest and smallest value of all cells in the value raster that belong to the same zone as the output cell.
- STD — Calculates the standard deviation of all cells in the value raster that belong to the same zone as the output cell.
- SUM — Calculates the total value of all cells in the value raster that belong to the same zone as the output cell.

- VARIETY — Calculates the number of unique values for all cells in the value raster that belong to the same zone as the output cell.



Parameters:

- Workspace
    - Enter the file geodatabase (.gdb) to which output data will be written.
- Zones
    - Enter the polygon feature classes representing statistical zones, such as walk shed and bike shed feature classes.
- Zone Identifier

-
    - Enter the name of the ID field that contains the unique identifier common to all zone geographies.
- Surfaces
    - Enter the countywide surfaces (rasters) for which statistics will be calculated within the input zone geographies.

Results:

The Calculate Statistics (Countywide) tool produces statistics tables for each zone type for each surface. The example result table below show sidewalks statistics for the three sample stations (ZIDs 86, 261, and 348) within the 15-minute Euclidean (as-the-crow-flies) bike sheds surrounding each station.

ZS_Sample15MinBikesheds_Euclidean_SampleSidewalks_surface

OBJECTID *	ZID	COUNT	AREA	MIN	MAX	RANGE	MEAN	STD	SUM	VARIETY	MAJORITY	MINORITY	MEDIAN
1	86	688867	619980000	1	5	4	4.14638	1.03975	2856310	5	5	2	4
2	261	708529	637676000	1	5	4	4.11126	1.05975	2912950	5	5	2	4
3	348	706998	636298000	1	5	4	4.08018	1.08188	2884680	5	5	2	4

CALCULATE STATISTICS (RDI)

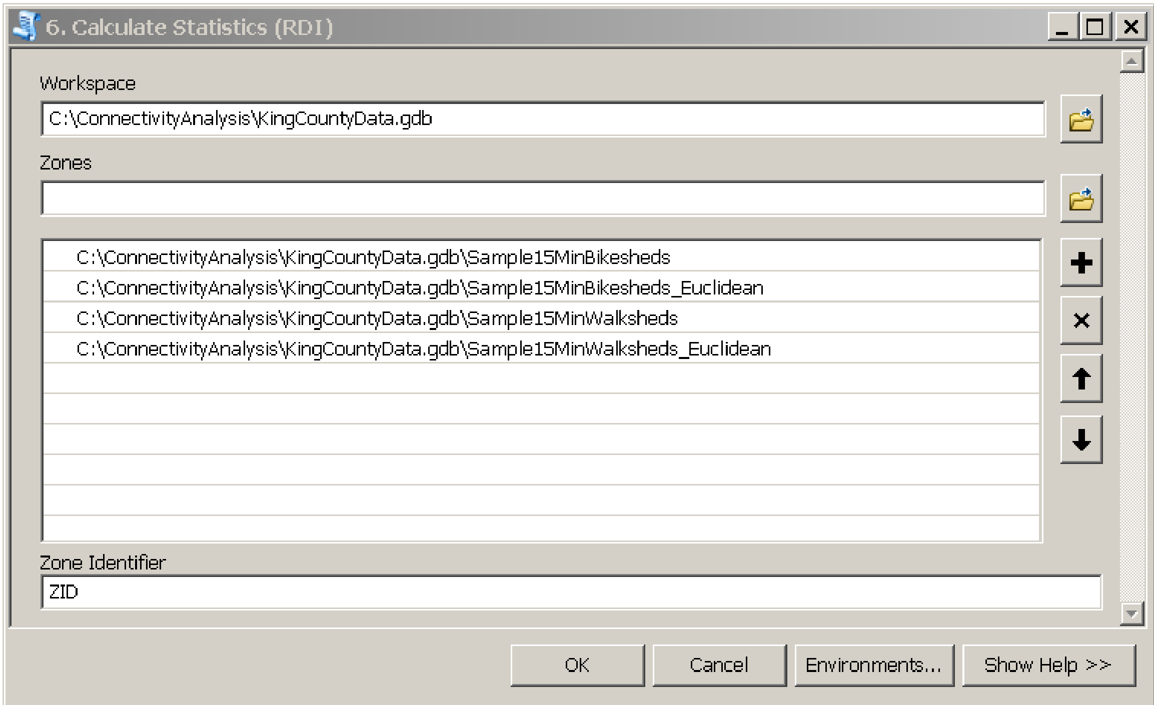
Summary:

The Calculate Statistics (RDI) tool uses ArcGIS Zonal Statistics to summarize surfaces created using the station-based RDI surface tool (RDI Analysis). In other words, this tool generates a numerical summary of the RDI raster values. The results can be examined in tabular format and applied in analyses such as linear regression where the average RDI of a transit stop area is of interest.

The Zonal Statistics geoprocessing tool in ArcGIS uses the Spatial Analyst extension. It calculates statistics on values of a raster within user defined "zones". The statistics types (mean, maximum, median, etc.) are described in the Calculate Statistics (Countywide) tool description above. Because the Create RDI Surfaces tool produces individual feature-by-feature surfaces, the process of summarizing the surfaces is different than the Calculate Statistics (Countywide tool). This is due to each station zone having a unique RDI surface[23]. As the tool iterates through each zone record, it selects the appropriate RDI surface for that zone and calls for the execution of the Zonal Statistics geoprocessing tool. It can be used to produce RDI surface summary values for each station. The zones being analyzed may include bike sheds and walk sheds surrounding a transit stations dataset.

This tool requires the Spatial Analyst extension.

[23] In other words, the RDI value of a location will vary based on which transit stop is being analyzed. In the Northgate example, a particular raster cell could have a poor RDI score to access the Northgate Transit Center and a relatively good RDI score to access a RapidRide stop on Aurora Avenue. In contrast the arterial crossing score of a location does not vary based on the transit stop being analyzed.



Parameters:

- Workspace
  - Enter the file geodatabase (.gdb) to which output data will be written. The workspace must contain RDI surfaces created using the RDI Analysis Tool.
- Zones
  - Enter the polygon feature classes representing “zones” over which to calculate the RDI statistics. These zones can be any shape/size, the example above specifies a variety of walk shed and bike shed polygons.
- Zone Identifier
  - Enter the name of the ID field that contains the unique identifier common to all zone geographies.

Results:

The Calculate Statistics (RDI) tool produces statistics tables for each zone. The example result table below shows RDI statistics for the three sample stations (ZIDs 86, 261, and 348) within the 15-minute bike sheds (zone) surrounding each station.

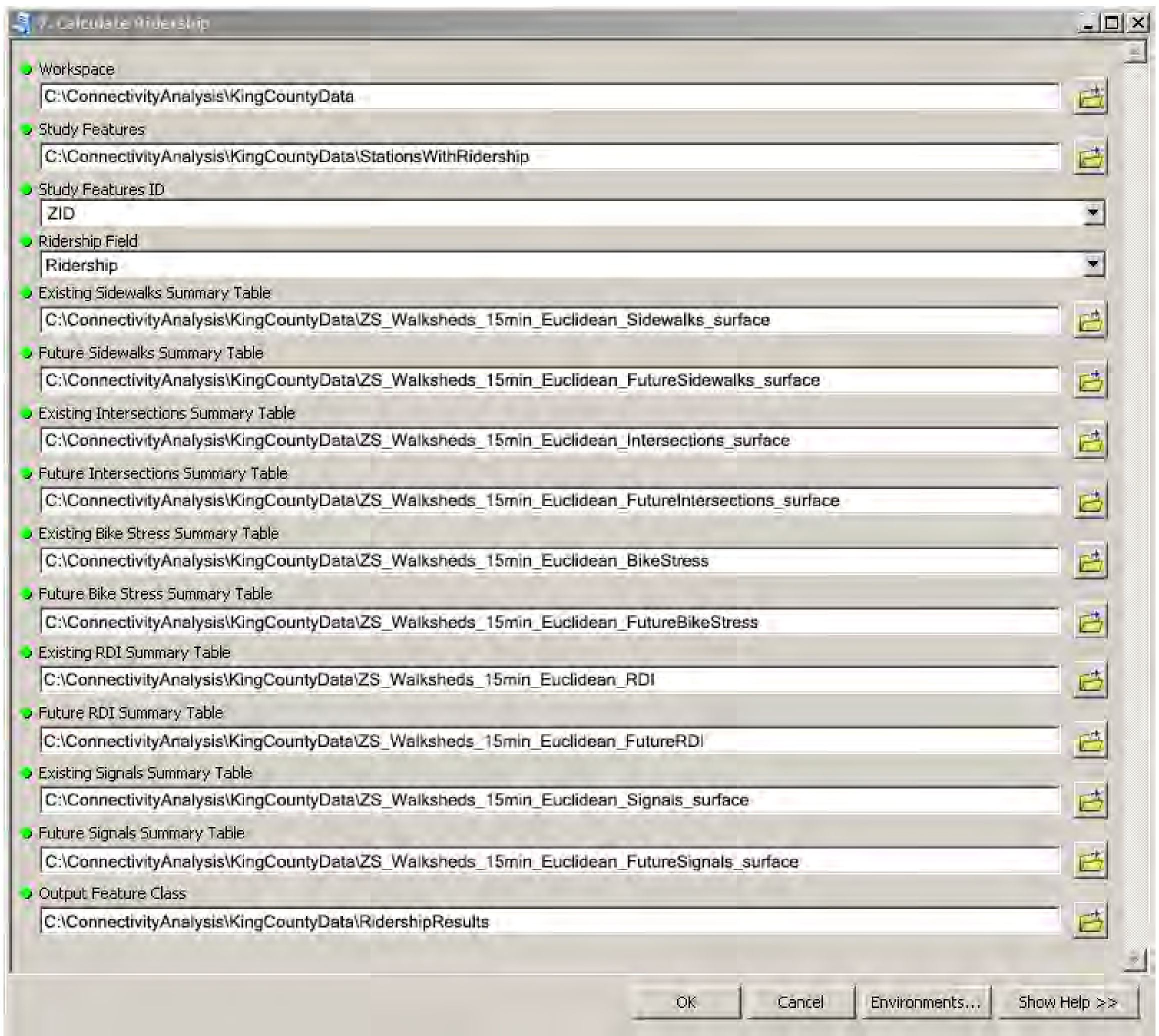
ZS_Sample15MinBikesheds_RDI

OBJECTID *	ZID	COUNT	AREA	MIN	MAX	RANGE	MEAN	STD	SUM	VARIETY	MAJORITY	MINORITY	MEDIAN
1	261	28472	25624800	2	5	3	4.26472	0.602801	121425	4	4	2	4
2	348	40642	36577800	2	5	3	4.35417	0.698514	176962	4	4	2	4
3	86	68411	61569900	4	5	1	4.42239	0.49394	302540	2	4	5	4

CALCULATE RIDERSHIP

Summary:

The Calculate Ridership tool uses ridership and connectivity variables for existing and future conditions to calculate change in ridership for a set of Study Features defined by the user. This tool works with file geodatabase tables produced using the Calculate Statistics (Countywide), Calculate Statistics (RDI), and Bike Stress Analysis tools.



Parameters:

- Workspace
    - Enter the file geodatabase (.gdb) to which output data will be written.
- Study Features
    - Enter a point feature class (ex: station locations). Bike stress will be calculated for each feature in the input Study Features feature class. The feature class must have a field containing a unique identifier for each point feature.
- Study Features ID
    - Select the ID field from the Study Features feature class that contains a unique identifier for each point feature.
- Ridership Field
    - Select the field from the Study Features feature class that contains ridership values for each study feature.
- Existing Sidewalks Summary Table
    - Enter a file geodatabase table with sidewalk summary results (existing conditions) from the Calculate Statistics (Countywide) tool. The "MEAN" field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Future Sidewalks Summary Table
    - Enter a file geodatabase table with sidewalk summary results (future conditions) from the Calculate Statistics (Countywide) tool. The "MEAN" field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Existing Intersections Summary Table
    - Enter a file geodatabase table with intersection summary results (existing conditions) from the Calculate Statistics (Countywide) tool. The "MEAN" field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Future Intersections Summary Table
    - Enter a file geodatabase table with intersection summary results (future conditions) from the Calculate Statistics (Countywide) tool. The "MEAN"

field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.

- Existing Bike Stress Summary Table
    - Enter a file geodatabase table with bike stress summary results (existing conditions) from the Bike Stress Analysis tool. The “avg_ratio” field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Future Bike Stress Summary Table
    - Enter a file geodatabase table with bike stress summary results (future conditions) from the Bike Stress Analysis tool. The “avg_ratio” field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Existing RDI Summary Table
    - Enter a file geodatabase table with bike stress summary results (existing conditions) from the Calculate Statistics (RDI) tool. The “MEAN” field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Future RDI Summary Table
    - Enter a file geodatabase table with bike stress summary results (future conditions) from the Calculate Statistics (RDI) tool. The “MEAN” field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Existing Signals Summary Table
    - Enter a file geodatabase table with signal summary results (existing conditions) from the Calculate Statistics (Countywide) tool. The “MEAN” field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Future Signals Summary Table
    - Enter a file geodatabase table with signal summary results (future conditions) from the Calculate Statistics (Countywide) tool. The “MEAN” field from this table will be used in conjunction with other tables to calculate change in ridership for each study feature in the Study Features feature class.
- Output Feature Class Name

- Enter the name and location of the output file to be created. The output produced is a point feature class containing connectivity variables and change in ridership for each study feature.

Results:

The Calculate Ridership tool produces an output point feature class containing ridership and connectivity variables as well as change in ridership. As described in the full report, the ridership outputs are one of the key products of the Connectivity Toolbox. Ridership is used to evaluate and prioritize potential non-motorized improvement projects.

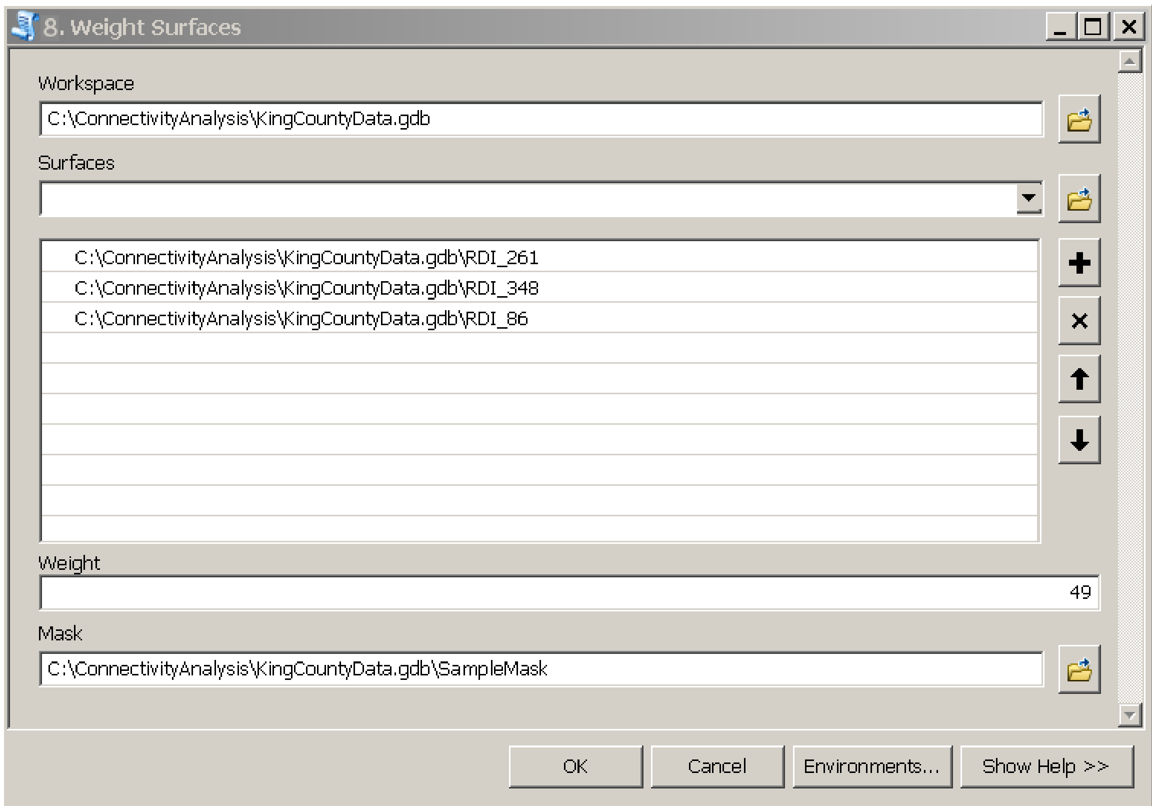
WEIGHT SURFACES

Summary:

The Weight Surface tool weights raster cells of an input surface according to a user-defined input weight. Surfaces weighted using this tool can be used as inputs to the Final Connectivity Index tool. The Weighted Surfaces and the Final Connectivity Index are intended for spatial representation and visualization. Statistics applied in the Calculate Ridership tool are weighted separately according to model findings. For consistency between model results and visualizations, it is recommended that the weight percentages derived from the model be applied in the Weight Surfaces tool. The table below shows the weight percentages applied for each surface in the Non-Motorized Connectivity Study. Refer to the project report for more information on the model results and weight percentages.

	Coefficient	Weight Percentage
RDI	0.860	36%
Bike Stress	0.145	6%
Sidewalk/Walkway Density	0.669	14%
Intersection Density	0.393	8%
Signalized Crossing	0.878	36%

This tool requires the Spatial Analyst extension.



Parameters:

- Workspace
  - Enter the file geodatabase (.gdb) to which output data will be written.
- Surfaces
  - Enter station-based or countywide raster surfaces produced using the RDI Analysis, Bike Stress Analysis, Create Surface, or Create Surface along Network tools. All surfaces entered will be weighted according to the weight value specified in the next field.
- Weight
  - Enter a whole-number weight value. This value will be multiplied by input surface raster cell values to produce weighted surfaces.
- Mask

- Enter a polygon feature class representing the study area and omitting regions not to be included in the analysis (ex: water features, parks, cemeteries).

Results:

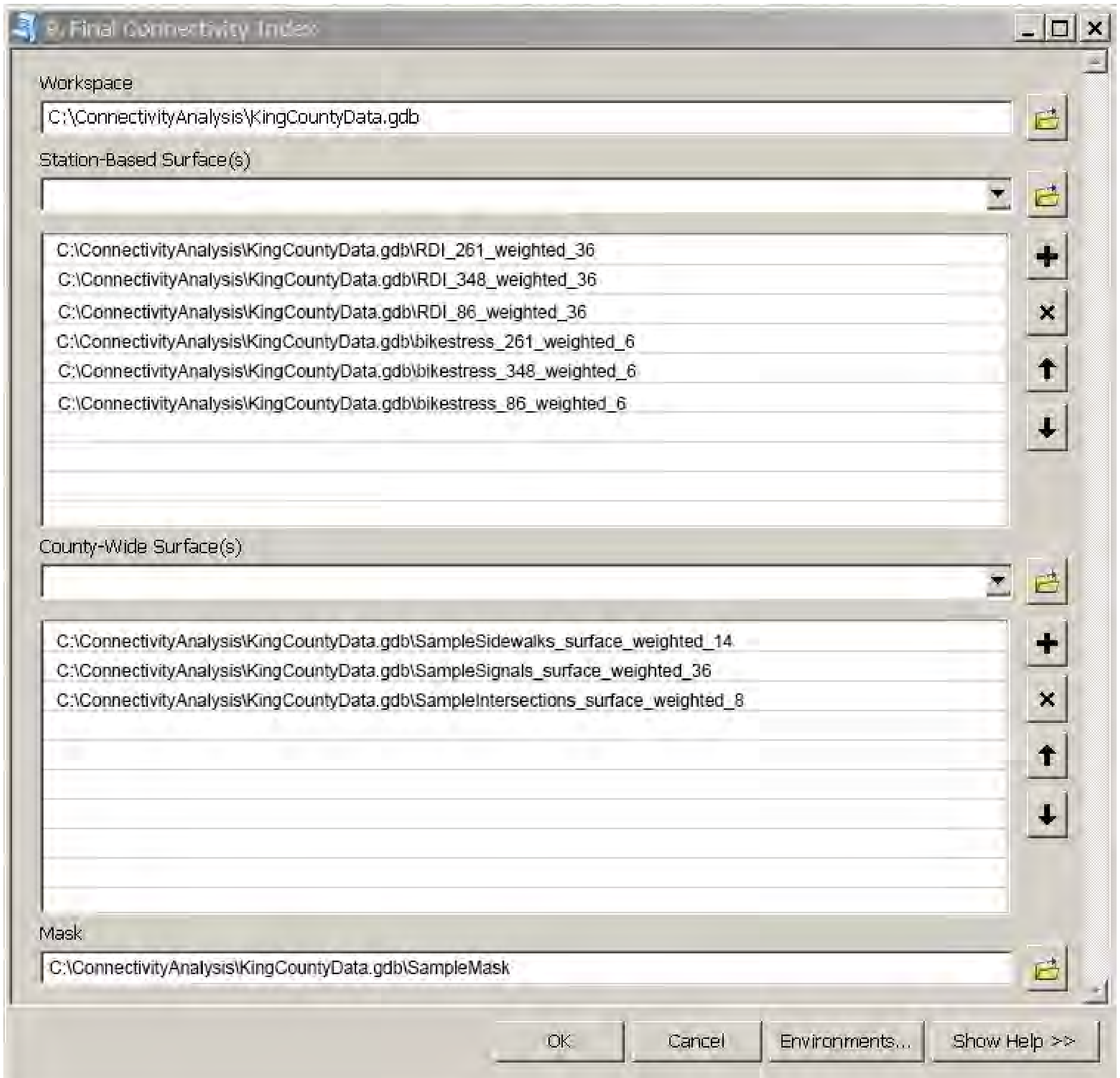
The Weight Surface tool produces weighted versions of input surfaces. The screen capture below shows the sample RDI surfaces as viewed in the Catalog window of ArcMap with their weighted equivalents (weighted by the weight percentage for RDI, which is 36).

FINAL CONNECTIVITY INDEX

Summary:

The Final Connectivity Index tool creates a composite scored surface using either the results from previous surface tools and/or new surfaces created from additional study layers. The Final Connectivity Index tool overlays component surfaces and assigns a composite score for each output raster cell. The output surface is a visual summary of connectivity based on features identified by the user as contributing to the connectivity of a region.

This tool requires the Spatial Analyst extension.



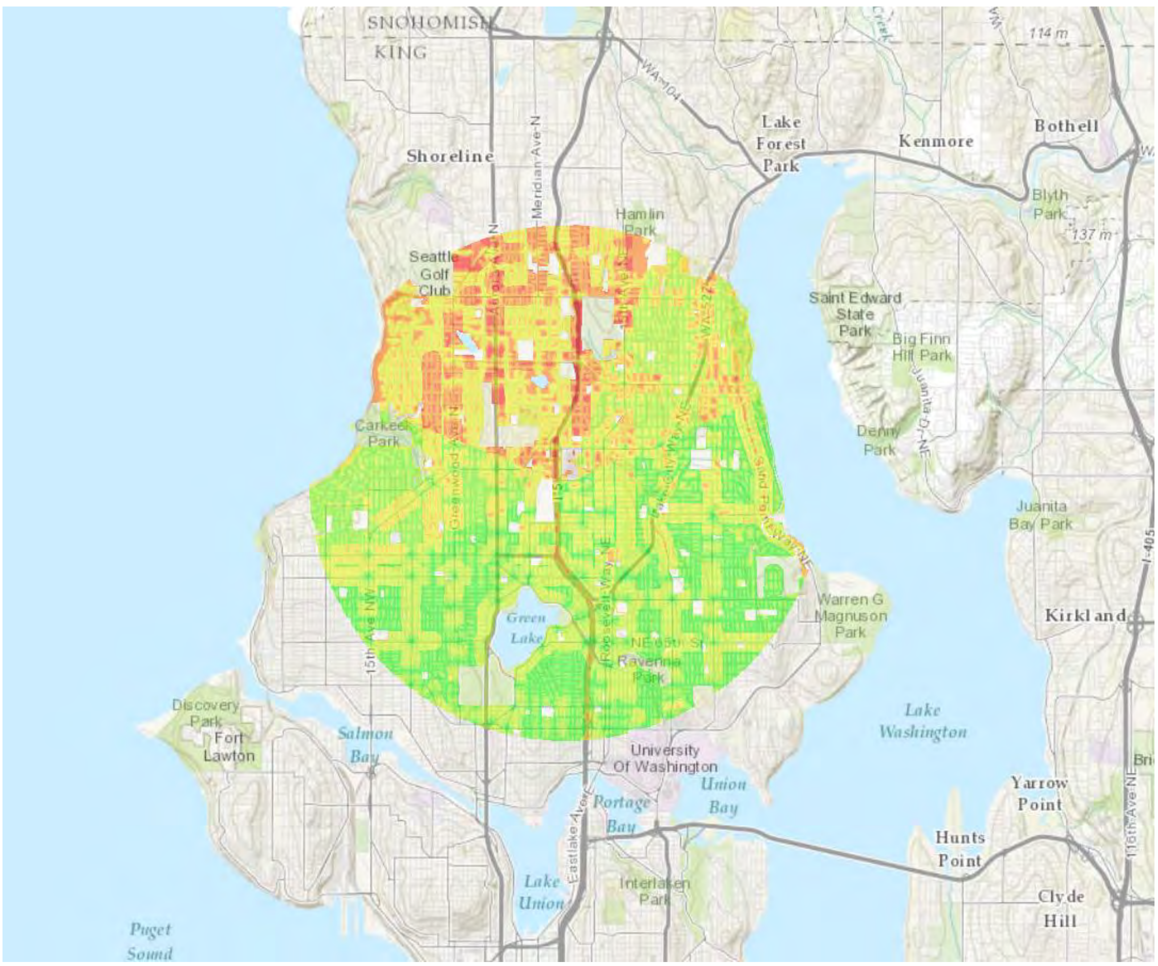
Parameters:

- Workspace
  - Enter the file geodatabase (.gdb) to which output data will be written.
- Station-Based Surface(s)
  - Enter station-based raster surfaces produced using the RDI Analysis or Bike Stress Analysis tools (or corresponding raster surfaces weighted using the Weight Surfaces tool). These surfaces must follow the naming convention *SurfaceName_SurfaceID* (ex: RDI_244), or for weighted surfaces, *SurfaceName_SurfaceID_Weight* (ex: RDI_244_5).

- County-Wide Surface(s)
    - Enter countywide raster surfaces produced using the Create Surface and Create Surface Along Network tools (or corresponding raster surfaces weighted using the Weight Surfaces tool).
- Mask
    - Enter a polygon feature class representing the study area and omitting regions not to be included in the analysis (ex: water features, parks, cemeteries).

Results:

The Final Connectivity Index tool produces station-based raster composites of individual input surfaces. The screen capture below shows the final composite index for one sample station (ZID = 261). The final scores depend on the scores of input surfaces and weighting where applied. In the example below, the lowest score is visualized in red and the highest score in green.

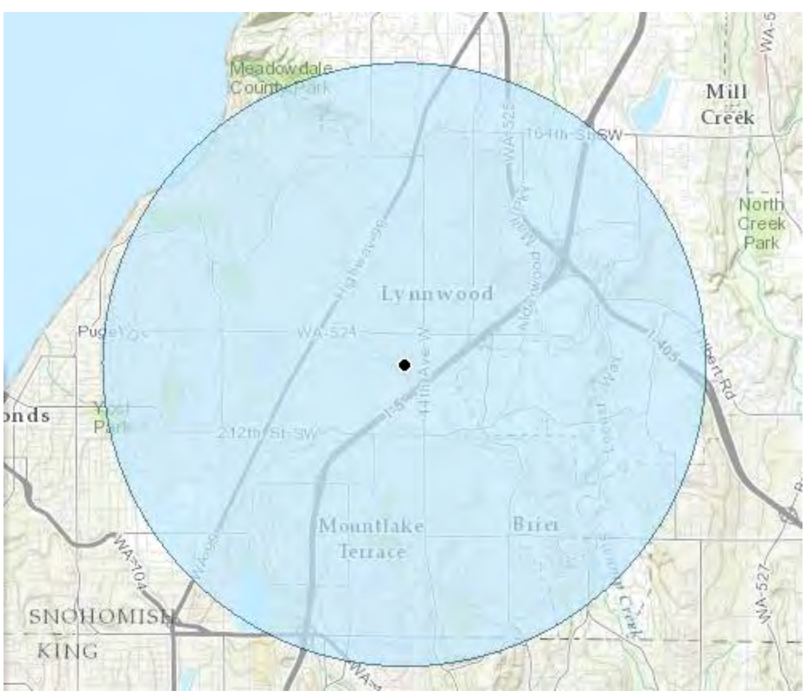


TRAVEL SHED DEVELOPMENT

A travel shed is a defined region surrounding a point or points of interest. This region typically describes a travel area from the points of interest outward or inward toward the points of interest. In addition to the development of the Connectivity Toolbox, a workflow was established to delineate travel sheds within the vicinity of each station included in the Non-Motorized Connectivity Analysis. Four travel sheds estimating 15-minute travel to and from King County transit stops were applied: network walk shed, network bike shed, Euclidean (as-the-crow-flies) walk shed and Euclidean bike shed. This section describes both types of travel sheds, as well as the travel shed development process performed in ArcMap.

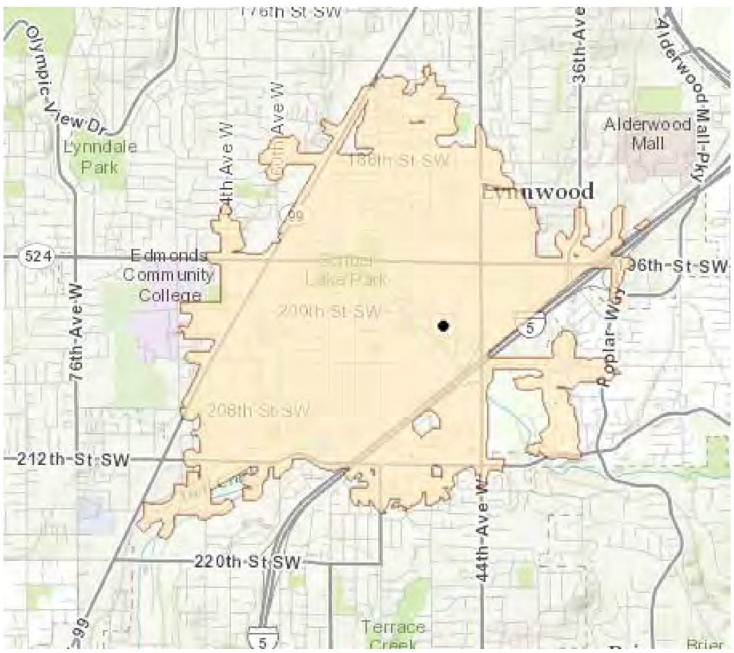
Euclidean Travel Sheds

Euclidean travel sheds are defined according to a straight-line, as-the-crow-flies, distance in all directions from points of interest. The Kind County Non-Motorized Connectivity analysis used Euclidean walk sheds (3,150 feet) and Euclidean bike sheds (3 miles) to summarize travel characteristics in the areas around each station. Below is an image showing a sample Euclidean bike shed.



Network Travel Sheds

Network travel sheds represent catchment areas along roadway features in all directions from points of interest. Network walk sheds were defined for 3,150 feet along the roadway network surrounding each station studied in the Non-Motorized Connectivity Analysis. To take into account the effects of terrain on bicycle travel in this region, an energy cost was applied to the roadway network, and a threshold of 500,000 Joules[24] was used to define network bike sheds. The image below is an example of a network bike shed surrounding a station.



Travel shed Creation Processing Steps

The steps below describe the ArcGIS process used to define the network and Euclidean walk sheds and bike sheds. This process requires a roadway network, elevation data, and a point feature class representing station locations.

1. Add the King County network feature class in ArcMap.

---

[24] 500,000 Joules is roughly the amount of energy an average-sized cyclist will consume when biking for 15-minutes on level terrain.

2. Add the station locations around which travel sheds are to be calculated in ArcMap.
3. Add elevation dataset that will be used to reference elevation information for network features in ArcMap. Acceptable input elevation data types include LAS Dataset Layer, Raster Layer, Terrain Layer, and TIN Layer.
4. Use the buffer tool to create the following travel sheds around station points:
   - 3,150 foot Euclidean Walk shed
   - 3 mile Euclidean Bike shed
5. Add elevation data to network lines feature class using the "Add Surface Information" tool in ArcMap.
6. Calculate watts for each network feature.
   - ((9.8 * 90) * 4.5) * (.0053 + (Average Slope/100)) + ((.185 * (4.5^2)) *4.5)
7. Calculate joules for each network feature.
   - `((Length *.3048)/4.5)* Watts`
8. Create King County network dataset in ArcGIS using Network Analyst extension with length and joules as costs.
9. Use Service Area tools in Network Analyst to create the following travel sheds around station points:
   - 15-minute Network Walk Shed (3,150 foot cutoff)
   - 15-minute Network Bike Shed (50,000[25] cutoff)

[25] Note that 500,000 joules is energy budget, but the tool uses a factor of 10 in the calculation. Thus use 50,000 for the travel shed cut-off

RECOMMENDED PRACTICES

Recommendations for geospatial data management best practices when working with the Connectivity Toolbox and associated data:

Data Format

Geodatabase feature classes are recommended for stability, data organization, and storage of large datasets.

Spatial Reference

The Spatial Reference settings below are recommended for all data used as inputs to the Connectivity Tools:

NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
WKID: 2285 Authority: EPSG
Projection: Lambert_Conformal_Conic
False_Easting: 1640416.666666667
False_Northing: 0.0
Central_Meridian: -120.8333333333333
Standard_Parallel_1: 47.5
Standard_Parallel_2: 48.73333333333333
Latitude_Of_Origin: 47.0
Linear Unit: Foot_US (0.3048006096012192)
Geographic Coordinate System: GCS_North_American_1983
Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_North_American_1983
Spheroid: GRS_1980
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314140356
Inverse Flattening: 298.257222101

Repeating Analyses

If repeating an analysis using modified or new data, it is recommended that users create a new geodatabase containing relevant data that can also be used to store analysis outputs. This will aid in the organization and maintenance of analysis results.

Editing Datasets

Below are suggested practices when editing or adding new features to existing datasets:

- If adding point data (for example, intersections or traffic signals) along roadway features, snapping is recommended.
- When adding new features to a network dataset, using the Planarize Lines editing tool is recommended before rebuilding the network (visit this link to learn more about planarization: http://resources.arcgis.com/en/help/main/10.1/index.html#//01m800000012000000).
- If two datasets are being used for comparison purposes, check for field type compatibility between datasets.
- When updating datasets or working with new datasets, overlay the dataset with the feature class representing the study area mask and adjust the mask if needed. Features not contained within the mask will not be included in the analysis.

Viewing the Geoprocessing Workflows in Python

Each tool is comprised of a series of geoprocessing tasks and custom functions defined in the Python programming language. The scripts associated with each tool by right clicking on the tool and selecting "Export Script". Define the script name and location to save the script to file. Once the file is saved, right click on the file name and select "Edit with IDLE".* Each script contains a header with name, purpose, author, version, and modification date information. Script processes are annotated with comments, indicated by the "#" symbol.

```
#-------------------------------
# Name: CalculateRDI.py
# Purpose: Calculate RDI for set of origins and destinations
# Author: Amy Smith
# Last Modified: 1/16/2014
# Copyright:   (c) Fehr & Peers
# ArcGIS Version:   10.1
# Python Version:   2.7
#-------------------------------

# Import Modules
import os,arcpy
from arcpy.sa import *
arcpy.env.overwriteOutput = True
arcpy.env.qualifiedFieldNames = False

# Function Definitions
def getValueList(inputTable, field):

    values = set()
    rows = arcpy.SearchCursor(inputTable)

    for row in rows:
        values.add(row.getValue(field))

    return sorted(values)

def deleteExistingField(layer, field):

    fieldList = arcpy.ListFields(layer, field)

    if len(fieldList) == 1:
        arcpy.DeleteField_management(layer, field)

def do_analysis(workspace,nd,cutoff,origins,originID,destinations,studyArea):
    try:
        # Check Out Extensions
        if arcpy.CheckExtension("Network") == "Available":
            arcpy.CheckOutExtension("Network")
            arcpy.AddMessage("Network Analyst Extension Checked Out.")
```

* IDLE is a Python development environment automatically installed with ArcGIS Desktop. If not currently installed, the “Edit with IDLE” option will not be available. IDLE can be downloaded from python.org.

RESOURCES

About 3D Analyst:

http://resources.arcgis.com/en/help/main/10.1/index.html#/What_is_the_ArcGIS_3D_Analyst_extension/00q8000000wv000000/

About Network Analyst:

http://resources.arcgis.com/en/help/main/10.1/index.html#//004700000001000000

About Spatial Analyst:

http://resources.arcgis.com/en/help/main/10.1/index.html#/What_is_the_ArcGIS_Spatial_Analyst_extension/005900000001000000/

Building Network Datasets:

http://resources.arcgis.com/en/help/main/10.1/index.html#//00470000000w000000

Creating File Geodatabases:

http://resources.arcgis.com/en/help/main/10.1/index.html#//018s0000000m000000

Extracting Elevation Data:

http://resources.arcgis.com/en/help/main/10.1/index.html#//00q900000016000000

APPENDIX B. PROJECT TYPE RANKINGS BY PERCENT CHANGE IN RIDERSHIP

Stop Location	Area	Project Type	Percent Change in Ridership
OVERLAKE VILLAGE	Redmond	New Streets	7.9%
INTERNATIONAL BLVD & S 180TH ST	SeaTac	New Streets	7.2%
NORTHGATE TC	Seattle	Off-street trails / Cycletracks*	6.8%
STRANDER BLVD & ANDOVER PARK E	Tukwila	New Streets	6.4%
FEDERAL WAY TC	Federal Way	New Streets	6.3%
INTERNATIONAL BLVD & S 176TH ST	SeaTac	New Streets	6.2%
OVERLAKE VILLAGE	Redmond	Off-street trails / Cycletracks*	6.1%
ANDOVER PARK W & MINKLER BLVD	Tukwila	New Streets	5.9%
ANDOVER PARK W & TRILAND DR	Tukwila	New Streets	5.7%
156TH AVE NE & NE 31ST ST	Redmond	New Streets	5.6%
MERIDIAN AVE N & N 105TH ST	Seattle	Off-street trails / Cycletracks	5.6%
BOEING ACS & S LONGACRES WAY	Renton	New Streets	5.3%
156TH AVE NE & NE 28TH ST	Redmond	New Streets	5.3%
NE 8TH ST & 124TH AVE NE	Bellevue	New Streets	4.9%
LYNNWOOD TC	Lynnwood	New Streets	4.3%
REDMOND TC	Redmond	Off-street trails / Cycletracks	4.3%
ANDOVER PARK W & BAKER BLVD	Tukwila	New Streets	4.2%
156TH AVE NE & NE 31ST ST	Redmond	Off-street trails / Cycletracks	4.2%
WEST VALLEY HWY & STRANDER BLVD	Tukwila	Off-street trails / Cycletracks	4.1%

Stop Location	Area	Project Type	Percent Change in Ridership
15TH AVE NW & NW 85TH ST	Seattle	Greenways / Signalized Crossings	4.1%
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Greenways / Signalized Crossings	4.0%
STRANDER BLVD & ANDOVER PARK W	Tukwila	New Streets	4.0%
ANDOVER PARK W & TRILAND DR	Tukwila	Off-street trails / Cycletracks	3.8%
156TH AVE NE & NE 28TH ST	Redmond	Off-street trails / Cycletracks	3.4%
S 180TH ST & SPERRY DR	Tukwila	New Streets	3.4%
15TH AVE NW & NW MARKET ST	Seattle	Greenways / Signalized Crossings	3.4%
15TH AVE NW & NW LEARY WAY	Seattle	Greenways / Signalized Crossings	3.4%
E THOMAS ST & 16TH AVE E	Seattle	Greenways / Signalized Crossings	3.4%
CALIFORNIA AVE SW & SW FINDLAY ST	Seattle	Greenways / Signalized Crossings	3.3%
TOTEM LAKE TC	Kirkland	New Streets	3.3%
FEDERAL WAY TC	Federal Way	Off-street trails / Cycletracks	3.2%
15TH AVE W & W DRAVUS ST	Seattle	Off-street trails / Cycletracks	3.1%
156TH AVE NE & NE 24TH ST	Bellevue	New Streets	3.1%
BEACON HILL STATION	Seattle	Off-street trails / Cycletracks	3.1%
1ST AVE NE & NE 95TH ST	Seattle	Greenways / Signalized Crossings	3.1%
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	3.0%
AURORA AVE N & N NORTHGATE WAY	Seattle	Off-street trails / Cycletracks	3.0%
5TH AVE NE & NE 103RD ST	Seattle	Greenways / Signalized Crossings	2.9%
15TH AVE E & E ROY ST	Seattle	Greenways / Signalized Crossings	2.9%
E MADISON ST & 17TH AVE	Seattle	Greenways / Signalized Crossings	2.8%

Stop Location	Area	Project Type	Percent Change in Ridership
PACIFIC HWY S & S 312TH ST	Federal Way	New Streets	2.7%
INTERNATIONAL BLVD & S 200TH ST	SeaTac	Off-street trails / Cycletracks	2.6%
MOUNTLAKE TERRACE TC	Mountlake Terrace	Off-street trails / Cycletracks	2.6%
SODO BUSWAY & S LANDER ST	Seattle	Off-street trails / Cycletracks	2.6%
5TH AVE NE & NE 106TH ST	Seattle	Greenways / Signalized Crossings	2.5%
ISSAQUAH TC	Issaquah	New Streets	2.4%
156TH AVE NE & NE 15TH ST	Bellevue	New Streets	2.4%
NE NORTHGATE WAY & 5TH AVE NE	Seattle	Greenways / Signalized Crossings	2.4%
BURIEN TC	Burien	Bike Lanes	2.4%
TOTEM LAKE TC	Kirkland	Bike Lanes	2.4%
MOUNTLAKE TERRACE TC	Mountlake Terrace	Bike Lanes	2.4%
SW 148TH ST & AMBAUM BLVD SW	Burien	Bike Lanes	2.4%
BOEING ACS & S LONGACRES WAY	Renton	Off-street trails / Cycletracks	2.4%
ISSAQUAH TC	Issaquah	Off-street trails / Cycletracks	2.4%
INTERNATIONAL BLVD & S 188TH ST	SeaTac	New Streets	2.3%
156TH AVE NE & NE 15TH ST	Bellevue	Off-street trails / Cycletracks	2.3%
5TH AVE NE & NE 103RD ST	Seattle	Off-street trails / Cycletracks	2.3%
AURORA AVE N & N 130TH ST	Seattle	Off-street trails / Cycletracks	2.3%
AURORA AVE N & N 165TH ST	Shoreline	New Streets	2.2%
BROADWAY E & E REPUBLICAN ST	Seattle	Greenways / Signalized Crossings	2.2%
FAIRVIEW AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	2.2%
TOTEM LAKE TC	Kirkland	Off-street trails /	2.2%

Stop Location	Area	Project Type	Percent Change in Ridership
		Cycletracks	
1ST AVE NE & NE 95TH ST	Seattle	Off-street trails / Cycletracks	2.2%
INTERNATIONAL BLVD & S 176TH ST	SeaTac	Off-street trails / Cycletracks	2.2%
NORTHGATE TC	Seattle	Greenways / Signalized Crossings	2.2%
AURORA AVE N & N 85TH ST	Seattle	Greenways / Signalized Crossings	2.1%
FAIRVIEW AVE N & VALLEY ST	Seattle	Off-street trails / Cycletracks	2.1%
148TH AVE NE & NE 51ST ST	Redmond	Off-street trails / Cycletracks	2.1%
AURORA AVE N & N 91ST ST	Seattle	Greenways / Signalized Crossings	2.1%
MT BAKER STATION	Seattle	Greenways / Signalized Crossings	2.1%
BROADWAY E & E JOHN ST	Seattle	Greenways / Signalized Crossings	2.0%
E ROY ST & BROADWAY E	Seattle	Greenways / Signalized Crossings	2.0%
STRANDER BLVD & ANDOVER PARK E	Tukwila	Off-street trails / Cycletracks	2.0%
15TH AVE NW & NW LEARY WAY	Seattle	Off-street trails / Cycletracks	2.0%
15TH AVE NW & NW 65TH ST	Seattle	Greenways / Signalized Crossings	2.0%
SOUTHCENTER BLVD & 62ND AVE S	Tukwila	New Streets	2.0%
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Off-street trails / Cycletracks	1.9%
MT BAKER STATION	Seattle	Off-street trails / Cycletracks	1.9%
WOODLAND PL N & N 64TH ST	Seattle	Greenways / Signalized Crossings	1.9%
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	1.9%
SW AVALON WAY & SW YANCY ST	Seattle	Off-street trails / Cycletracks	1.9%
3RD AVE & UNION ST	Seattle	Off-street trails /	1.9%

Stop Location	Area	Project Type	Percent Change in Ridership
		Cycletracks	
BAY C & WESTLAKE STATION	Seattle	Off-street trails / Cycletracks	1.9%
E UNION ST & BROADWAY	Seattle	Off-street trails / Cycletracks	1.8%
FAIRVIEW AVE E & YALE AVE N	Seattle	Off-street trails / Cycletracks	1.8%
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Off-street trails / Cycletracks	1.8%
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Off-street trails / Cycletracks	1.8%
FEDERAL WAY TC	Federal Way	Bike Lanes	1.8%
EVERETT SOUNDER	Everett	Bike Lanes	1.8%
AURORA AVE N & N 185TH ST	Shoreline	Bike Lanes	1.8%
AURORA VILLAGE TC	Shoreline	Bike Lanes	1.8%
NORTHGATE TC	Seattle	Bike Lanes	1.8%
OVERLAKE TC	Redmond	Bike Lanes	1.8%
OVERLAKE TC	Redmond	Bike Lanes	1.8%
SODO BUSWAY & S LANDER ST	Seattle	Bike Lanes	1.8%
FAIRVIEW AVE N & MERCER ST	Seattle	Bike Lanes	1.8%
156TH AVE NE & NE 36TH ST	Redmond	New Streets	1.8%
SW BARTON ST & 29TH AVE SW	Seattle	Greenways / Signalized Crossings	1.8%
148TH AVE NE & NE OLD REDMOND RD	Redmond	Off-street trails / Cycletracks	1.7%
PACIFIC HWY S & S 288TH ST	Federal Way	Sidewalks	1.7%
AURORA AVE N & N 145TH ST	Shoreline	New Streets	1.7%
148TH AVE NE & NE 87TH ST	Redmond	Off-street trails / Cycletracks	1.7%
WEST VALLEY HWY & S LONGACRES WAY	Tukwila	Off-street trails / Cycletracks	1.6%
S 180TH ST & SPERRY DR	Tukwila	Off-street trails / Cycletracks	1.6%

Stop Location	Area	Project Type	Percent Change in Ridership
INTERNATIONAL BLVD & S 188TH ST	SeaTac	Off-street trails / Cycletracks	1.6%
5TH AVE NE & NE 112TH ST	Seattle	Greenways / Signalized Crossings	1.6%
PACIFIC HWY S & S 312TH ST	Federal Way	Sidewalks	1.6%
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Greenways / Signalized Crossings	1.5%
WESTLAKE AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	1.5%
LYNNWOOD TC	Lynnwood	Off-street trails / Cycletracks	1.4%
MERIDIAN AVE N & N NORTHGATE WAY	Seattle	Off-street trails / Cycletracks	1.4%
ANDOVER PARK W & MINKLER BLVD	Tukwila	Off-street trails / Cycletracks	1.4%
35TH AVE SW & SW AVALON WAY	Seattle	Off-street trails / Cycletracks	1.4%
NE 8TH ST & 124TH AVE NE	Bellevue	Off-street trails / Cycletracks	1.4%
AURORA AVE N & N 100TH ST	Seattle	Off-street trails / Cycletracks	1.4%
ANDOVER PARK W & BAKER BLVD	Tukwila	Off-street trails / Cycletracks	1.4%
ANDOVER PARK W & BAKER BLVD	Tukwila	Off-street trails / Cycletracks	1.4%
WESTLAKE AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	1.3%
PACIFIC HWY S & S 312TH ST	Federal Way	Off-street trails / Cycletracks	1.3%
S 154TH ST & 32ND AVE S	SeaTac	New Streets	1.3%
DEXTER AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	1.3%
1ST AVE W & W MERCER ST	Seattle	Off-street trails / Cycletracks	1.3%
VIRGINIA ST & 6TH AVE	Seattle	Off-street trails / Cycletracks	1.2%
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Off-street trails / Cycletracks	1.2%

Stop Location	Area	Project Type	Percent Change in Ridership
PACIFIC HWY S & S 272ND ST	Des Moines	Sidewalks	1.2%
DENNY WAY & DEXTER AVE N	Seattle	Off-street trails / Cycletracks	1.2%
E JEFFERSON ST & 15TH AVE	Seattle	Greenways / Signalized Crossings	1.2%
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Bike Lanes	1.2%
S 156TH ST & 1ST AVE S	Burien	Bike Lanes	1.2%
REDMOND TC	Redmond	Bike Lanes	1.2%
156TH AVE NE & NE 45TH ST	Redmond	Bike Lanes	1.2%
ISSAQUAH TC	Issaquah	Bike Lanes	1.2%
AURORA AVE N & N 192ND ST	Shoreline	Bike Lanes	1.2%
148TH AVE NE & NE OLD REDMOND RD	Redmond	Bike Lanes	1.2%
156TH AVE NE & NE 36TH ST	Redmond	Bike Lanes	1.2%
BELLEVUE TC	Bellevue	Bike Lanes	1.2%
15TH AVE W & W DRAVUS ST	Seattle	Bike Lanes	1.2%
15TH AVE NW & NW LEARY WAY	Seattle	Bike Lanes	1.2%
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Bike Lanes	1.2%
1ST AVE W & W MERCER ST	Seattle	Bike Lanes	1.2%
DENNY WAY & DEXTER AVE N	Seattle	Bike Lanes	1.2%
E UNION ST & BROADWAY	Seattle	Bike Lanes	1.2%
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	Bike Lanes	1.2%
WESTLAKE AVE N & HARRISON ST	Seattle	Bike Lanes	1.2%
DEXTER AVE N & MERCER ST	Seattle	Bike Lanes	1.2%
156TH AVE NE & NE 24TH ST	Bellevue	Off-street trails / Cycletracks	1.2%

Stop Location	Area	Project Type	Percent Change in Ridership
BROADWAY E & E REPUBLICAN ST	Seattle	Off-street trails / Cycletracks	1.1%
156TH AVE NE & NE 36TH ST	Redmond	Off-street trails / Cycletracks	1.1%
SW AVALON WAY & SW YANCY ST	Seattle	Greenways / Signalized Crossings	1.1%
KING ST STATION	Seattle	Off-street trails / Cycletracks	1.1%
AURORA AVE N & N 145TH ST	Shoreline	Off-street trails / Cycletracks	1.1%
NE 8TH ST & 140TH AVE NE	Bellevue	Off-street trails / Cycletracks	1.1%
35TH AVE SW & SW AVALON WAY	Seattle	Greenways / Signalized Crossings	1.1%
INTERNATIONAL BLVD & S 182ND ST	SeaTac	Off-street trails / Cycletracks	1.0%
PACIFIC HWY S & KENT-DESMOINES RD	Des Moines	Sidewalks	1.0%
BURIEN TC	Burien	Off-street trails / Cycletracks	1.0%
NE 8TH ST & 140TH AVE NE	Bellevue	New Streets	1.0%
AURORA AVE N & N 100TH ST	Seattle	Greenways / Signalized Crossings	1.0%
AURORA AVE N & N 192ND ST	Shoreline	Off-street trails / Cycletracks	1.0%
15TH AVE NE & NE CAMPUS PKWY	Seattle	Off-street trails / Cycletracks	1.0%
AURORA AVE N & N 46TH ST	Seattle	Greenways / Signalized Crossings	1.0%
ELLIOTT AVE W & W PROSPECT ST	Seattle	Off-street trails / Cycletracks	1.0%
MONTLAKE BLVD NE & NE 45TH ST	Seattle	Off-street trails / Cycletracks	1.0%
SOUTHCENTER BLVD & 62ND AVE S	Tukwila	Off-street trails / Cycletracks	0.9%
PACIFIC HWY S & S 240TH ST	Des Moines	Sidewalks	0.9%
4TH AVE SW & SW 156TH ST	Burien	Off-street trails / Cycletracks	0.9%

Stop Location	Area	Project Type	Percent Change in Ridership
AURORA VILLAGE TC	Shoreline	Off-street trails / Cycletracks	0.9%
NE 45TH ST & UNION BAY PL NE	Seattle	Off-street trails / Cycletracks	0.8%
SOUTH TACOMA STATION	Tacoma	Off-street trails / Cycletracks	0.8%
3RD AVE & COLUMBIA ST	Seattle	Off-street trails / Cycletracks	0.8%
PACIFIC HWY S & S 260TH ST	Des Moines	Sidewalks	0.8%
PREFONTAINE PL S & YESLER WAY	Seattle	Off-street trails / Cycletracks	0.8%
NE 45TH ST & 7TH AVE NE	Seattle	Greenways / Signalized Crossings	0.8%
RENTON TC	Renton	Off-street trails / Cycletracks	0.8%
BROADWAY E & E JOHN ST	Seattle	Off-street trails / Cycletracks	0.8%
15TH AVE NE & NE 45TH ST	Seattle	Off-street trails / Cycletracks	0.8%
SODO BUSWAY & S ROYAL BROUGHAM WAY	Seattle	Off-street trails / Cycletracks	0.8%
MONTLAKE BLVD NE & NE 45TH ST	Seattle	Greenways / Signalized Crossings	0.8%
156TH AVE NE & NE 10TH ST	Bellevue	Off-street trails / Cycletracks	0.7%
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	Off-street trails / Cycletracks	0.7%
NE 45TH ST & 7TH AVE NE	Seattle	Off-street trails / Cycletracks	0.7%
BELLEVUE TC	Bellevue	Off-street trails / Cycletracks	0.7%
S HENDERSON ST & MARTIN L KING JR WAY	Seattle	Off-street trails / Cycletracks	0.7%
NE 45TH ST & UNION BAY PL NE	Seattle	Greenways / Signalized Crossings	0.7%
AURORA AVE N & GALER ST	Seattle	Off-street trails / Cycletracks	0.7%
156TH AVE NE & NE 10TH ST	Bellevue	New Streets	0.7%

Stop Location	Area	Project Type	Percent Change in Ridership
DENNY WAY & STEWART ST	Seattle	Off-street trails / Cycletracks	0.7%
S 3RD ST & SHATTUCK AVE S	Renton	Off-street trails / Cycletracks	0.7%
E DENNY WAY & BELLEVUE AVE E	Seattle	Off-street trails / Cycletracks	0.7%
FAIRVIEW AVE E & YALE AVE N	Seattle	Greenways / Signalized Crossings	0.7%
SENECA ST & 4TH AVE	Seattle	Off-street trails / Cycletracks	0.7%
E DENNY WAY & BELLEVUE AVE E	Seattle	Greenways / Signalized Crossings	0.6%
3RD AVE & VINE ST	Seattle	Off-street trails / Cycletracks	0.6%
TUK INTL BLVD STATION	Tukwila	New Streets	0.6%
BROADWAY & E COLUMBIA ST	Seattle	Off-street trails / Cycletracks	0.6%
PACIFIC HWY S & S 288TH ST	Federal Way	Off-street trails / Cycletracks	0.6%
MT BAKER STATION	Seattle	New Streets	0.6%
E MADISON ST & 17TH AVE	Seattle	Off-street trails / Cycletracks	0.6%
E THOMAS ST & 16TH AVE E	Seattle	Off-street trails / Cycletracks	0.6%
15TH AVE NE & NE CAMPUS PKWY	Seattle	Bike Lanes	0.6%
SOUTH TACOMA STATION	Tacoma	Bike Lanes	0.6%
PACIFIC HWY S & S 260TH ST	Des Moines	Bike Lanes	0.6%
PACIFIC HWY S & S 312TH ST	Federal Way	Bike Lanes	0.6%
15TH AVE NE & NE 55TH ST	Seattle	Bike Lanes	0.6%
PACIFIC HWY S & S 272ND ST	Des Moines	Bike Lanes	0.6%
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Bike Lanes	0.6%
5TH AVE NE & NE 103RD ST	Seattle	Bike Lanes	0.6%

Stop Location	Area	Project Type	Percent Change in Ridership
OVERLAKE VILLAGE	Redmond	Bike Lanes	0.6%
156TH AVE NE & NE 24TH ST	Bellevue	Bike Lanes	0.6%
148TH AVE NE & NE 40TH ST	Redmond	Bike Lanes	0.6%
156TH AVE NE & NE 31ST ST	Redmond	Bike Lanes	0.6%
148TH AVE NE & NE 51ST ST	Redmond	Bike Lanes	0.6%
AURORA AVE N & N 145TH ST	Shoreline	Bike Lanes	0.6%
4TH AVE SW & SW 156TH ST	Burien	Bike Lanes	0.6%
AMBAUM BLVD SW & SW 144TH ST	Burien	Bike Lanes	0.6%
1ST AVE NE & NE 95TH ST	Seattle	Bike Lanes	0.6%
AURORA AVE N & GALER ST	Seattle	Bike Lanes	0.6%
AURORA AVE N & N 130TH ST	Seattle	Bike Lanes	0.6%
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Bike Lanes	0.6%
BEACON HILL STATION	Seattle	Bike Lanes	0.6%
AURORA AVE N & N 100TH ST	Seattle	Bike Lanes	0.6%
PREFONTAINE PL S & YESLER WAY	Seattle	Bike Lanes	0.6%
SODO BUSWAY & S ROYAL BROUGHAM WAY	Seattle	Bike Lanes	0.6%
DENNY WAY & STEWART ST	Seattle	Bike Lanes	0.6%
E THOMAS ST & 16TH AVE E	Seattle	Bike Lanes	0.6%
FAIRVIEW AVE E & YALE AVE N	Seattle	Bike Lanes	0.6%
STRANDER BLVD & ANDOVER PARK W	Tukwila	Off-street trails / Cycletracks	0.6%
MOUNTLAKE TERRACE TC	Mountlake Terrace	Greenways / Signalized Crossings	0.6%

Stop Location	Area	Project Type	Percent Change in Ridership
NE PACIFIC ST & NE PACIFIC PL	Seattle	Greenways / Signalized Crossings	0.5%
BROADWAY & E COLUMBIA ST	Seattle	Greenways / Signalized Crossings	0.5%
S JACKSON ST & 12TH AVE S	Seattle	Greenways / Signalized Crossings	0.5%
SODO BUSWAY & S LANDER ST	Seattle	Greenways / Signalized Crossings	0.5%
15TH AVE W & W DRAVUS ST	Seattle	Greenways / Signalized Crossings	0.4%
TUK INTL BLVD STATION	Tukwila	Off-street trails / Cycletracks	0.4%
FAIRVIEW AVE N & VALLEY ST	Seattle	Greenways / Signalized Crossings	0.4%
NE PACIFIC ST & NE PACIFIC PL	Seattle	Off-street trails / Cycletracks	0.4%
S 154TH ST & 32ND AVE S	SeaTac	Off-street trails / Cycletracks	0.4%
AURORA AVE N & N 130TH ST	Seattle	Greenways / Signalized Crossings	0.4%
E ROY ST & BROADWAY E	Seattle	Off-street trails / Cycletracks	0.4%
INTERNATIONAL BLVD & S 180TH ST	SeaTac	Off-street trails / Cycletracks	0.4%
15TH AVE NE & NE CAMPUS PKWY	Seattle	Greenways / Signalized Crossings	0.4%
BEACON HILL STATION	Seattle	New Streets	0.4%
5TH AVE S & S JACKSON ST	Seattle	Off-street trails / Cycletracks	0.4%
OVERLAKE TC	Redmond	New Streets	0.4%
OVERLAKE TC	Redmond	New Streets	0.4%
E UNION ST & BROADWAY	Seattle	Greenways / Signalized Crossings	0.4%
FAIRVIEW AVE N & MERCER ST	Seattle	Greenways / Signalized Crossings	0.4%
WESTLAKE AVE N & MERCER ST	Seattle	Greenways / Signalized Crossings	0.3%
S JACKSON ST & 12TH AVE S	Seattle	Off-street trails / Cycletracks	0.3%
FAIRVIEW AVE N &	Seattle	Off-street trails /	0.3%

Stop Location	Area	Project Type	Percent Change in Ridership
HARRISON ST		Cycletracks	
INTERNATIONAL BLVD & S 208TH ST	SeaTac	Off-street trails / Cycletracks	0.3%
15TH AVE E & E ROY ST	Seattle	Off-street trails / Cycletracks	0.3%
PACIFIC HWY S & KENT-DESMOINES RD	Des Moines	Off-street trails / Cycletracks	0.3%
S 156TH ST & 1ST AVE S	Burien	Off-street trails / Cycletracks	0.3%
FAIRVIEW AVE N & HARRISON ST	Seattle	Greenways / Signalized Crossings	0.3%
5TH AVE NE & NE 106TH ST	Seattle	Off-street trails / Cycletracks	0.3%
15TH AVE NE & NE 45TH ST	Seattle	Greenways / Signalized Crossings	0.3%
148TH AVE NE & NE 40TH ST	Redmond	Off-street trails / Cycletracks	0.2%
PACIFIC HWY S & S 272ND ST	Des Moines	Off-street trails / Cycletracks	0.2%
5TH AVE NE & NE 112TH ST	Seattle	Off-street trails / Cycletracks	0.2%
15TH AVE NW & NW MARKET ST	Seattle	Off-street trails / Cycletracks	0.2%
BELLEVUE TC	Bellevue	New Streets	0.2%
NE PACIFIC ST & 15TH AVE NE	Seattle	Off-street trails / Cycletracks	0.2%
NE PACIFIC ST & 15TH AVE NE	Seattle	Greenways / Signalized Crossings	0.2%
PACIFIC HWY S & S 240TH ST	Des Moines	Off-street trails / Cycletracks	0.2%
NE NORTHGATE WAY & 5TH AVE NE	Seattle	Off-street trails / Cycletracks	0.2%
INTERNATIONAL BLVD & S 216TH ST	SeaTac	Off-street trails / Cycletracks	0.1%
15TH AVE NW & NW 85TH ST	Seattle	Off-street trails / Cycletracks	0.1%
PACIFIC HWY S & S 260TH ST	Des Moines	Off-street trails / Cycletracks	0.1%
4TH AVE N & W SMITH ST	Kent	Off-street trails / Cycletracks	0.1%

Stop Location	Area	Project Type	Percent Change in Ridership
148TH AVE NE & NE 40TH ST	Redmond	New Streets	0.1%
BAY A & CONVENTION PLACE	Seattle	Off-street trails / Cycletracks	0.1%
BAY 1 & AUBURN TC	Auburn	New Streets	0.1%
PREFONTAINE PL S & YESLER WAY	Seattle	Greenways / Signalized Crossings	0.1%
15TH AVE NE & NE 52ND ST	Seattle	Greenways / Signalized Crossings	0.1%
5TH AVE S & S JACKSON ST	Seattle	Greenways / Signalized Crossings	0.1%
AURORA AVE N & PROSPECT ST	Seattle	Off-street trails / Cycletracks	0.1%
AURORA AVE N & N 91ST ST	Seattle	Off-street trails / Cycletracks	0.1%
DEXTER AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	0.1%
W JAMES ST & LINCOLN AVE N	Kent	Off-street trails / Cycletracks	0.1%

APPENDIX C. PROJECT TYPE RANKINGS BY POTENTIAL NEW RIDERS

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
NORTHGATE TC	Seattle	Off-street trails / Cycletracks	6.8%	443	$31.2	$19
BAY C & WESTLAKE STATION	Seattle	Off-street trails / Cycletracks	1.9%	329	$15.7	$13
3RD AVE & UNION ST	Seattle	Off-street trails / Cycletracks	1.9%	249	$13.3	$14
FEDERAL WAY TC	Federal Way	New Streets	6.3%	149	$10.4	$19
NORTHGATE TC	Seattle	Greenways / Signalized Crossings	2.2%	140	$4.5	$9
NORTHGATE TC	Seattle	Bike Lanes	1.8%	116	$2.8	$6
MT BAKER STATION	Seattle	Greenways / Signalized Crossings	2.1%	88	$3.0	$9
BELLEVUE TC	Bellevue	Bike Lanes	1.2%	87	$2.2	$7
BEACON HILL STATION	Seattle	Off-street trails / Cycletracks	3.1%	87	$15.2	$47
MT BAKER STATION	Seattle	Off-street trails / Cycletracks	1.9%	83	$10.5	$34
REDMOND TC	Redmond	Off-street trails / Cycletracks	4.3%	76	$10.4	$36
INTERNATIONAL BLVD & S 176TH ST	SeaTac	New Streets	6.2%	76	$6.6	$23
FEDERAL WAY TC	Federal Way	Off-street trails / Cycletracks	3.2%	75	$7.4	$26
15TH AVE NE & NE CAMPUS PKWY	Seattle	Off-street trails / Cycletracks	1.0%	65	$14.1	$58
BURIEN TC	Burien	Bike Lanes	2.4%	65	$2.5	$10
3RD AVE & COLUMBIA ST	Seattle	Off-street trails / Cycletracks	0.8%	60	$11.7	$52
BELLEVUE TC	Bellevue	Off-street trails / Cycletracks	0.7%	51	$8.9	$46
BEACON HILL STATION	Seattle	Greenways / Signalized Crossings	1.8%	51	$2.5	$13
LYNNWOOD TC	Lynnwood	New Streets	4.3%	48	$8.9	$49
SENECA ST & 4TH AVE	Seattle	Off-street trails / Cycletracks	0.7%	47	$13.1	$74

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
15TH AVE NW & NW MARKET ST	Seattle	Greenways / Signalized Crossings	3.4%	47	$6.0	$35
5TH AVE S & S JACKSON ST	Seattle	Off-street trails / Cycletracks	0.4%	46	$11.6	$67
15TH AVE NW & NW 85TH ST	Seattle	Greenways / Signalized Crossings	4.1%	46	$4.0	$24
KING ST STATION	Seattle	Off-street trails / Cycletracks	1.1%	44	$11.0	$66
FEDERAL WAY TC	Federal Way	Bike Lanes	1.8%	42	$2.2	$13
15TH AVE NE & NE CAMPUS PKWY	Seattle	Bike Lanes	0.6%	40	$0.6	$4
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Off-street trails / Cycletracks	1.9%	39	$11.8	$81
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	1.9%	37	$3.0	$22
ISSAQUAH TC	Issaquah	New Streets	2.4%	36	$4.3	$32
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Off-street trails / Cycletracks	1.8%	36	$6.1	$46
ISSAQUAH TC	Issaquah	Off-street trails / Cycletracks	2.4%	35	$5.3	$41
BAY 2 & TUK INTL BLVD STA	Tukwila	New Streets	0.6%	35	$1.9	$15
PREFONTAINE PL S & YESLER WAY	Seattle	Off-street trails / Cycletracks	0.8%	34	$11.3	$88
BROADWAY E & E JOHN ST	Seattle	Greenways / Signalized Crossings	2.0%	34	$2.5	$20
STRANDER BLVD & ANDOVER PARK W	Tukwila	New Streets	4.0%	32	$25.9	$218
OVERLAKE VILLAGE	Redmond	New Streets	7.9%	31	$23.2	$199
1ST AVE W & W MERCER ST	Seattle	Off-street trails / Cycletracks	1.3%	30	$10.7	$94
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Greenways / Signalized Crossings	1.5%	30	$2.5	$22
1ST AVE W & W MERCER ST	Seattle	Bike Lanes	1.2%	29	$0.3	$3
AURORA VILLAGE TC	Shoreline	Bike Lanes	1.8%	28	$1.3	$12

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
BURIEN TC	Burien	Off-street trails / Cycletracks	1.0%	28	$1.8	$18
SODO BUSWAY & S LANDER ST	Seattle	Off-street trails / Cycletracks	2.6%	27	$12.1	$119
INTERNATIONAL BLVD & S 176TH ST	SeaTac	Off-street trails / Cycletracks	2.2%	27	$6.9	$69
MT BAKER STATION	Seattle	New Streets	0.6%	27	$0.6	$6
PREFONTAINE PL S & YESLER WAY	Seattle	Bike Lanes	0.6%	26	$0.9	$9
RENTON TC	Renton	Off-street trails / Cycletracks	0.8%	26	$1.7	$18
15TH AVE NE & NE CAMPUS PKWY	Seattle	Greenways / Signalized Crossings	0.4%	25	$1.0	$11
BAY 2 & TUK INTL BLVD STA	Tukwila	Off-street trails / Cycletracks	0.4%	24	$1.9	$20
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Bike Lanes	1.2%	24	$1.1	$12
OVERLAKE VILLAGE	Redmond	Off-street trails / Cycletracks	6.1%	24	$12.9	$144
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Bike Lanes	1.2%	23	$1.1	$12
AURORA AVE N & N NORTHGATE WAY	Seattle	Off-street trails / Cycletracks	3.0%	23	$5.2	$61
REDMOND TC	Redmond	Bike Lanes	1.2%	21	$2.4	$30
BROADWAY E & E REPUBLICAN ST	Seattle	Greenways / Signalized Crossings	2.2%	21	$2.5	$32
15TH AVE NW & NW LEARY WAY	Seattle	Greenways / Signalized Crossings	3.4%	21	$5.5	$72
15TH AVE NE & NE 45TH ST	Seattle	Off-street trails / Cycletracks	0.8%	21	$12.5	$163
AURORA AVE N & N 85TH ST	Seattle	Greenways / Signalized Crossings	2.1%	20	$3.5	$46
156TH AVE NE & NE 15TH ST	Bellevue	New Streets	2.4%	20	$20.8	$280
SODO BUSWAY & S LANDER ST	Seattle	Bike Lanes	1.8%	19	$0.5	$7
156TH AVE NE & NE 15TH ST	Bellevue	Off-street trails / Cycletracks	2.3%	19	$6.7	$94
MERIDIAN AVE N & N 105TH ST	Seattle	Off-street trails / Cycletracks	5.6%	19	$6.3	$89

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
INTERNATIONAL BLVD & S 182ND ST	SeaTac	New Streets	6.1%	19	$6.6	$93
NE NORTHGATE WAY & 5TH AVE NE	Seattle	Greenways / Signalized Crossings	2.4%	18	$2.5	$37
ISSAQUAH TC	Issaquah	Bike Lanes	1.2%	18	$3.0	$44
BEACON HILL STATION	Seattle	Bike Lanes	0.6%	17	$1.9	$29
OVERLAKE TC	Redmond	Bike Lanes	1.8%	17	$4.0	$61
5TH AVE NE & NE 103RD ST	Seattle	Greenways / Signalized Crossings	2.9%	16	$5.0	$82
LYNNWOOD TC	Lynnwood	Off-street trails / Cycletracks	1.4%	16	$4.0	$66
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	3.0%	16	$3.5	$59
E MADISON ST & 17TH AVE	Seattle	Greenways / Signalized Crossings	2.8%	15	$4.0	$73
NE PACIFIC ST & NE PACIFIC PL	Seattle	Greenways / Signalized Crossings	0.5%	15	$1.0	$19
ANDOVER PARK W & BAKER BLVD	Tukwila	Off-street trails / Cycletracks	1.4%	14	$0.7	$12
ANDOVER PARK W & BAKER BLVD	Tukwila	Off-street trails / Cycletracks	1.4%	14	$0.7	$12
AURORA VILLAGE TC	Shoreline	Off-street trails / Cycletracks	0.9%	14	$0.8	$15
DENNY WAY & DEXTER AVE N	Seattle	Off-street trails / Cycletracks	1.2%	14	$17.7	$335
DENNY WAY & DEXTER AVE N	Seattle	Bike Lanes	1.2%	14	$0.8	$14
15TH AVE W & W DRAVUS ST	Seattle	Off-street trails / Cycletracks	3.1%	14	$7.1	$137
BELLEVUE TC	Bellevue	New Streets	0.2%	14	$4.5	$86
S JACKSON ST & 12TH AVE S	Seattle	Greenways / Signalized Crossings	0.5%	14	$0.5	$10
SW BARTON ST & 29TH AVE SW	Seattle	Greenways / Signalized Crossings	1.8%	13	$2.5	$51

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
5TH AVE NE & NE 103RD ST	Seattle	Off-street trails / Cycletracks	2.3%	13	$6.7	$139
S HENDERSON ST & MARTIN L KING JR WAY	Seattle	Off-street trails / Cycletracks	0.7%	13	$11.0	$231
BROADWAY E & E JOHN ST	Seattle	Off-street trails / Cycletracks	0.8%	13	$10.6	$222
INTERNATIONAL BLVD & S 188TH ST	SeaTac	New Streets	2.3%	13	$6.6	$138
35TH AVE SW & SW AVALON WAY	Seattle	Off-street trails / Cycletracks	1.4%	12	$9.4	$207
15TH AVE NW & NW LEARY WAY	Seattle	Off-street trails / Cycletracks	2.0%	12	$6.2	$139
E THOMAS ST & 16TH AVE E	Seattle	Greenways / Signalized Crossings	3.4%	12	$4.5	$103
NE PACIFIC ST & NE PACIFIC PL	Seattle	Off-street trails / Cycletracks	0.4%	12	$14.5	$334
AURORA AVE N & N 130TH ST	Seattle	Off-street trails / Cycletracks	2.3%	12	$3.8	$87
MOUNTLAKE TERRACE TC	Mountlake Terrace	Off-street trails / Cycletracks	2.6%	11	$2.2	$51
E UNION ST & BROADWAY	Seattle	Off-street trails / Cycletracks	1.8%	11	$10.3	$245
5TH AVE NE & NE 106TH ST	Seattle	Greenways / Signalized Crossings	2.5%	11	$3.5	$86
15TH AVE NW & NW 65TH ST	Seattle	Greenways / Signalized Crossings	2.0%	11	$2.0	$50
BROADWAY E & E REPUBLICAN ST	Seattle	Off-street trails / Cycletracks	1.1%	11	$10.9	$274
CALIFORNIA AVE SW & SW FINDLAY ST	Seattle	Greenways / Signalized Crossings	3.3%	11	$3.0	$77
BEACON HILL STATION	Seattle	New Streets	0.4%	10	$0.6	$15
MOUNTLAKE TERRACE TC	Mountlake Terrace	Bike Lanes	2.4%	10	$2.5	$62
PACIFIC HWY S & S 312TH ST	Federal Way	New Streets	2.7%	10	$10.4	$267
3RD AVE & VINE ST	Seattle	Off-street trails / Cycletracks	0.6%	10	$15.4	$415
S JACKSON ST & 12TH AVE S	Seattle	Off-street trails / Cycletracks	0.3%	10	$8.4	$229

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
SODO BUSWAY & S ROYAL BROUGHAM WAY	Seattle	Off-street trails / Cycletracks	0.8%	10	$11.5	$322
5TH AVE S & S JACKSON ST	Seattle	Greenways / Signalized Crossings	0.1%	10	$0.8	$21
E ROY ST & BROADWAY E	Seattle	Greenways / Signalized Crossings	2.0%	9	$2.5	$71
35TH AVE SW & SW AVALON WAY	Seattle	Greenways / Signalized Crossings	1.1%	9	$1.5	$43
AURORA AVE N & N 185TH ST	Shoreline	Bike Lanes	1.8%	9	$2.1	$61
BOEING ACS & S LONGACRES WAY	Renton	New Streets	5.3%	9	$13.9	$413
156TH AVE NE & NE 24TH ST	Bellevue	New Streets	3.1%	9	$20.8	$638
INTERNATIONAL BLVD & S 188TH ST	SeaTac	Off-street trails / Cycletracks	1.6%	9	$9.1	$282
SW AVALON WAY & SW YANCY ST	Seattle	Off-street trails / Cycletracks	1.9%	8	$9.5	$302
156TH AVE NE & NE 31ST ST	Redmond	New Streets	5.6%	8	$16.8	$559
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Greenways / Signalized Crossings	4.0%	8	$4.5	$159
SODO BUSWAY & S ROYAL BROUGHAM WAY	Seattle	Bike Lanes	0.6%	8	$0.8	$26
E UNION ST & BROADWAY	Seattle	Bike Lanes	1.2%	7	$0.9	$31
15TH AVE NW & NW LEARY WAY	Seattle	Bike Lanes	1.2%	7	$0.3	$11
15TH AVE NE & NE 45TH ST	Seattle	Greenways / Signalized Crossings	0.3%	7	$1.0	$38
NE 8TH ST & 124TH AVE NE	Bellevue	New Streets	4.9%	7	$17.3	$671
MERIDIAN AVE N & N NORTHGATE WAY	Seattle	Off-street trails / Cycletracks	1.4%	7	$5.9	$235
AURORA AVE N & N 46TH ST	Seattle	Greenways / Signalized Crossings	1.0%	7	$2.0	$81
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Off-street trails / Cycletracks	1.2%	7	$8.2	$332
156TH AVE NE & NE 31ST ST	Redmond	Off-street trails / Cycletracks	4.2%	6	$7.1	$318

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
PACIFIC HWY S & S 312TH ST	Federal Way	Sidewalks	1.6%	6	$3.7	$163
5TH AVE NE & NE 112TH ST	Seattle	Greenways / Signalized Crossings	1.6%	6	$3.0	$137
INTERNATIONAL BLVD & S 200TH ST	SeaTac	Off-street trails / Cycletracks	2.6%	6	$10.2	$464
AURORA AVE N & N 91ST ST	Seattle	Greenways / Signalized Crossings	2.1%	6	$2.5	$116
156TH AVE NE & NE 10TH ST	Bellevue	Off-street trails / Cycletracks	0.7%	6	$5.1	$235
TOTEM LAKE TC	Kirkland	New Streets	3.3%	6	$0.9	$43
156TH AVE NE & NE 10TH ST	Bellevue	New Streets	0.7%	5	$9.6	$481
15TH AVE W & W DRAVUS ST	Seattle	Bike Lanes	1.2%	5	$0.4	$20
S 180TH ST & SPERRY DR	Tukwila	New Streets	3.4%	5	$19.0	$971
DENNY WAY & STEWART ST	Seattle	Off-street trails / Cycletracks	0.7%	5	$16.9	$888
PACIFIC HWY S & S 288TH ST	Federal Way	Sidewalks	1.7%	5	$10.1	$520
SW AVALON WAY & SW YANCY ST	Seattle	Greenways / Signalized Crossings	1.1%	5	$2.0	$108
PACIFIC HWY S & S 312TH ST	Federal Way	Off-street trails / Cycletracks	1.3%	5	$7.3	$397
SODO BUSWAY & S LANDER ST	Seattle	Greenways / Signalized Crossings	0.5%	5	$0.5	$28
15TH AVE NE & NE 55TH ST	Seattle	Bike Lanes	0.6%	5	$1.1	$62
AURORA AVE N & N 192ND ST	Shoreline	Bike Lanes	1.2%	5	$2.3	$124
STRANDER BLVD & ANDOVER PARK W	Tukwila	Off-street trails / Cycletracks	0.6%	5	$0.7	$38
BAY A & CONVENTION PLACE	Seattle	Off-street trails / Cycletracks	0.1%	5	$16.1	$930
E DENNY WAY & BELLEVUE AVE E	Seattle	Off-street trails / Cycletracks	0.7%	5	$14.7	$872
DENNY WAY & STEWART ST	Seattle	Bike Lanes	0.6%	4	$0.9	$52
E DENNY WAY & BELLEVUE AVE E	Seattle	Greenways / Signalized	0.6%	4	$1.0	$63

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
		Crossings				
TOTEM LAKE TC	Kirkland	Bike Lanes	2.4%	4	$0.7	$48
BOEING ACS & S LONGACRES WAY	Renton	Off-street trails / Cycletracks	2.4%	4	$0.7	$44
AURORA AVE N & N 192ND ST	Shoreline	Off-street trails / Cycletracks	1.0%	4	$0.4	$27
TOTEM LAKE TC	Kirkland	Off-street trails / Cycletracks	2.2%	4	$2.1	$146
MONTLAKE BLVD NE & NE 45TH ST	Seattle	Off-street trails / Cycletracks	1.0%	4	$8.7	$644
FAIRVIEW AVE N & VALLEY ST	Seattle	Off-street trails / Cycletracks	2.1%	4	$14.7	$1,098
PACIFIC HWY S & S 240TH ST	Des Moines	Sidewalks	0.9%	4	$2.1	$151
SOUTHCENTER BLVD & 62ND AVE S	Tukwila	New Streets	2.0%	4	$18.2	$1,383
INTERNATIONAL BLVD & S 180TH ST	SeaTac	New Streets	7.2%	4	$6.6	$500
PREFONTAINE PL S & YESLER WAY	Seattle	Greenways / Signalized Crossings	0.1%	3	$0.8	$59
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Off-street trails / Cycletracks	1.8%	3	$8.5	$664
5TH AVE NE & NE 103RD ST	Seattle	Bike Lanes	0.6%	3	$2.8	$219
OVERLAKE TC	Redmond	New Streets	0.4%	3	$11.5	$924
AURORA AVE N & N 100TH ST	Seattle	Off-street trails / Cycletracks	1.4%	3	$5.7	$469
156TH AVE NE & NE 24TH ST	Bellevue	Off-street trails / Cycletracks	1.2%	3	$7.3	$605
INTERNATIONAL BLVD & S 182ND ST	SeaTac	Off-street trails / Cycletracks	1.0%	3	$6.2	$516
E MADISON ST & 17TH AVE	Seattle	Off-street trails / Cycletracks	0.6%	3	$3.1	$260
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Bike Lanes	0.6%	3	$0.8	$69
15TH AVE NW & NW MARKET ST	Seattle	Off-street trails / Cycletracks	0.2%	3	$4.3	$380
AURORA AVE N & N 130TH ST	Seattle	Bike Lanes	0.6%	3	$0.4	$30
PACIFIC HWY S & S 272ND ST	Des Moines	Sidewalks	1.2%	3	$7.8	$685
AURORA AVE N & GALER ST	Seattle	Off-street trails / Cycletracks	0.7%	3	$11.9	$1,095
15TH AVE E & E ROY ST	Seattle	Greenways / Signalized	2.9%	3	$3.5	$325

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
		Crossings				
148TH AVE NE & NE 51ST ST	Redmond	Off-street trails / Cycletracks	2.1%	3	$3.7	$338
MONTLAKE BLVD NE & NE 45TH ST	Seattle	Greenways / Signalized Crossings	0.8%	3	$1.0	$95
PACIFIC HWY S & KENT-DESMOINES RD	Des Moines	Sidewalks	1.0%	3	$0.4	$37
ANDOVER PARK W & MINKLER BLVD	Tukwila	New Streets	5.9%	3	$25.9	$2,500
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	Bike Lanes	1.2%	3	$1.0	$95
148TH AVE NE & NE OLD REDMOND RD	Redmond	Off-street trails / Cycletracks	1.7%	3	$4.5	$457
WESTLAKE AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	1.3%	3	$18.1	$1,902
AURORA AVE N & GALER ST	Seattle	Bike Lanes	0.6%	3	$1.0	$103
MOUNTLAKE TERRACE TC	Mountlake Terrace	Greenways / Signalized Crossings	0.6%	3	$0.5	$54
	Everett	Bike Lanes	1.8%	3	$0.5	$49
S 180TH ST & SPERRY DR	Tukwila	Off-street trails / Cycletracks	1.6%	2	$0.3	$33
AURORA AVE N & N 100TH ST	Seattle	Greenways / Signalized Crossings	1.0%	2	$2.0	$221
NE 45TH ST & 7TH AVE NE	Seattle	Greenways / Signalized Crossings	0.8%	2	$1.5	$169
WESTLAKE AVE N & HARRISON ST	Seattle	Bike Lanes	1.2%	2	$0.9	$93
OVERLAKE VILLAGE	Redmond	Bike Lanes	0.6%	2	$4.8	$526
NE PACIFIC ST & 15TH AVE NE	Seattle	Off-street trails / Cycletracks	0.2%	2	$14.6	$1,700
NE PACIFIC ST & 15TH AVE NE	Seattle	Greenways / Signalized Crossings	0.2%	2	$0.5	$59
PACIFIC HWY S & S 312TH ST	Federal Way	Bike Lanes	0.6%	2	$1.6	$179
ELLIOTT AVE W & W PROSPECT ST	Seattle	Off-street trails / Cycletracks	1.0%	2	$8.0	$942

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
WOODLAND PL N & N 64TH ST	Seattle	Greenways / Signalized Crossings	1.9%	2	$1.5	$181
NE 45TH ST & 7TH AVE NE	Seattle	Off-street trails / Cycletracks	0.7%	2	$12.3	$1,470
SW 148TH ST & AMBAUM BLVD SW	Burien	Bike Lanes	2.4%	2	$1.4	$161
E UNION ST & BROADWAY	Seattle	Greenways / Signalized Crossings	0.4%	2	$0.5	$63
E THOMAS ST & 16TH AVE E	Seattle	Off-street trails / Cycletracks	0.6%	2	$6.2	$792
E THOMAS ST & 16TH AVE E	Seattle	Bike Lanes	0.6%	2	$0.8	$97
AURORA AVE N & N 165TH ST	Shoreline	New Streets	2.2%	2	$3.9	$506
AURORA AVE N & N 145TH ST	Shoreline	New Streets	1.7%	2	$3.9	$509
148TH AVE NE & NE 87TH ST	Redmond	Off-street trails / Cycletracks	1.7%	2	$8.9	$1,211
15TH AVE W & W DRAVUS ST	Seattle	Greenways / Signalized Crossings	0.4%	2	$1.0	$139
AURORA AVE N & N 130TH ST	Seattle	Greenways / Signalized Crossings	0.4%	2	$0.5	$70
ANDOVER PARK W & TRILAND DR	Tukwila	New Streets	5.7%	2	$20.9	$2,896
NE 8TH ST & 124TH AVE NE	Bellevue	Off-street trails / Cycletracks	1.4%	2	$13.9	$1,951
E ROY ST & BROADWAY E	Seattle	Off-street trails / Cycletracks	0.4%	2	$11.0	$1,600
E JEFFERSON ST & 15TH AVE	Seattle	Greenways / Signalized Crossings	1.2%	2	$2.0	$296
PACIFIC HWY S & S 288TH ST	Federal Way	Off-street trails / Cycletracks	0.6%	2	$5.7	$849
148TH AVE NE & NE OLD REDMOND RD	Redmond	Bike Lanes	1.2%	2	$1.7	$246
PACIFIC HWY S & S 260TH ST	Des Moines	Sidewalks	0.8%	2	$5.9	$844
FAIRVIEW AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	2.2%	2	$15.2	$2,287
SOUTHCENTER BLVD & 62ND AVE S	Tukwila	Off-street trails / Cycletracks	0.9%	2	$0.7	$105

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
NE 8TH ST & 140TH AVE NE	Bellevue	Off-street trails / Cycletracks	1.1%	2	$7.8	$1,237
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	Off-street trails / Cycletracks	0.7%	2	$4.4	$707
156TH AVE NE & NE 24TH ST	Bellevue	Bike Lanes	0.6%	2	$4.1	$638
SOUTH TACOMA STATION	Tacoma	Off-street trails / Cycletracks	0.8%	2	$1.3	$207
DEXTER AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	1.3%	2	$15.5	$2,515
NE 45TH ST & UNION BAY PL NE	Seattle	Off-street trails / Cycletracks	0.8%	2	$3.3	$537
15TH AVE NW & NW 85TH ST	Seattle	Off-street trails / Cycletracks	0.1%	2	$0.5	$80
NE 8TH ST & 140TH AVE NE	Bellevue	New Streets	1.0%	2	$22.9	$3,902
DEXTER AVE N & MERCER ST	Seattle	Bike Lanes	1.2%	2	$0.7	$117
1ST AVE NE & NE 95TH ST	Seattle	Greenways / Signalized Crossings	3.1%	2	$4.5	$794
148TH AVE NE & NE 40TH ST	Redmond	Bike Lanes	0.6%	1	$2.2	$378
FAIRVIEW AVE N & MERCER ST	Seattle	Bike Lanes	1.8%	1	$0.9	$165
AURORA AVE N & N 100TH ST	Seattle	Bike Lanes	0.6%	1	$1.5	$272
PACIFIC HWY S & S 272ND ST	Des Moines	Bike Lanes	0.6%	1	$1.3	$229
STRANDER BLVD & ANDOVER PARK E	Tukwila	New Streets	6.4%	1	$25.9	$4,902
NE 45TH ST & UNION BAY PL NE	Seattle	Greenways / Signalized Crossings	0.7%	1	$1.0	$201
PACIFIC HWY S & S 260TH ST	Des Moines	Bike Lanes	0.6%	1	$1.6	$322
AURORA AVE N & N 145TH ST	Shoreline	Off-street trails / Cycletracks	1.1%	1	$2.1	$424
ANDOVER PARK W & TRILAND DR	Tukwila	Off-street trails / Cycletracks	3.8%	1	$0.9	$190
S 156TH ST & 1ST AVE S	Burien	Bike Lanes	1.2%	1	$2.0	$416
WESTLAKE AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	1.5%	1	$16.2	$3,446
5TH AVE NE & NE 106TH ST	Seattle	Off-street trails / Cycletracks	0.3%	1	$7.2	$1,566
156TH AVE NE & NE 28TH ST	Redmond	New Streets	5.3%	1	$20.0	$4,424

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
SOUTH TACOMA STATION	Tacoma	Bike Lanes	0.6%	1	$2.5	$543
NE NORTHGATE WAY & 5TH AVE NE	Seattle	Off-street trails / Cycletracks	0.2%	1	$8.0	$1,829
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Bike Lanes	0.6%	1	$2.1	$488
1ST AVE NE & NE 95TH ST	Seattle	Off-street trails / Cycletracks	2.2%	1	$6.7	$1,619
4TH AVE SW & SW 156TH ST	Burien	Off-street trails / Cycletracks	0.9%	1	$2.3	$617
VIRGINIA ST & 6TH AVE	Seattle	Off-street trails / Cycletracks	1.2%	1	$17.7	$4,730
INTERNATIONAL BLVD & S 208TH ST	SeaTac	Off-street trails / Cycletracks	0.3%	1	$7.0	$1,893
BAY 1 & AUBURN TC	Auburn	New Streets	0.1%	1	$1.5	$450
156TH AVE NE & NE 31ST ST	Redmond	Bike Lanes	0.6%	1	$4.5	$1,363
FAIRVIEW AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	0.3%	1	$15.9	$4,973
5TH AVE NE & NE 112TH ST	Seattle	Off-street trails / Cycletracks	0.2%	1	$9.5	$3,059
148TH AVE NE & NE 51ST ST	Redmond	Bike Lanes	0.6%	1	$1.7	$523
PACIFIC HWY S & KENT-DESMOINES RD	Des Moines	Off-street trails / Cycletracks	0.3%	1	$2.5	$854
156TH AVE NE & NE 28TH ST	Redmond	Off-street trails / Cycletracks	3.4%	1	$8.0	$2,702
FAIRVIEW AVE N & HARRISON ST	Seattle	Greenways / Signalized Crossings	0.3%	1	$0.5	$185
FAIRVIEW AVE N & VALLEY ST	Seattle	Greenways / Signalized Crossings	0.4%	1	$0.5	$189
AURORA AVE N & N 145TH ST	Shoreline	Bike Lanes	0.6%	1	$0.7	$270
INTERNATIONAL BLVD & S 216TH ST	SeaTac	Off-street trails / Cycletracks	0.1%	1	$5.3	$2,123
4TH AVE SW & SW 156TH ST	Burien	Bike Lanes	0.6%	1	$2.0	$790
ANDOVER PARK W & MINKLER BLVD	Tukwila	Off-street trails / Cycletracks	1.4%	1	$1.4	$584
S 154TH ST & 32ND AVE S	SeaTac	New Streets	1.3%	1	$1.9	$810
PACIFIC HWY S & S 240TH ST	Des Moines	Off-street trails / Cycletracks	0.2%	1	$1.2	$506
FAIRVIEW AVE E & YALE AVE N	Seattle	Off-street trails / Cycletracks	1.8%	1	$14.9	$6,547

Stop Location	Area	Project Type	Percent Change in Ridership	Potential New Boardings	Estimated Cost ($millions)	Ann. Cost per Rider ($)
148TH AVE NE & NE 40TH ST	Redmond	Off-street trails / Cycletracks	0.2%	1	$5.9	$2,633
PACIFIC HWY S & S 272ND ST	Des Moines	Off-street trails / Cycletracks	0.2%	1	$1.5	$706
BROADWAY & E COLUMBIA ST	Seattle	Off-street trails / Cycletracks	0.6%	1	$11.6	$5,743

APPENDIX D. DEMOGRAPHIC AND RANKING TABLES

Employment Change – 20 year horizon

Source: PSRC TAZ 2010

Percent Change in Employment	Score
.33	1
.33-.78	2
.78-1.52	3
1.52-3.03	4
>3.03	5

Population Change – 20 year horizon

Source: PSRC TAZ 2010

Percent Change in Population	Score
<1.8	1
1.8-6.2	2
6.2-10.8	3
10.8-68.0	4
>68.0	5

Note that the scoring shown in the tables is based on the range of scores of the study sites. While the study sites represent a large cross-section of the region, if other sites were added, the range, and thus the scoring of the sites could be affected.

Percent of station area under 24 years of age (half-mile buffer)

Source: Census 2010

Percent Under 24	Score
<23.6	1
23.6-30.3	2
30.3-35.9	3
35.9-50.5	4
>50.5	5

Percent of station area over 60 years of age (half-mile buffer)

Source: Census 2010

Percent Over 60	Score
<9.8	1
.8-14.5	2
14.5-19.1	3
19.1-25.7	4
>25.7	5

APPENDIX E. PROJECT TYPE PRIORITIZATION BY AGGREGATE METHOD

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
FEDERAL WAY TC	Federal Way	New Streets	$ 10.35	9.2	7.2	7.5	24.0
INTERNATIONAL BLVD & S 176TH ST	SeaTac	New Streets	$ 6.57	8.9	7.1	7.5	23.4
NORTHGATE TC	Seattle	Off-street trails / Cycletracks	$ 31.20	7.0	7.8	7.5	22.3
BURIEN TC	Burien	Bike Lanes	$ 2.48	8.3	2.7	10.0	21.1
FEDERAL WAY TC	Federal Way	Off-street trails / Cycletracks	$ 7.39	9.2	3.7	7.5	20.4
15TH AVE NW & NW 85TH ST	Seattle	Greenways / Signalized Crossings	$ 4.00	8.1	4.7	7.5	20.3
MT BAKER STATION	Seattle	Greenways / Signalized Crossings	$ 3.00	7.9	2.3	10.0	20.3
PREFONTAINE PL S & YESLER WAY	Seattle	Bike Lanes	$ 0.85	9.4	0.7	10.0	20.0
15TH AVE NE & NE CAMPUS PKWY	Seattle	Bike Lanes	$ 0.58	8.8	0.7	10.0	19.5
NORTHGATE TC	Seattle	Greenways / Signalized Crossings	$ 4.50	7.0	2.5	10.0	19.5
BELLEVUE TC	Bellevue	Bike Lanes	$ 2.22	8.1	1.4	10.0	19.5
15TH AVE NE & NE CAMPUS PKWY	Seattle	Greenways / Signalized Crossings	$ 1.00	8.8	0.4	10.0	19.3
NORTHGATE TC	Seattle	Bike Lanes	$ 2.85	7.0	2.1	10.0	19.1
BAY C & WESTLAKE STATION	Seattle	Off-street trails / Cycletracks	$ 15.69	9.3	2.1	7.5	18.9
SODO BUSWAY & S LANDER ST	Seattle	Bike Lanes	$ 0.55	6.8	2.1	10.0	18.9
S JACKSON ST & 12TH AVE S	Seattle	Greenways / Signalized Crossings	$ 0.50	8.3	0.5	10.0	18.9
FEDERAL WAY TC	Federal Way	Bike Lanes	$ 2.16	9.2	2.1	7.5	18.8
MT BAKER STATION	Seattle	New Streets	$ 0.59	7.9	0.7	10.0	18.6
AURORA VILLAGE TC	Shoreline	Bike Lanes	$ 1.27	8.7	2.1	7.5	18.2
OVERLAKE VILLAGE	Redmond	New Streets	$ 23.22	8.1	9.1	1.0	18.1
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Greenways / Signalized Crossings	$ 2.50	8.6	1.7	7.5	17.8
INTERNATIONAL BLVD & S 182ND ST	SeaTac	New Streets	$ 6.57	8.7	7.0	2.0	17.6

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
15TH AVE NW & NW LEARY WAY	Seattle	Bike Lanes	$ 0.31	7.5	0.2	10.0	17.6
5TH AVE S & S JACKSON ST	Seattle	Greenways / Signalized Crossings	$ 0.75	9.8	0.2	7.5	17.6
1ST AVE W & W MERCER ST	Seattle	Bike Lanes	$ 0.34	6.1	1.4	10.0	17.4
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Bike Lanes	$ 1.14	8.6	1.4	7.5	17.4
3RD AVE & UNION ST	Seattle	Off-street trails / Cycletracks	$ 13.34	7.8	2.1	7.5	17.4
AURORA VILLAGE TC	Shoreline	Off-street trails / Cycletracks	$ 0.78	8.7	1.0	7.5	17.2
NE PACIFIC ST & NE PACIFIC PL	Seattle	Greenways / Signalized Crossings	$ 1.00	9.0	0.6	7.5	17.1
BURIEN TC	Burien	Off-street trails / Cycletracks	$ 1.82	8.3	1.2	7.5	17.0
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	$ 3.00	7.2	2.2	7.5	16.8
BEACON AVE S & S LANDER ST	Seattle	Greenways / Signalized Crossings	$ 2.50	7.1	2.0	7.5	16.6
LYNNWOOD TC	Lynnwood	New Streets	$ 8.91	8.6	4.9	3.0	16.5
TUK INTL BLVD STATION	Tukwila	New Streets	$ 1.95	8.3	0.7	7.5	16.5
TUK INTL BLVD STATION	Tukwila	Off-street trails / Cycletracks	$ 1.86	8.3	0.5	7.5	16.3
AURORA AVE N & N 192ND ST	Shoreline	Off-street trails / Cycletracks	$ 0.40	8.6	0.1	7.5	16.2
ANDOVER PARK W & BAKER BLVD	Tukwila	Off-street trails / Cycletracks	$ 0.66	7.1	1.5	7.5	16.1
ANDOVER PARK W & BAKER BLVD	Tukwila	Off-street trails / Cycletracks	$ 0.66	7.1	1.5	7.5	16.1
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Bike Lanes	$ 1.13	7.2	1.4	7.5	16.0
OVERLAKE VILLAGE	Redmond	Off-street trails / Cycletracks	$ 12.86	8.1	6.9	1.0	16.0
REDMOND TC	Redmond	Off-street trails / Cycletracks	$ 10.37	7.8	4.9	3.0	15.7
MERIDIAN AVE N & N 105TH ST	Seattle	Off-street trails / Cycletracks	$ 6.26	7.3	6.4	2.0	15.6
BEACON HILL STATION	Seattle	New Streets	$ 0.59	7.1	0.4	7.5	15.0
15TH AVE W & W DRAVUS ST	Seattle	Bike Lanes	$ 0.41	7.3	0.1	7.5	14.9
ISSAQUAH TC	Issaquah	New Streets	$ 4.25	9.1	2.8	3.0	14.9
ISSAQUAH TC	Issaquah	Off-street trails / Cycletracks	$ 5.33	9.1	2.7	3.0	14.8
RENTON TC	Renton	Off-street trails / Cycletracks	$ 1.70	6.2	0.9	7.5	14.6

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
BROADWAY E & E JOHN ST	Seattle	Greenways / Signalized Crossings	$ 2.50	4.7	2.3	7.5	14.5
DENNY WAY & DEXTER AVE N	Seattle	Bike Lanes	$ 0.76	5.6	1.4	7.5	14.5
E THOMAS ST & 16TH AVE E	Seattle	Greenways / Signalized Crossings	$ 4.50	8.7	3.8	2.0	14.5
SODO BUSWAY & S LANDER ST	Seattle	Greenways / Signalized Crossings	$ 0.50	6.8	0.1	7.5	14.4
SODO BUSWAY & S ROYAL BROUGHAM WAY	Seattle	Bike Lanes	$ 0.77	6.7	0.2	7.5	14.4
BOEING ACS & S LONGACRES WAY	Renton	Off-street trails / Cycletracks	$ 0.66	10.6	0.1	3.0	13.7
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Greenways / Signalized Crossings	$ 3.50	7.2	3.5	3.0	13.7
BEACON HILL STATION	Seattle	Off-street trails / Cycletracks	$ 15.19	7.1	3.5	3.0	13.6
ISSAQUAH TC	Issaquah	Bike Lanes	$ 3.04	9.1	1.4	3.0	13.5
INTERNATIONAL BLVD & S 176TH ST	SeaTac	Off-street trails / Cycletracks	$ 6.88	8.9	2.5	2.0	13.4
MOUNTLAKE TERRACE TC	Mountlake Terrace	Off-street trails / Cycletracks	$ 2.17	7.4	3.0	3.0	13.3
15TH AVE NW & NW LEARY WAY	Seattle	Greenways / Signalized Crossings	$ 5.50	7.5	3.9	2.0	13.3
MT BAKER STATION	Seattle	Off-street trails / Cycletracks	$ 10.51	7.9	2.2	3.0	13.1
15TH AVE NE & NE CAMPUS PKWY	Seattle	Off-street trails / Cycletracks	$ 14.08	8.8	1.1	3.0	13.0
15TH AVE NW & NW MARKET ST	Seattle	Greenways / Signalized Crossings	$ 6.00	6.0	3.9	3.0	12.9
PACIFIC HWY S & S 312TH ST	Federal Way	New Streets	$ 10.35	8.8	3.1	1.0	12.9
ANDOVER PARK W & BAKER BLVD	Tukwila	New Streets	$ 25.41	7.1	4.8	1.0	12.8
NE NORTHGATE WAY & 5TH AVE NE	Seattle	Greenways / Signalized Crossings	$ 2.50	7.1	2.8	3.0	12.8
MARTIN L KING JR WAY & S MYRTLE ST	Seattle	Off-street trails / Cycletracks	$ 11.82	8.6	2.2	2.0	12.8
CALIFORNIA AVE SW & SW FINDLAY ST	Seattle	Greenways / Signalized Crossings	$ 3.00	7.0	3.8	2.0	12.8
AURORA AVE N & N NORTHGATE WAY	Seattle	Off-street trails / Cycletracks	$ 5.19	7.3	3.4	2.0	12.8
5TH AVE NE & NE 103RD ST	Seattle	Greenways / Signalized Crossings	$ 5.00	7.4	3.3	2.0	12.7
SENECA ST & 4TH AVE	Seattle	Off-street trails / Cycletracks	$ 13.13	10.0	0.7	2.0	12.7
156TH AVE NE & NE 15TH ST	Bellevue	Off-street trails / Cycletracks	$ 6.67	8.0	2.7	2.0	12.7
AURORA AVE N & N 130TH ST	Seattle	Off-street trails / Cycletracks	$ 3.76	7.8	2.6	2.0	12.4

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
PREFONTAINE PL S & YESLER WAY	Seattle	Greenways / Signalized Crossings	$ 0.75	9.4	0.1	3.0	12.4
INTERNATIONAL BLVD & S 188TH ST	SeaTac	New Streets	$ 6.57	8.7	2.7	1.0	12.4
PREFONTAINE PL S & YESLER WAY	Seattle	Off-street trails / Cycletracks	$ 11.29	9.4	0.9	2.0	12.3
5TH AVE S & S JACKSON ST	Seattle	Off-street trails / Cycletracks	$ 11.57	9.8	0.4	2.0	12.3
SW ALASKA ST & CALIFORNIA AVE SW	Seattle	Off-street trails / Cycletracks	$ 6.08	7.2	2.1	3.0	12.3
EVERETT SOUNDER	Everett	Bike Lanes	$ 0.48	9.2	0.1	3.0	12.2
LYNNWOOD TC	Lynnwood	Off-street trails / Cycletracks	$ 3.97	8.6	1.6	2.0	12.2
SW BARTON ST & 29TH AVE SW	Seattle	Greenways / Signalized Crossings	$ 2.50	7.2	2.0	3.0	12.2
15TH AVE NE & NE 45TH ST	Seattle	Greenways / Signalized Crossings	$ 1.00	9.0	0.2	3.0	12.2
STRANDER BLVD & ANDOVER PARK W	Tukwila	New Streets	$ 25.90	6.6	4.6	1.0	12.2
3RD AVE & COLUMBIA ST	Seattle	Off-street trails / Cycletracks	$ 11.74	8.2	0.9	3.0	12.2
REDMOND TC	Redmond	Bike Lanes	$ 2.41	7.8	1.4	3.0	12.2
DENNY WAY & STEWART ST	Seattle	Bike Lanes	$ 0.90	9.0	0.1	3.0	12.1
MOUNTLAKE TERRACE TC	Mountlake Terrace	Bike Lanes	$ 2.48	7.4	2.7	2.0	12.1
AURORA AVE N & N 85TH ST	Seattle	Greenways / Signalized Crossings	$ 3.50	6.5	2.4	3.0	12.0
15TH AVE NW & NW 65TH ST	Seattle	Greenways / Signalized Crossings	$ 2.00	6.7	2.2	3.0	12.0
5TH AVE NE & NE 106TH ST	Seattle	Greenways / Signalized Crossings	$ 3.50	7.1	2.9	2.0	11.9
15TH AVE W & W DRAVUS ST	Seattle	Off-street trails / Cycletracks	$ 7.15	7.3	3.6	1.0	11.9
BELLEVUE TC	Bellevue	Off-street trails / Cycletracks	$ 8.86	8.1	0.8	3.0	11.9
156TH AVE NE & NE 15TH ST	Bellevue	New Streets	$ 20.80	8.0	2.8	1.0	11.8
SODO BUSWAY & S LANDER ST	Seattle	Off-street trails / Cycletracks	$ 12.07	6.8	2.9	2.0	11.8
OVERLAKE TC	Redmond	Bike Lanes	$ 3.95	7.4	2.1	2.0	11.4
BOEING ACS & S LONGACRES WAY	Renton	New Streets	$ 13.91	10.6	0.2	0.3	11.1
KING ST STATION	Seattle	Off-street trails / Cycletracks	$ 10.96	7.8	1.3	2.0	11.1
5TH AVE NE & NE 103RD ST	Seattle	Off-street trails / Cycletracks	$ 6.73	7.4	2.6	1.0	11.1

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
E DENNY WAY & BELLEVUE AVE E	Seattle	Greenways / Signalized Crossings	$ 1.00	8.8	0.1	2.0	10.9
MONTLAKE BLVD NE & NE 45TH ST	Seattle	Greenways / Signalized Crossings	$ 1.00	8.8	0.1	2.0	10.9
15TH AVE NE & NE 45TH ST	Seattle	Off-street trails / Cycletracks	$ 12.53	9.0	0.9	1.0	10.9
AURORA AVE N & N 130TH ST	Seattle	Bike Lanes	$ 0.35	7.8	0.1	3.0	10.9
BEACON HILL STATION	Seattle	Bike Lanes	$ 1.91	7.1	0.7	3.0	10.8
S 154TH ST & 32ND AVE S	SeaTac	New Streets	$ 1.95	10.6	0.0	0.1	10.8
E THOMAS ST & 16TH AVE E	Seattle	Bike Lanes	$ 0.79	8.7	0.0	2.0	10.7
15TH AVE NW & NW LEARY WAY	Seattle	Off-street trails / Cycletracks	$ 6.23	7.5	2.2	1.0	10.7
TOTEM LAKE TC	Kirkland	New Streets	$ 0.88	7.5	0.1	3.0	10.7
S 154TH ST & 32ND AVE S	SeaTac	Off-street trails / Cycletracks	$ 1.56	10.6	0.0	0.0	10.6
TOTEM LAKE TC	Kirkland	Bike Lanes	$ 0.75	7.5	0.1	3.0	10.6
INTERNATIONAL BLVD & S 208TH ST	SeaTac	Off-street trails / Cycletracks	$ 7.03	10.5	0.0	0.0	10.5
AURORA AVE N & N 185TH ST	Shoreline	Bike Lanes	$ 2.12	8.3	0.2	2.0	10.5
PACIFIC HWY S & KENT-DESMOINES RD	Des Moines	Sidewalks	$ 0.41	7.4	0.1	3.0	10.5
MOUNTLAKE TERRACE TC	Mountlake Terrace	Greenways / Signalized Crossings	$ 0.50	7.4	0.1	3.0	10.4
E MADISON ST & 17TH AVE	Seattle	Greenways / Signalized Crossings	$ 4.00	5.2	3.2	2.0	10.4
SOUTH TACOMA STATION	Tacoma	Off-street trails / Cycletracks	$ 1.28	9.3	0.0	1.0	10.3
BELLEVUE TC	Bellevue	New Streets	$ 4.47	8.1	0.2	2.0	10.3
15TH AVE NW & NW 85TH ST	Seattle	Off-street trails / Cycletracks	$ 0.48	8.1	0.0	2.0	10.2
NE PACIFIC ST & 15TH AVE NE	Seattle	Greenways / Signalized Crossings	$ 0.50	7.1	0.1	3.0	10.1
BROADWAY E & E REPUBLICAN ST	Seattle	Greenways / Signalized Crossings	$ 2.50	4.4	2.5	3.0	10.0
PACIFIC HWY S & S 312TH ST	Federal Way	Sidewalks	$ 3.75	8.8	0.1	1.0	9.9
INTERNATIONAL BLVD & S 188TH ST	SeaTac	Off-street trails / Cycletracks	$ 9.10	8.7	0.2	1.0	9.9
S HENDERSON ST & MARTIN L KING JR WAY	Seattle	Off-street trails / Cycletracks	$ 11.02	8.1	0.8	1.0	9.9
SW 148TH ST & AMBAUM BLVD SW	Burien	Bike Lanes	$ 1.39	8.8	0.1	1.0	9.9

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
148TH AVE NE & NE OLD REDMOND RD	Redmond	Bike Lanes	$ 1.71	8.8	0.0	1.0	9.9
FAIRVIEW AVE N & HARRISON ST	Seattle	Greenways / Signalized Crossings	$ 0.50	8.8	0.0	1.0	9.9
AURORA AVE N & N 130TH ST	Seattle	Greenways / Signalized Crossings	$ 0.50	7.8	0.0	2.0	9.9
S 180TH ST & SPERRY DR	Tukwila	Off-street trails / Cycletracks	$ 0.31	6.8	0.1	3.0	9.8
PACIFIC HWY S & S 312TH ST	Federal Way	Bike Lanes	$ 1.58	8.8	0.1	1.0	9.8
NE 8TH ST & 124TH AVE NE	Bellevue	New Streets	$ 17.29	9.5	0.2	0.1	9.8
NE PACIFIC ST & NE PACIFIC PL	Seattle	Off-street trails / Cycletracks	$ 14.53	9.0	0.5	0.3	9.8
35TH AVE SW & SW AVALON WAY	Seattle	Greenways / Signalized Crossings	$ 1.50	6.5	0.2	3.0	9.8
AURORA AVE N & N 192ND ST	Shoreline	Bike Lanes	$ 2.27	8.6	0.1	1.0	9.7
STRANDER BLVD & ANDOVER PARK W	Tukwila	Off-street trails / Cycletracks	$ 0.66	6.6	0.1	3.0	9.7
SOUTH TACOMA STATION	Tacoma	Bike Lanes	$ 2.52	9.3	0.0	0.3	9.6
PACIFIC HWY S & S 240TH ST	Des Moines	Sidewalks	$ 2.08	8.5	0.1	1.0	9.6
NE 8TH ST & 124TH AVE NE	Bellevue	Off-street trails / Cycletracks	$ 13.92	9.5	0.0	0.0	9.6
AURORA AVE N & GALER ST	Seattle	Bike Lanes	$ 1.01	7.5	0.1	2.0	9.6
S JACKSON ST & 12TH AVE S	Seattle	Off-street trails / Cycletracks	$ 8.37	8.3	0.2	1.0	9.6
INTERNATIONAL BLVD & S 180TH ST	SeaTac	New Streets	$ 6.57	9.2	0.1	0.3	9.6
NE 45TH ST & UNION BAY PL NE	Seattle	Greenways / Signalized Crossings	$ 1.00	8.5	0.0	1.0	9.5
1ST AVE W & W MERCER ST	Seattle	Off-street trails / Cycletracks	$ 10.71	6.1	1.4	2.0	9.5
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	Bike Lanes	$ 1.00	7.4	0.1	2.0	9.5
15TH AVE NE & NE 55TH ST	Seattle	Bike Lanes	$ 1.14	7.3	0.1	2.0	9.4
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Bike Lanes	$ 0.84	7.2	0.1	2.0	9.3
DENNY WAY & STEWART ST	Seattle	Off-street trails / Cycletracks	$ 16.93	9.0	0.1	0.1	9.2
148TH AVE NE & NE OLD REDMOND RD	Redmond	Off-street trails / Cycletracks	$ 4.46	8.8	0.1	0.3	9.2
PACIFIC HWY S & S 312TH ST	Federal Way	Off-street trails / Cycletracks	$ 7.27	8.8	0.1	0.3	9.2
INTERNATIONAL BLVD & S 180TH ST	SeaTac	Off-street trails / Cycletracks	$ 6.95	9.2	0.0	0.0	9.2

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
SOUTHCENTER BLVD & 62ND AVE S	Tukwila	Off-street trails / Cycletracks	$ 0.66	7.1	0.0	2.0	9.1
35TH AVE SW & SW AVALON WAY	Seattle	Off-street trails / Cycletracks	$ 9.39	6.5	1.6	1.0	9.1
AURORA AVE N & N 145TH ST	Shoreline	Bike Lanes	$ 0.74	8.1	0.0	1.0	9.1
NE 8TH ST & 140TH AVE NE	Bellevue	Off-street trails / Cycletracks	$ 7.77	9.0	0.0	0.0	9.1
NE 8TH ST & 140TH AVE NE	Bellevue	New Streets	$ 22.93	9.0	0.0	0.0	9.1
NE 45TH ST & 7TH AVE NE	Seattle	Greenways / Signalized Crossings	$ 1.50	8.0	0.1	1.0	9.1
E DENNY WAY & BELLEVUE AVE E	Seattle	Off-street trails / Cycletracks	$ 14.74	8.8	0.1	0.1	9.1
INTERNATIONAL BLVD & S 182ND ST	SeaTac	Off-street trails / Cycletracks	$ 6.21	8.7	0.1	0.3	9.0
MONTLAKE BLVD NE & NE 45TH ST	Seattle	Off-street trails / Cycletracks	$ 8.70	8.8	0.1	0.1	9.0
S 156TH ST & 1ST AVE S	Burien	Bike Lanes	$ 2.03	8.7	0.0	0.3	9.0
INTERNATIONAL BLVD & S 200TH ST	SeaTac	Off-street trails / Cycletracks	$ 10.25	8.4	0.1	0.3	8.9
FAIRVIEW AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	$ 15.87	8.8	0.0	0.0	8.9
PACIFIC HWY S & S 240TH ST	Des Moines	Off-street trails / Cycletracks	$ 1.15	8.5	0.0	0.3	8.9
NE 45TH ST & UNION BAY PL NE	Seattle	Off-street trails / Cycletracks	$ 3.27	8.5	0.0	0.3	8.8
E THOMAS ST & 16TH AVE E	Seattle	Off-street trails / Cycletracks	$ 6.24	8.7	0.0	0.1	8.8
156TH AVE NE & NE 10TH ST	Bellevue	Off-street trails / Cycletracks	$ 5.06	7.7	0.1	1.0	8.8
5TH AVE NE & NE 112TH ST	Seattle	Greenways / Signalized Crossings	$ 3.00	7.6	0.1	1.0	8.7
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Greenways / Signalized Crossings	$ 4.50	7.6	0.2	1.0	8.7
S 156TH ST & 1ST AVE S	Burien	Off-street trails / Cycletracks	$ 4.67	8.7	0.0	0.0	8.7
AMBAUM BLVD SW & SW 144TH ST	Burien	Bike Lanes	$ 1.21	8.6	0.0	0.1	8.7
SW AVALON WAY & SW YANCY ST	Seattle	Greenways / Signalized Crossings	$ 2.00	6.5	0.1	2.0	8.6
PACIFIC HWY S & S 272ND ST	Des Moines	Bike Lanes	$ 1.26	7.6	0.0	1.0	8.6
TOTEM LAKE TC	Kirkland	Off-street trails / Cycletracks	$ 2.05	7.5	0.1	1.0	8.6
PACIFIC HWY S & S 288TH ST	Federal Way	Sidewalks	$ 10.13	8.2	0.1	0.3	8.6
W JAMES ST & LINCOLN AVE N	Kent	Off-street trails / Cycletracks	$ 0.97	8.6	0.0	0.0	8.6

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
AURORA AVE N & N 165TH ST	Shoreline	New Streets	$ 3.87	8.2	0.0	0.3	8.5
5TH AVE NE & NE 103RD ST	Seattle	Bike Lanes	$ 2.85	7.4	0.1	1.0	8.5
AURORA AVE N & N 145TH ST	Shoreline	New Streets	$ 3.87	8.1	0.0	0.3	8.4
15TH AVE NE & NE 52ND ST	Seattle	Greenways / Signalized Crossings	$ 0.50	8.3	0.0	0.1	8.4
AURORA AVE N & N 145TH ST	Shoreline	Off-street trails / Cycletracks	$ 2.07	8.1	0.0	0.3	8.4
OVERLAKE VILLAGE	Redmond	Bike Lanes	$ 4.78	8.1	0.1	0.3	8.4
E ROY ST & BROADWAY E	Seattle	Greenways / Signalized Crossings	$ 2.50	6.2	0.2	2.0	8.4
ANDOVER PARK W & TRILAND DR	Tukwila	Off-street trails / Cycletracks	$ 0.92	7.4	0.0	1.0	8.4
15TH AVE W & W DRAVUS ST	Seattle	Greenways / Signalized Crossings	$ 1.00	7.3	0.0	1.0	8.4
4TH AVE SW & SW 156TH ST	Burien	Off-street trails / Cycletracks	$ 2.33	8.2	0.0	0.1	8.4
4TH AVE SW & SW 156TH ST	Burien	Bike Lanes	$ 2.00	8.2	0.0	0.1	8.4
156TH AVE NE & NE 24TH ST	Bellevue	New Streets	$ 20.80	8.0	0.2	0.1	8.3
PACIFIC HWY S & S 288TH ST	Federal Way	Off-street trails / Cycletracks	$ 5.75	8.2	0.0	0.1	8.3
BAY 1 & AUBURN TC	Auburn	New Streets	$ 1.53	8.0	0.0	0.3	8.3
WESTLAKE AVE N & HARRISON ST	Seattle	Bike Lanes	$ 0.85	6.2	0.1	2.0	8.2
156TH AVE NE & NE 24TH ST	Bellevue	Off-street trails / Cycletracks	$ 7.28	8.0	0.1	0.1	8.2
AURORA AVE N & N 46TH ST	Seattle	Greenways / Signalized Crossings	$ 2.00	6.0	0.2	2.0	8.2
156TH AVE NE & NE 24TH ST	Bellevue	Bike Lanes	$ 4.11	8.0	0.0	0.1	8.2
WOODLAND PL N & N 64TH ST	Seattle	Greenways / Signalized Crossings	$ 1.50	7.1	0.1	1.0	8.2
INTERNATIONAL BLVD & S 216TH ST	SeaTac	Off-street trails / Cycletracks	$ 5.26	8.1	0.0	0.0	8.1
156TH AVE NE & NE 10TH ST	Bellevue	New Streets	$ 9.58	7.7	0.1	0.3	8.1
4TH AVE N & W SMITH ST	Kent	Off-street trails / Cycletracks	$ 0.39	7.8	0.0	0.3	8.1
MERIDIAN AVE N & N NORTHGATE WAY	Seattle	Off-street trails / Cycletracks	$ 5.94	6.9	0.2	1.0	8.1
15TH AVE E & E ROY ST	Seattle	Greenways / Signalized Crossings	$ 3.50	7.7	0.1	0.3	8.1
NE 45TH ST & 7TH AVE NE	Seattle	Off-street trails / Cycletracks	$ 12.29	8.0	0.1	0.0	8.1

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
PACIFIC HWY S & S 260TH ST	Des Moines	Bike Lanes	$ 1.63	7.7	0.0	0.3	8.0
VIRGINIA ST & 6TH AVE	Seattle	Off-street trails / Cycletracks	$ 17.69	8.0	0.0	0.0	8.0
156TH AVE NE & NE 31ST ST	Redmond	New Streets	$ 16.76	7.4	0.2	0.3	7.9
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Bike Lanes	$ 2.14	7.6	0.0	0.3	7.9
156TH AVE NE & NE 31ST ST	Redmond	Off-street trails / Cycletracks	$ 7.07	7.4	0.1	0.3	7.9
PACIFIC HWY S & S 260TH ST	Des Moines	Sidewalks	$ 5.85	7.7	0.0	0.1	7.9
PACIFIC HWY S & S 260TH ST	Des Moines	Off-street trails / Cycletracks	$ 0.68	7.7	0.0	0.1	7.8
PACIFIC HWY S & S 272ND ST	Des Moines	Sidewalks	$ 7.82	7.6	0.1	0.1	7.8
NE NORTHGATE WAY & ROOSEVELT WAY NE	Seattle	Off-street trails / Cycletracks	$ 8.51	7.6	0.1	0.1	7.7
BAY A & CONVENTION PLACE	Seattle	Off-street trails / Cycletracks	$ 16.12	7.5	0.1	0.1	7.7
PACIFIC HWY S & S 272ND ST	Des Moines	Off-street trails / Cycletracks	$ 1.49	7.6	0.0	0.1	7.7
15TH AVE E & E ROY ST	Seattle	Off-street trails / Cycletracks	$ 9.73	7.7	0.0	0.0	7.7
148TH AVE NE & NE 51ST ST	Redmond	Off-street trails / Cycletracks	$ 3.68	7.3	0.1	0.3	7.7
AURORA AVE N & GALER ST	Seattle	Off-street trails / Cycletracks	$ 11.94	7.5	0.1	0.1	7.7
156TH AVE NE & NE 28TH ST	Redmond	New Streets	$ 20.04	7.7	0.0	0.0	7.7
FAUNTLEROY WAY SW & CALIFORNIA AVE SW	Seattle	Off-street trails / Cycletracks	$ 8.16	7.2	0.1	0.3	7.7
156TH AVE NE & NE 28TH ST	Redmond	Off-street trails / Cycletracks	$ 7.96	7.7	0.0	0.0	7.7
FAIRVIEW AVE N & MERCER ST	Seattle	Bike Lanes	$ 0.92	6.6	0.0	1.0	7.7
148TH AVE NE & NE 51ST ST	Redmond	Bike Lanes	$ 1.67	7.3	0.0	0.3	7.7
5TH AVE NE & NE 112TH ST	Seattle	Off-street trails / Cycletracks	$ 9.50	7.6	0.0	0.0	7.6
E UNION ST & BROADWAY	Seattle	Bike Lanes	$ 0.87	4.4	0.2	3.0	7.6
FAUNTLEROY WAY SW & SW BARTON ST	Seattle	Off-street trails / Cycletracks	$ 4.42	7.4	0.0	0.1	7.6
E JEFFERSON ST & 15TH AVE	Seattle	Greenways / Signalized Crossings	$ 2.00	6.5	0.0	1.0	7.6
OVERLAKE TC	Redmond	New Streets	$ 11.52	7.4	0.1	0.1	7.5
E UNION ST & BROADWAY	Seattle	Off-street trails / Cycletracks	$ 10.31	4.4	2.1	1.0	7.5

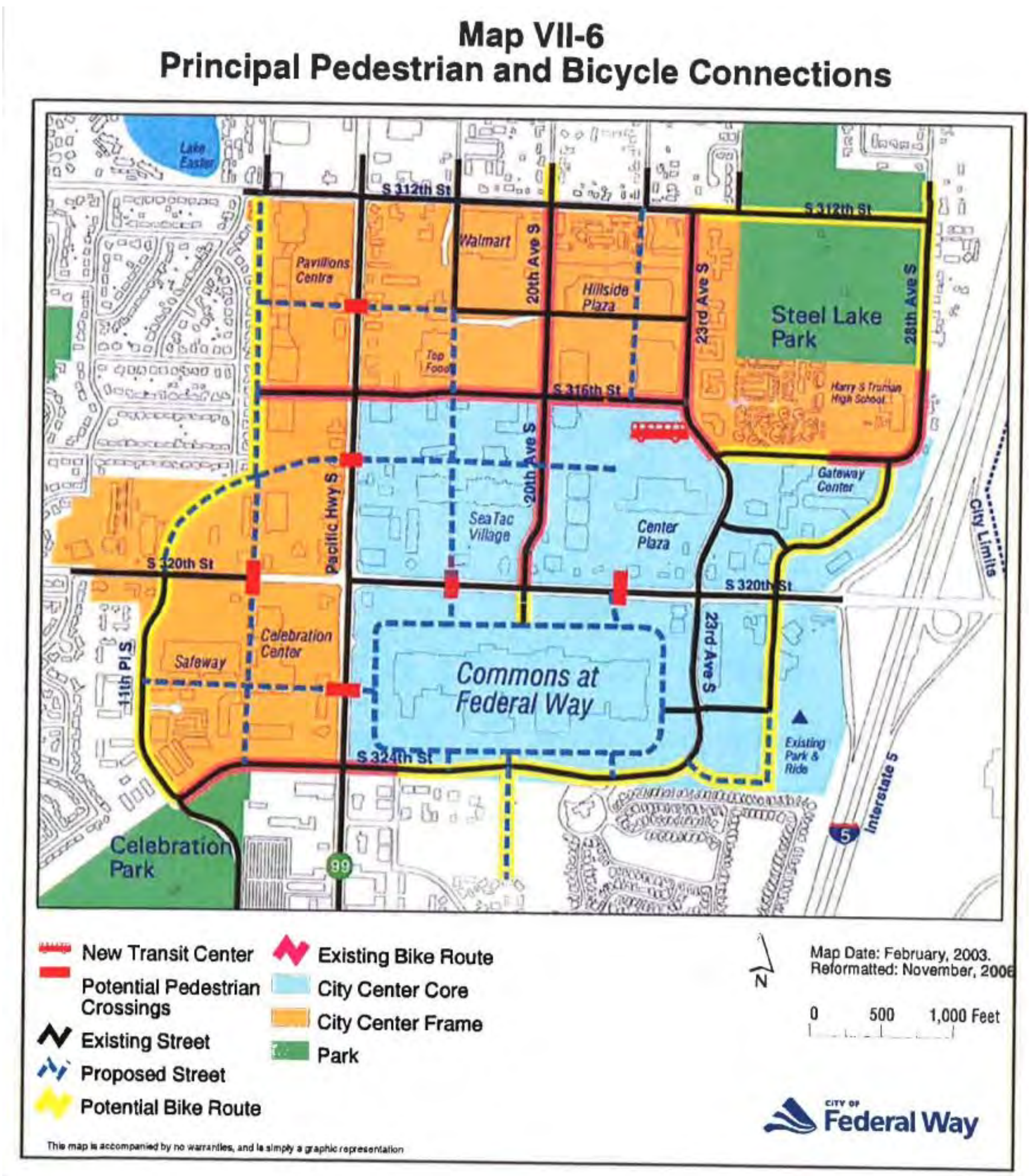
Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
PACIFIC HWY S & KENT-DESMOINES RD	Des Moines	Off-street trails / Cycletracks	$ 2.54	7.4	0.0	0.1	7.5
1ST AVE NE & NE 95TH ST	Seattle	Greenways / Signalized Crossings	$ 4.50	7.3	0.0	0.1	7.5
156TH AVE NE & NE 31ST ST	Redmond	Bike Lanes	$ 4.52	7.4	0.0	0.0	7.5
148TH AVE NE & NE 87TH ST	Redmond	Off-street trails / Cycletracks	$ 8.91	7.4	0.0	0.0	7.5
148TH AVE NE & NE 40TH ST	Redmond	Bike Lanes	$ 2.18	7.1	0.0	0.3	7.5
DEXTER AVE N & MERCER ST	Seattle	Bike Lanes	$ 0.70	6.4	0.0	1.0	7.5
ANDOVER PARK W & TRILAND DR	Tukwila	New Streets	$ 20.89	7.4	0.0	0.0	7.4
OVERLAKE TC	Redmond	New Streets	$ 11.52	7.2	0.1	0.1	7.4
BROADWAY & E COLUMBIA ST	Seattle	Greenways / Signalized Crossings	$ 0.50	7.1	0.0	0.3	7.4
OVERLAKE TC	Redmond	Off-street trails / Cycletracks	$ 6.87	7.4	0.0	0.0	7.4
1ST AVE NE & NE 95TH ST	Seattle	Off-street trails / Cycletracks	$ 6.65	7.3	0.0	0.0	7.4
AURORA AVE N & N 100TH ST	Seattle	Greenways / Signalized Crossings	$ 2.00	6.3	0.1	1.0	7.3
1ST AVE NE & NE 95TH ST	Seattle	Bike Lanes	$ 2.26	7.3	0.0	0.0	7.3
DENNY WAY & DEXTER AVE N	Seattle	Off-street trails / Cycletracks	$ 17.68	5.6	1.4	0.3	7.3
AURORA AVE N & N 100TH ST	Seattle	Bike Lanes	$ 1.51	6.3	0.0	1.0	7.3
AURORA AVE N & N 91ST ST	Seattle	Greenways / Signalized Crossings	$ 2.50	5.1	0.1	2.0	7.3
OVERLAKE TC	Redmond	Off-street trails / Cycletracks	$ 6.87	7.2	0.0	0.0	7.2
SODO BUSWAY & S ROYAL BROUGHAM WAY	Seattle	Off-street trails / Cycletracks	$ 11.51	6.7	0.2	0.3	7.2
SOUTHCENTER BLVD & 62ND AVE S	Tukwila	New Streets	$ 18.21	7.1	0.1	0.0	7.2
148TH AVE NE & NE 40TH ST	Redmond	Off-street trails / Cycletracks	$ 5.89	7.1	0.0	0.0	7.1
NE PACIFIC ST & 15TH AVE NE	Seattle	Off-street trails / Cycletracks	$ 14.62	7.1	0.1	0.0	7.1
ELLIOTT AVE W & W PROSPECT ST	Seattle	Off-street trails / Cycletracks	$ 8.03	7.0	0.1	0.1	7.1
148TH AVE NE & NE 40TH ST	Redmond	New Streets	$ 11.12	7.1	0.0	0.0	7.1
5TH AVE NE & NE 106TH ST	Seattle	Off-street trails / Cycletracks	$ 7.16	7.1	0.0	0.0	7.1
NE NORTHGATE WAY & 5TH AVE NE	Seattle	Off-street trails / Cycletracks	$ 8.03	7.1	0.0	0.0	7.1

Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
BROADWAY & E COLUMBIA ST	Seattle	Off-street trails / Cycletracks	$ 11.58	7.1	0.0	0.0	7.1
ANDOVER PARK W & MINKLER BLVD	Tukwila	Off-street trails / Cycletracks	$ 1.42	6.8	0.0	0.3	7.1
SW AVALON WAY & SW YANCY ST	Seattle	Off-street trails / Cycletracks	$ 9.47	6.5	0.2	0.3	7.0
S 180TH ST & SPERRY DR	Tukwila	New Streets	$ 18.99	6.8	0.1	0.1	7.0
STRANDER BLVD & ANDOVER PARK E	Tukwila	Off-street trails / Cycletracks	$ 0.66	6.7	0.0	0.3	7.0
WESTLAKE AVE N & MERCER ST	Seattle	Greenways / Signalized Crossings	$ 0.50	6.7	0.0	0.3	7.0
FAIRVIEW AVE N & MERCER ST	Seattle	Greenways / Signalized Crossings	$ 0.50	6.6	0.0	0.3	6.9
ANDOVER PARK W & MINKLER BLVD	Tukwila	New Streets	$ 25.90	6.8	0.1	0.0	6.8
STRANDER BLVD & ANDOVER PARK E	Tukwila	New Streets	$ 25.90	6.7	0.0	0.0	6.7
BROADWAY E & E REPUBLICAN ST	Seattle	Off-street trails / Cycletracks	$ 10.92	4.4	1.3	1.0	6.7
WESTLAKE AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	$ 16.21	6.7	0.0	0.0	6.7
FAIRVIEW AVE N & VALLEY ST	Seattle	Greenways / Signalized Crossings	$ 0.50	5.7	0.0	1.0	6.7
FAIRVIEW AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	$ 15.24	6.6	0.0	0.0	6.7
AURORA AVE N & N 100TH ST	Seattle	Off-street trails / Cycletracks	$ 5.73	6.3	0.1	0.3	6.7
BROADWAY E & E JOHN ST	Seattle	Off-street trails / Cycletracks	$ 10.59	4.7	0.9	1.0	6.6
156TH AVE NE & NE 45TH ST	Redmond	Bike Lanes	$ 3.19	6.6	0.0	0.0	6.6
DEXTER AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	$ 16.71	6.5	0.0	0.0	6.5
AURORA AVE N & N 85TH ST	Seattle	Off-street trails / Cycletracks	$ 5.70	6.5	0.0	0.0	6.5
E UNION ST & BROADWAY	Seattle	Greenways / Signalized Crossings	$ 0.50	4.4	0.0	2.0	6.5
DEXTER AVE N & MERCER ST	Seattle	Off-street trails / Cycletracks	$ 15.49	6.4	0.0	0.0	6.5
15TH AVE NW & NW MARKET ST	Seattle	Off-street trails / Cycletracks	$ 4.33	6.0	0.1	0.3	6.4
WESTLAKE AVE N & HARRISON ST	Seattle	Off-street trails / Cycletracks	$ 18.06	6.2	0.1	0.0	6.3
E ROY ST & BROADWAY E	Seattle	Off-street trails / Cycletracks	$ 10.99	6.2	0.0	0.0	6.2
E MADISON ST & 17TH AVE	Seattle	Off-street trails / Cycletracks	$ 3.11	5.2	0.1	1.0	6.2
AURORA AVE N & PROSPECT ST	Seattle	Off-street trails / Cycletracks	$ 13.97	6.2	0.0	0.0	6.2

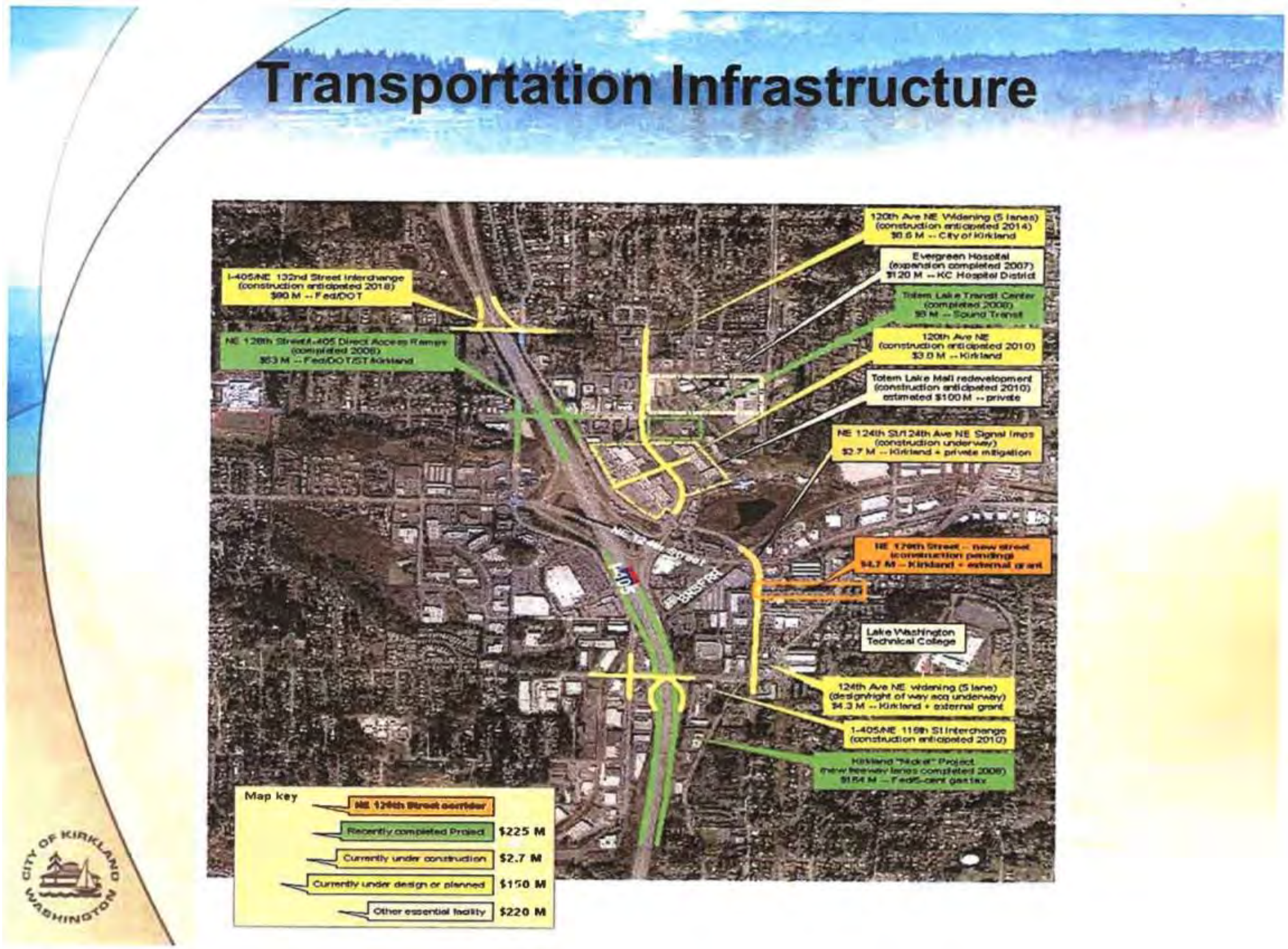
Stop Location	Area	Project Type	Estimated Cost ($millions)	*Demo./ Pop/Emp Change Score*	*Pct. Change Ridership Score*	*Cost per Rider Score*	*Aggregate Score*
3RD AVE & VINE ST	Seattle	Off-street trails / Cycletracks	$ 15.44	5.5	0.2	0.3	6.0
FAIRVIEW AVE E & YALE AVE N	Seattle	Bike Lanes	$ 0.36	5.6	0.0	0.3	5.9
FAIRVIEW AVE N & VALLEY ST	Seattle	Off-street trails / Cycletracks	$ 14.73	5.7	0.1	0.1	5.8
FAIRVIEW AVE E & YALE AVE N	Seattle	Greenways / Signalized Crossings	$ 0.50	5.6	0.0	0.1	5.7
FAIRVIEW AVE E & YALE AVE N	Seattle	Off-street trails / Cycletracks	$ 14.87	5.6	0.0	0.0	5.6
AURORA AVE N & N 91ST ST	Seattle	Off-street trails / Cycletracks	$ 6.10	5.1	0.0	0.0	5.1

APPENDIX F. EXAMPLE PLANS FOR FUTURE PROJECTS

Federal Way Transit Center



Totem Lake Transit Center



Aurora Square

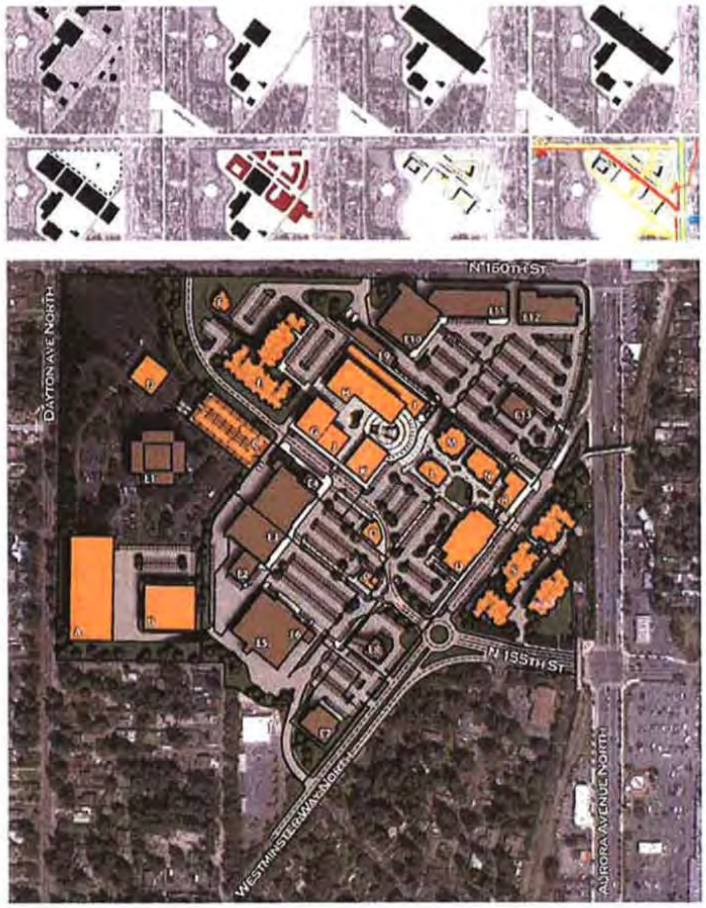
MASTER PLANNING

Aurora Square is home to many outstanding businesses, but due to the absence of cohesive planning to guide investment, the center provides little synergy. In order to create an effective Renewal Plan, the City of Shoreline conducted a master planning effort that identified **ten projects for renewal**, which are further explained in the pages to follow.

The ten renewal projects provide a **dynamic and flexible framework** for guiding public-private partnership projects by allowing individual property owners to understand and invest in the "big picture" without control of other properties. The projects aren't about specific buildings or uses as much as about infrastructure, connectivity, jobs, and attracting people. The renewal projects help the CRA become more economically healthy for the property owners, tenants, and community while providing significant public benefit.

The City of Shoreline seeks renewal at Aurora Square **by mobilizing its resources to improve the existing infrastructure**; we believe this to be both environmentally responsible and honoring of the investment already made. That is why the master planning suggests such projects as repurposing the Sears building, increasing land use efficiency, enhancing the "on-ground" experience, and providing solutions to stubborn design and connectivity problems.

The City's role will be complete when the obstacles for typical investment are overcome and significant investment is attracted. The City is attempting to be **the catalyst that starts the boulder of private enterprise rolling** down the hill toward a wonderful outcome.



INCREASE LAND EFFICIENCY

Lynnwood Subarea Plan

	WEST END	CORE	NORTH END
Summary	Residential, Retail, Local Services	Major Office, Retail, Services, Convention Center, Hotel, Residential	Office, Services, Retail
Ranges of FAR's	3-5 FAR	8-10 FAR	3-5 FAR
Ranges of Height	70'-140' height	150'-350' height	70'-140' height
Ranges of Stories	5-13 stories	15-34 stories	5-13 stories

* Promenade Key Attributes:
- 16-20 foot wide sidewalks
- specimen trees
- unique, pedestrian-scaled lighting fixtures
- benches, bollards, and other furnishings
- decorative paving
- water features
- artwork
- on-street parallel parking (where a street)
- one driving lane each direction (where a street)

Notes:
1. All streets would have street trees, but only the Major Boulevards have been highlighted.
2. Streets (not including Major Boulevards or Arterials, would have on-street parking, especially in areas with retail frontage.

Figure 1.3 Southcenter Block Patterns

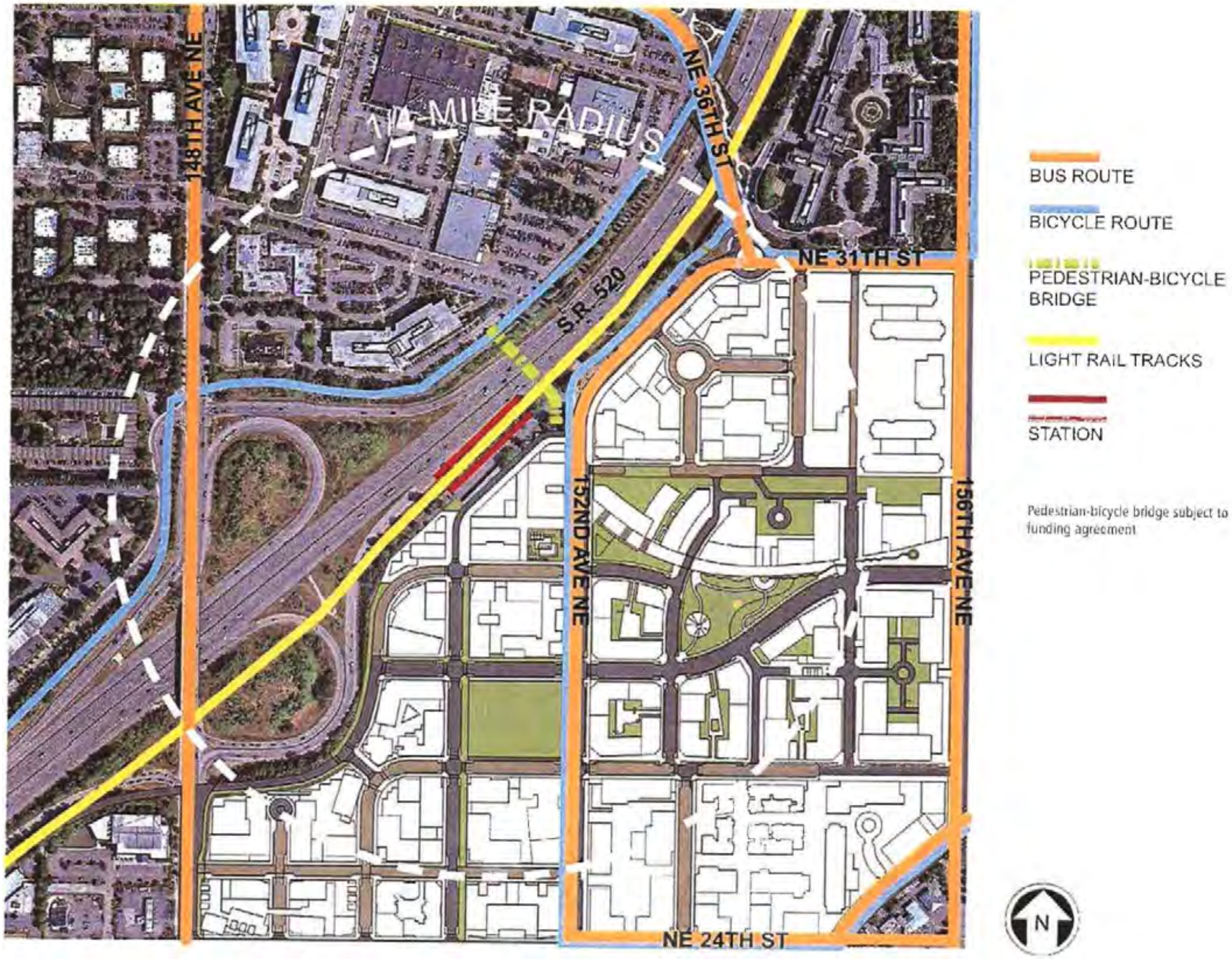
Strander Boulevard will continue to be the most well-traveled east-west thoroughfare and the gateway for many visitors to the Regional Center, Pond District and TOD Neighborhood. Ultimately, Strander Boulevard will be extended eastward to provide a new through street to Renton. This extension will pass underneath the railroad lines and provide direct access to the Tukwila ~~Longacres/Amtrak s~~Station from both Tukwila and Renton. Of the several north-south arterials, Andover Park West provides the most direct connection to and through the Regional Center, the new Pond District, and the new Southcenter~~Tukwila~~ Transit Center.

3) Transit: Integrated with Urban Center Development

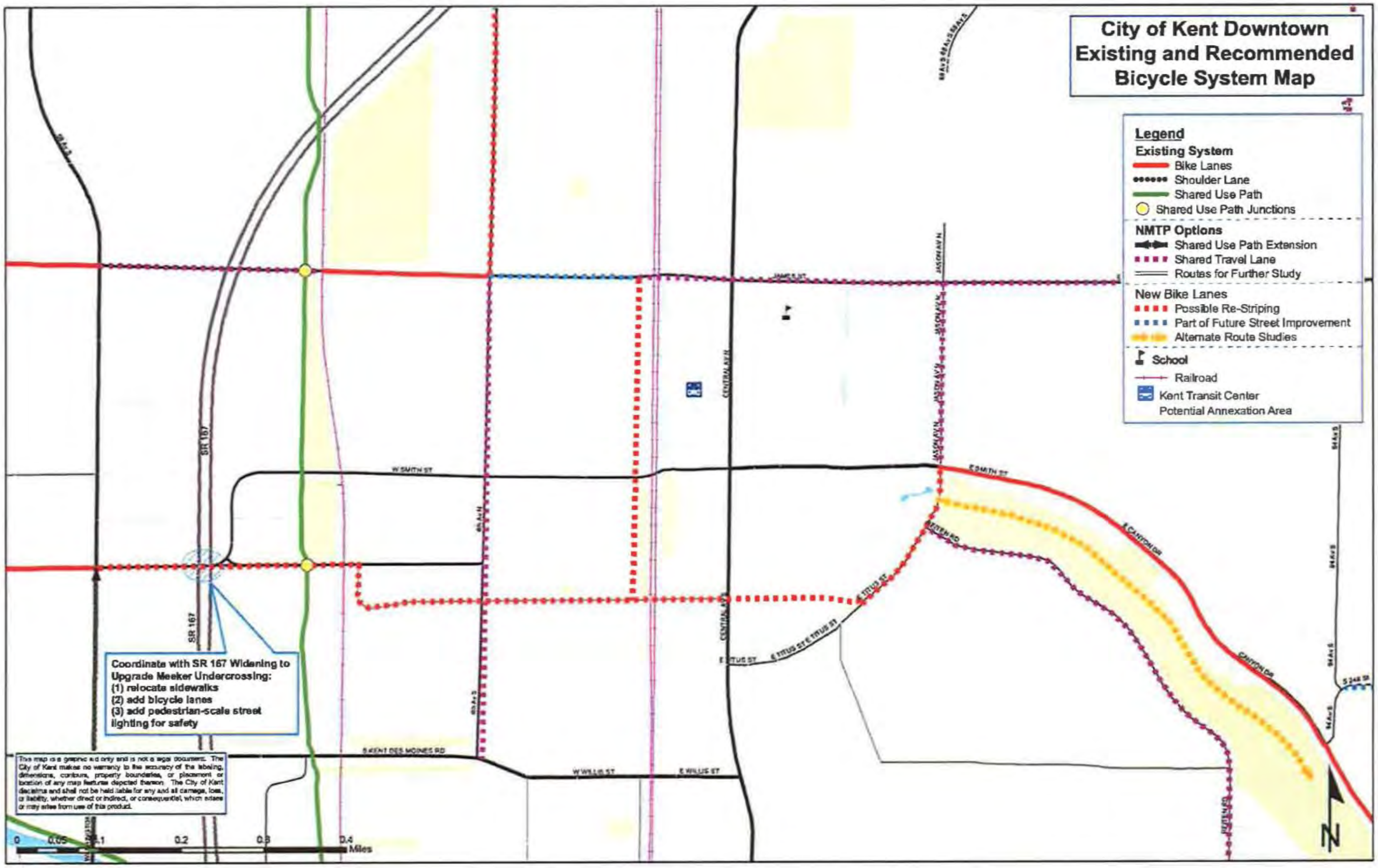
As the region continues to grow, gas prices increase, and the demand surges for increasingly compact, walkable and mixed use formats, a wide range of mobility options, especially rail transit, will become critical components for economic success, livability and sustainability. These trends will favor the areas of Southcenter within walking distance of the- Tukwila ~~Longacres/Amtrak s~~Station and Southcenter Transit Center, which can be expected to capture an increasing share of regional demand for housing and office development.

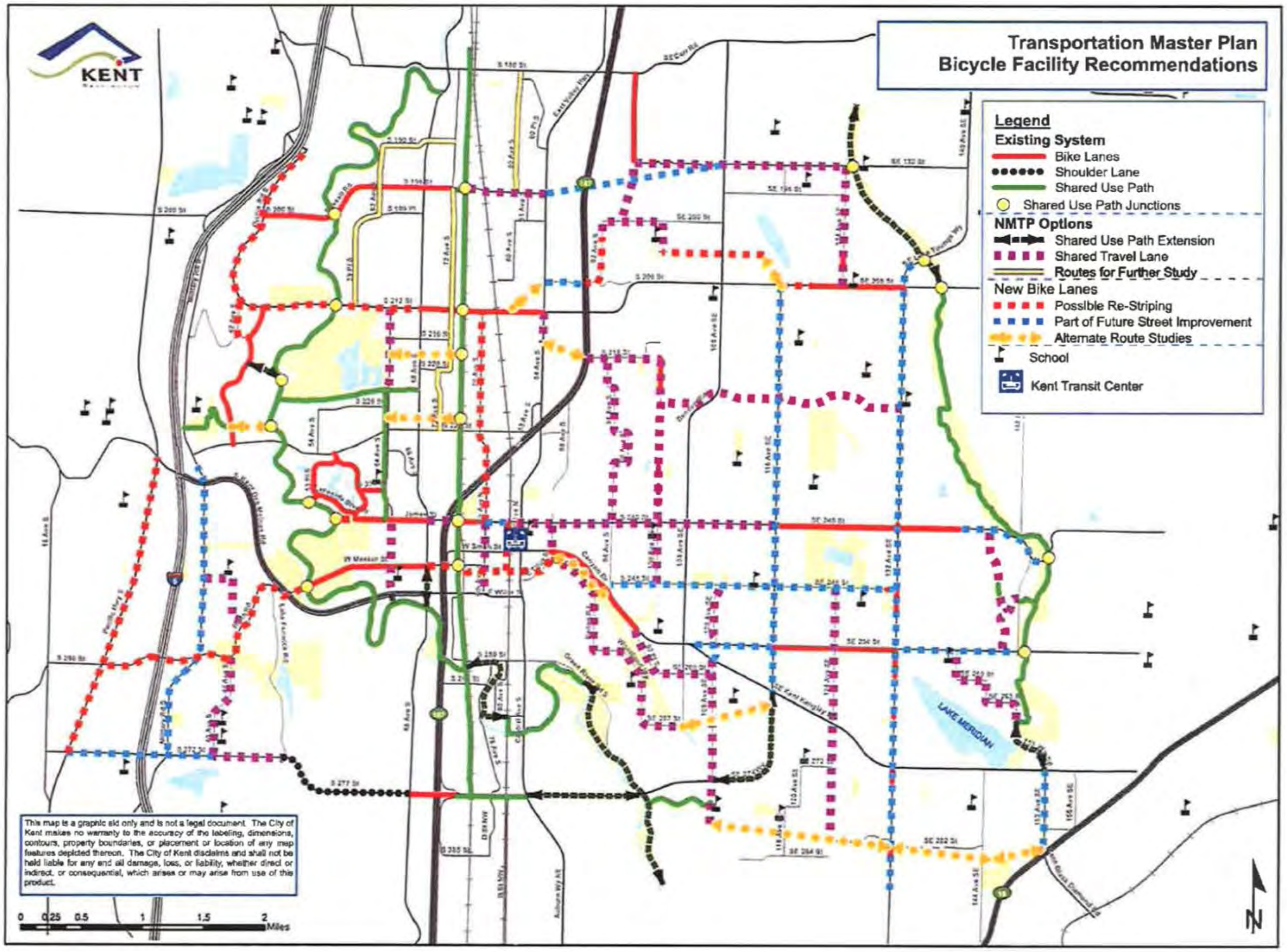
In order to realize the full potential of these transit facilities, existing barriers to visibility, access and convenience will be removed. Development within walking distance of transit stations will provide much enhanced connectivity to and from transit facilities as they contribute to improvements that incrementally add to the network of walkable, safe, and complete street environments – and in turn, the new transit oriented development will promote system ridership.

Overlake Village



Kent Bicycle System Plan




KENT
Transportation Master Plan
Bicycle Facility Recommendations
Legend
Existing System
Bike Lanes
Shoulder Lane
Shared Use Path
Shared Use Path Junctions
NMTP Options
Shared Use Path Extension
Shared Travel Lane
Routes for Further Study
New Bike Lanes
Possible Re-Striping
Part of Future Street Improvement
Alternate Route Studies
School
Kent Transit Center
LAKE MERIDIAN
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0 0.25 0.5 1 1.5 2 Miles
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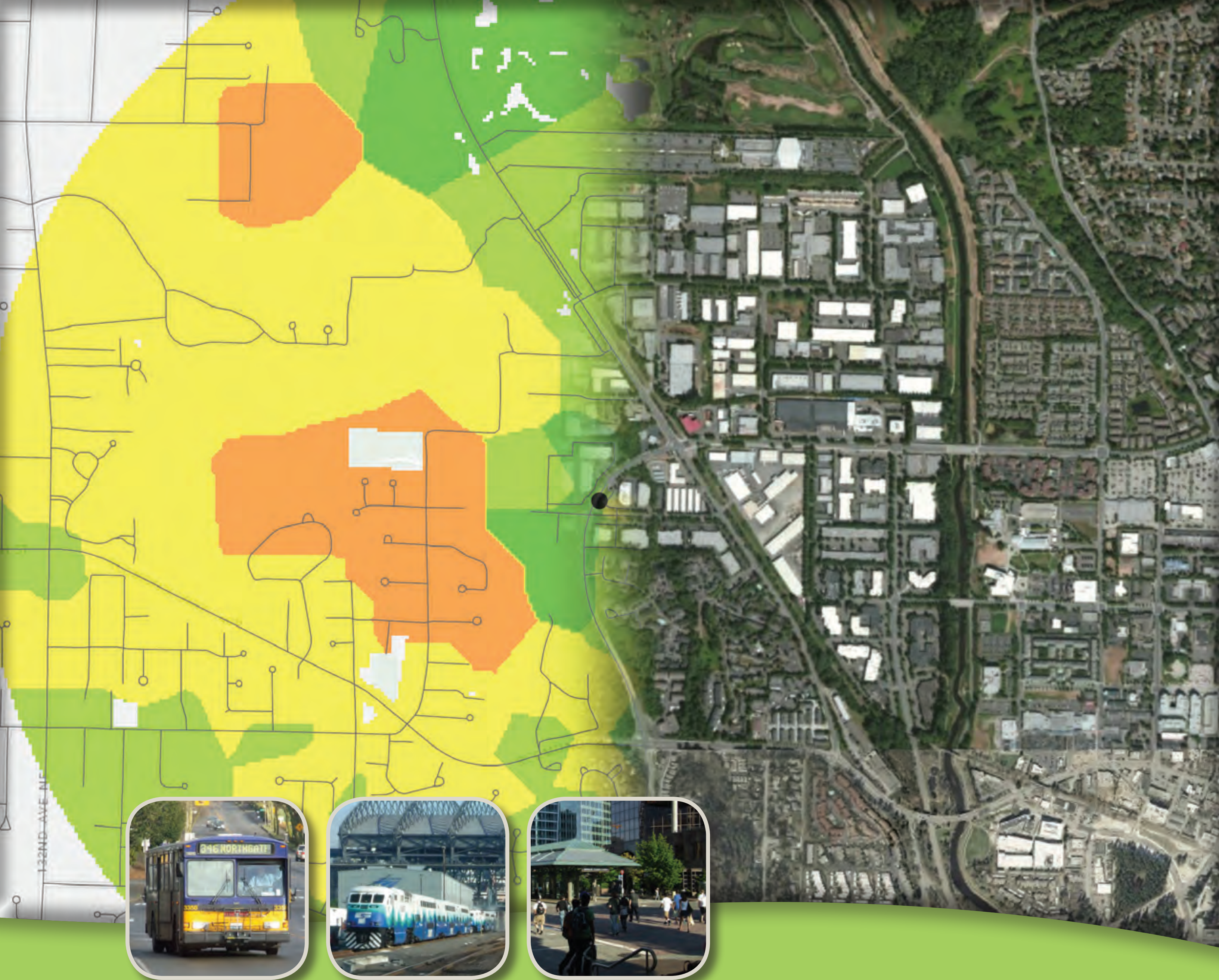

Submitted by:

FEHR & PEERS

Fehr & Peers
1001 4th Avenue
Suite 4120
Seattle, WA 98154

King County
METRO

SOUNDTRANSIT