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

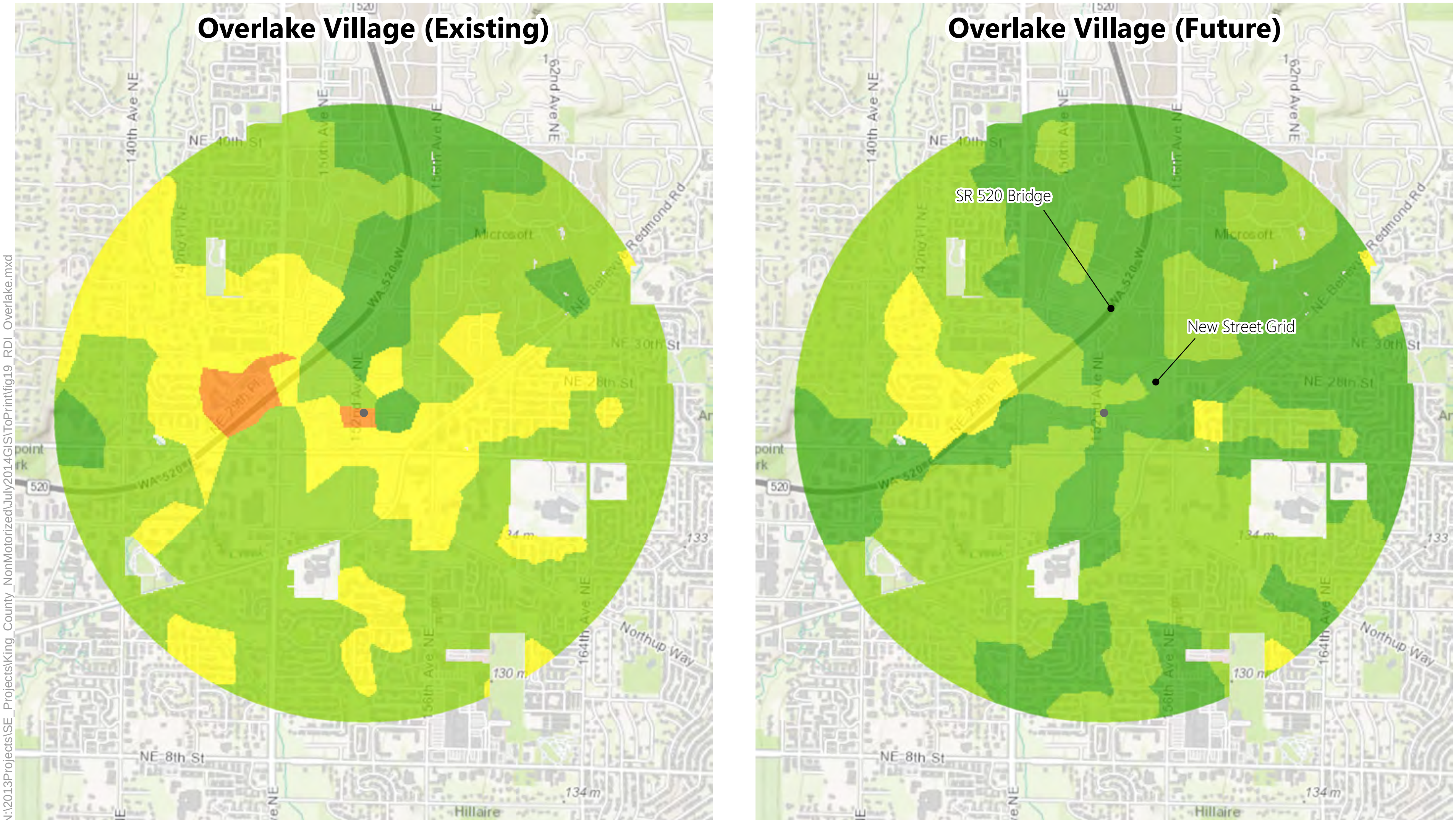
Primarily, areas with new streets or major barrier crossing projects experienced the largest change in RDI. This included SeaTac (City Center), Tukwila (Southcenter), Overlake Village, Federal Way Transit Center, and Northgate. **Table 13** highlights the RDI change for each of these areas.

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.



Route Directness
High
Low

● Study Stations

0 0.25 0.5 1 Miles

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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.

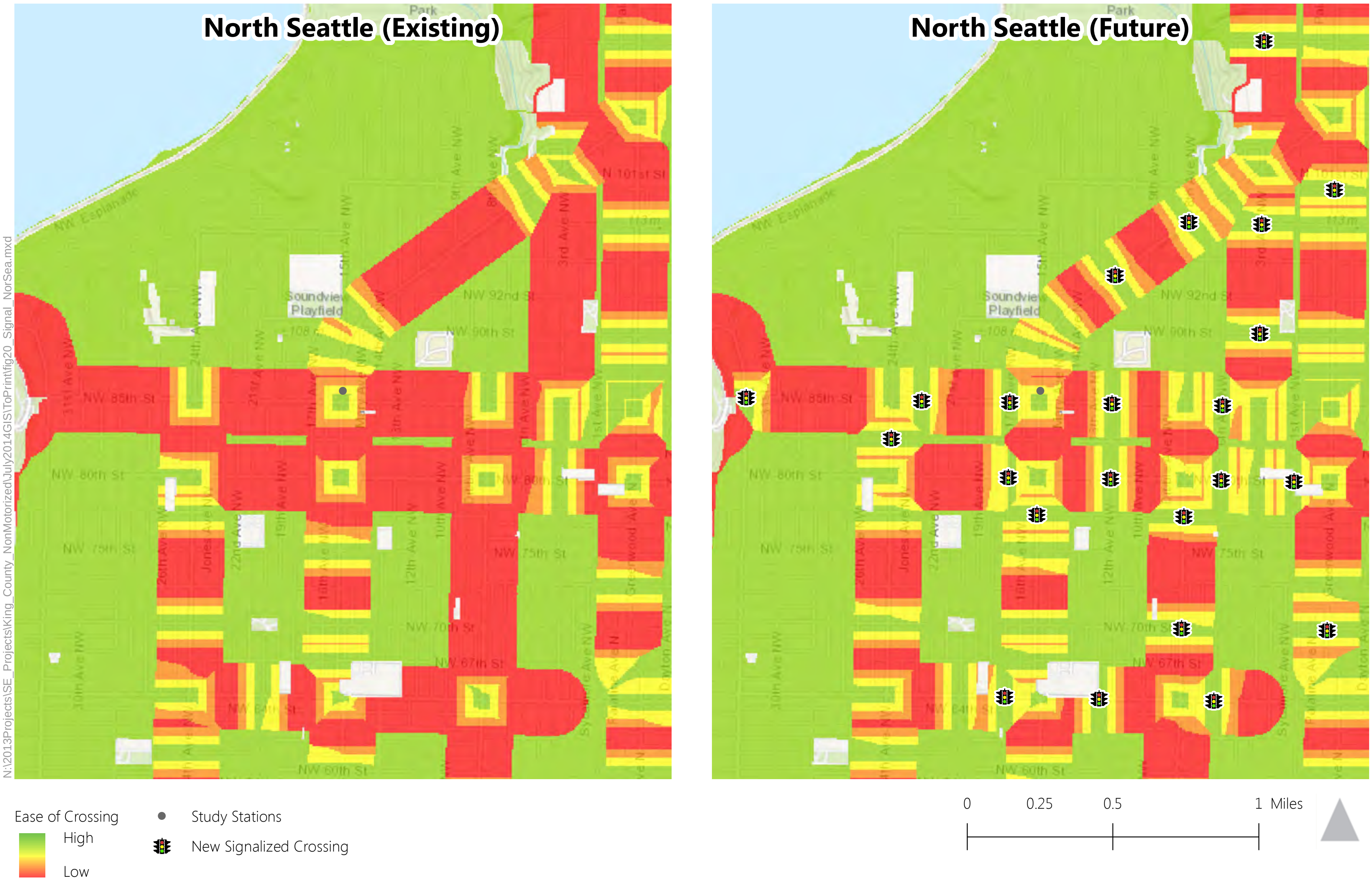


Figure 20

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

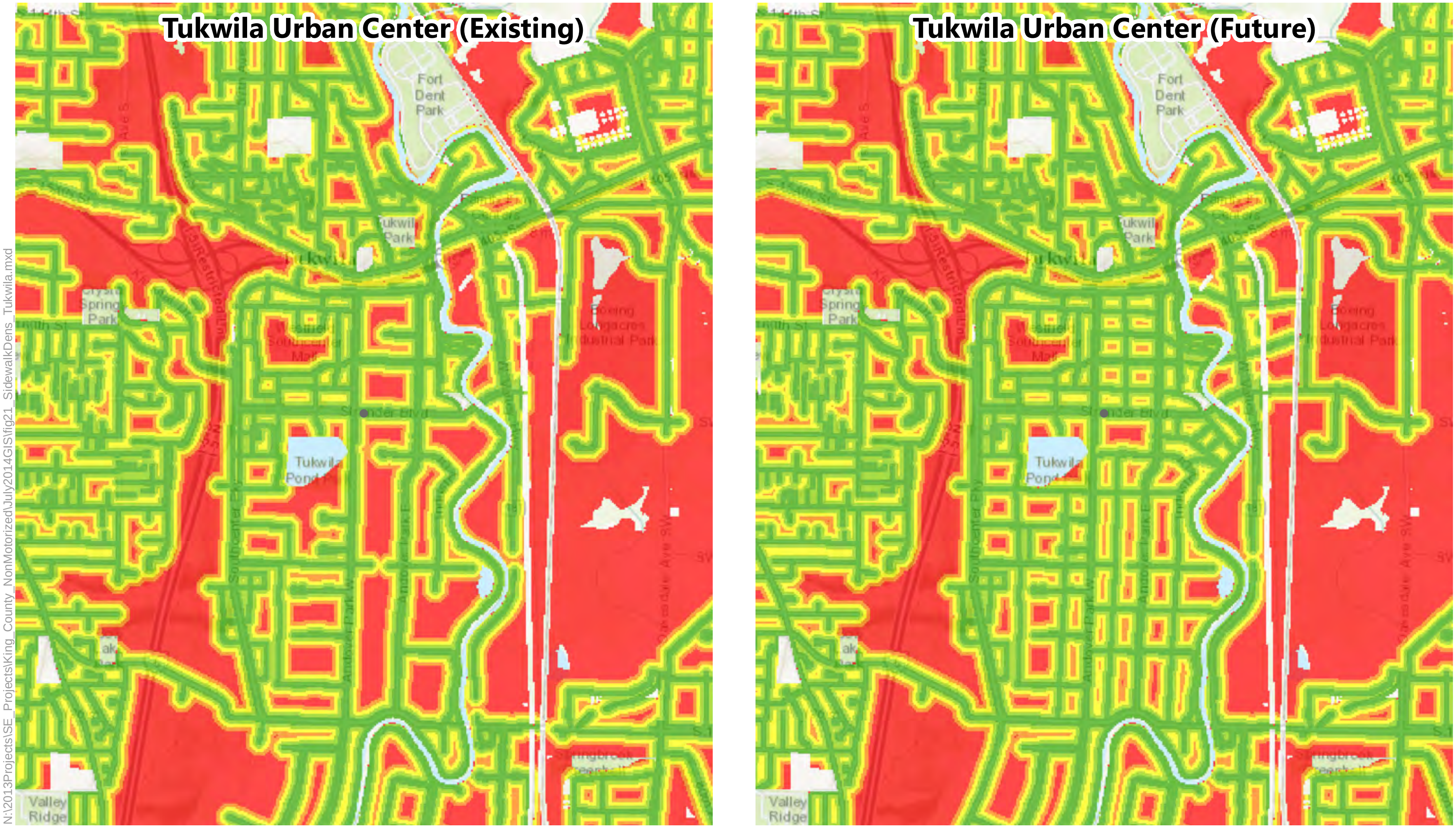
SIDEWALK/WALKWAY DENSITY

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.

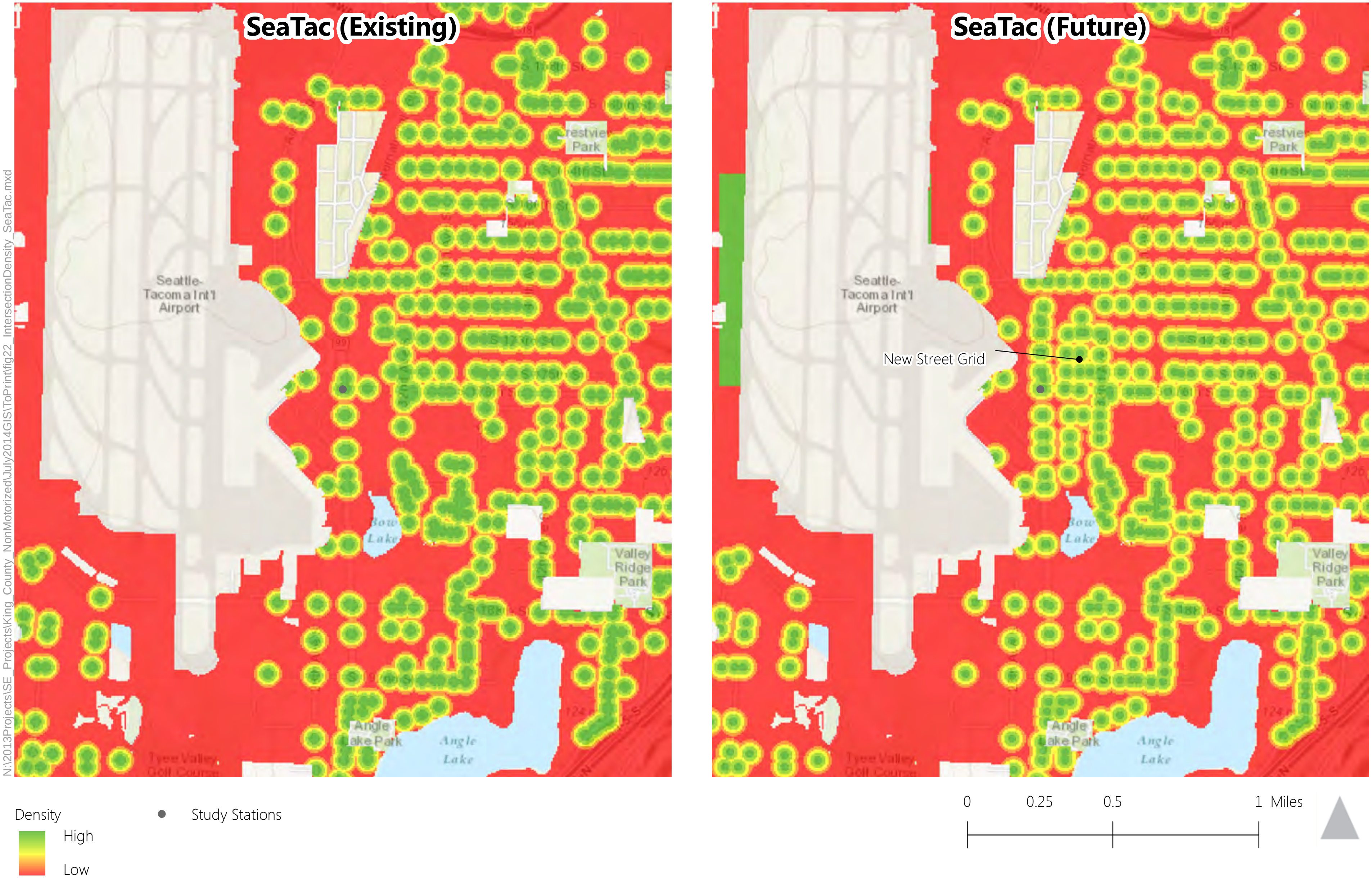


Figure 22

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.

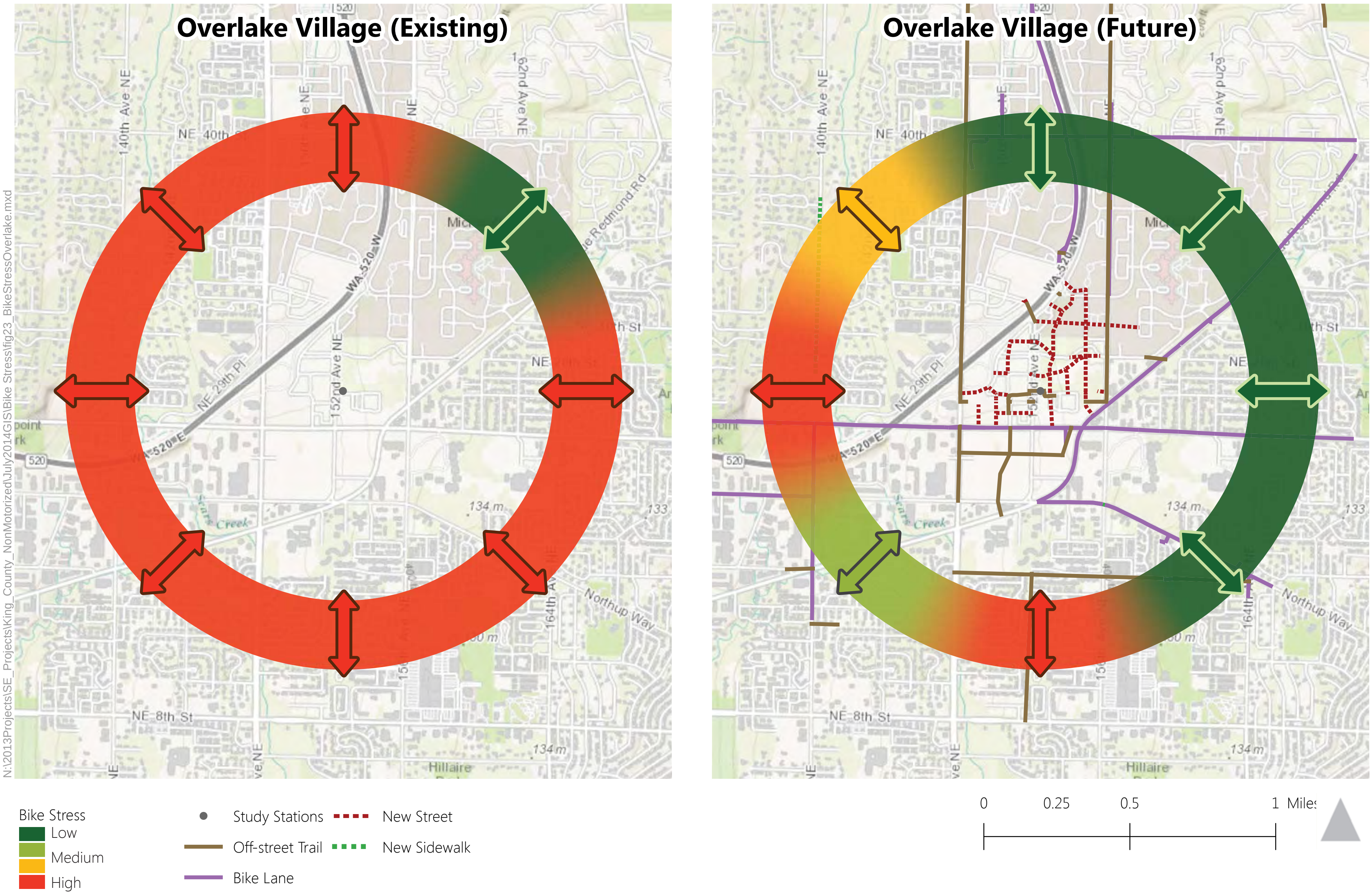


Figure 23

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.

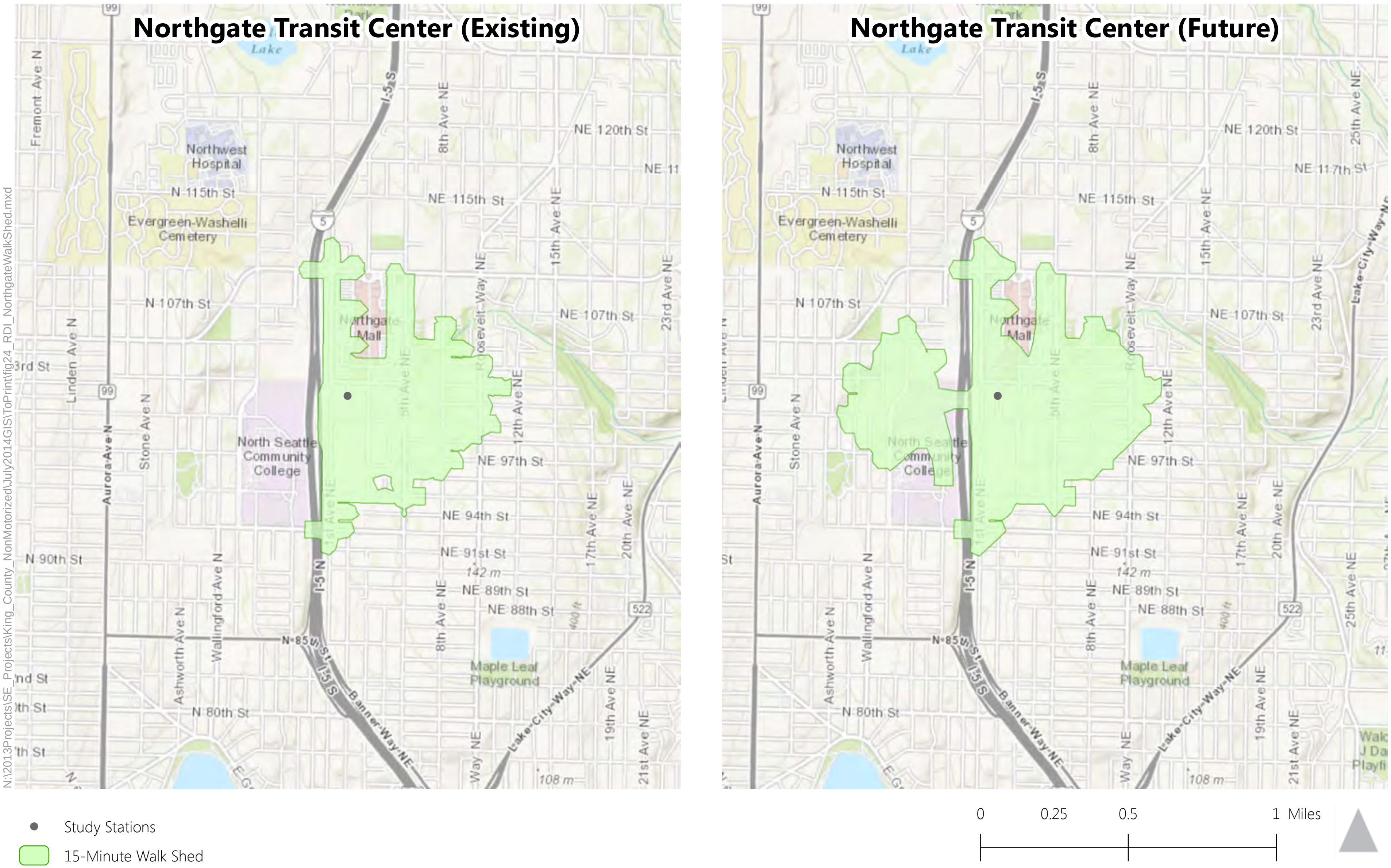


Figure 24

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

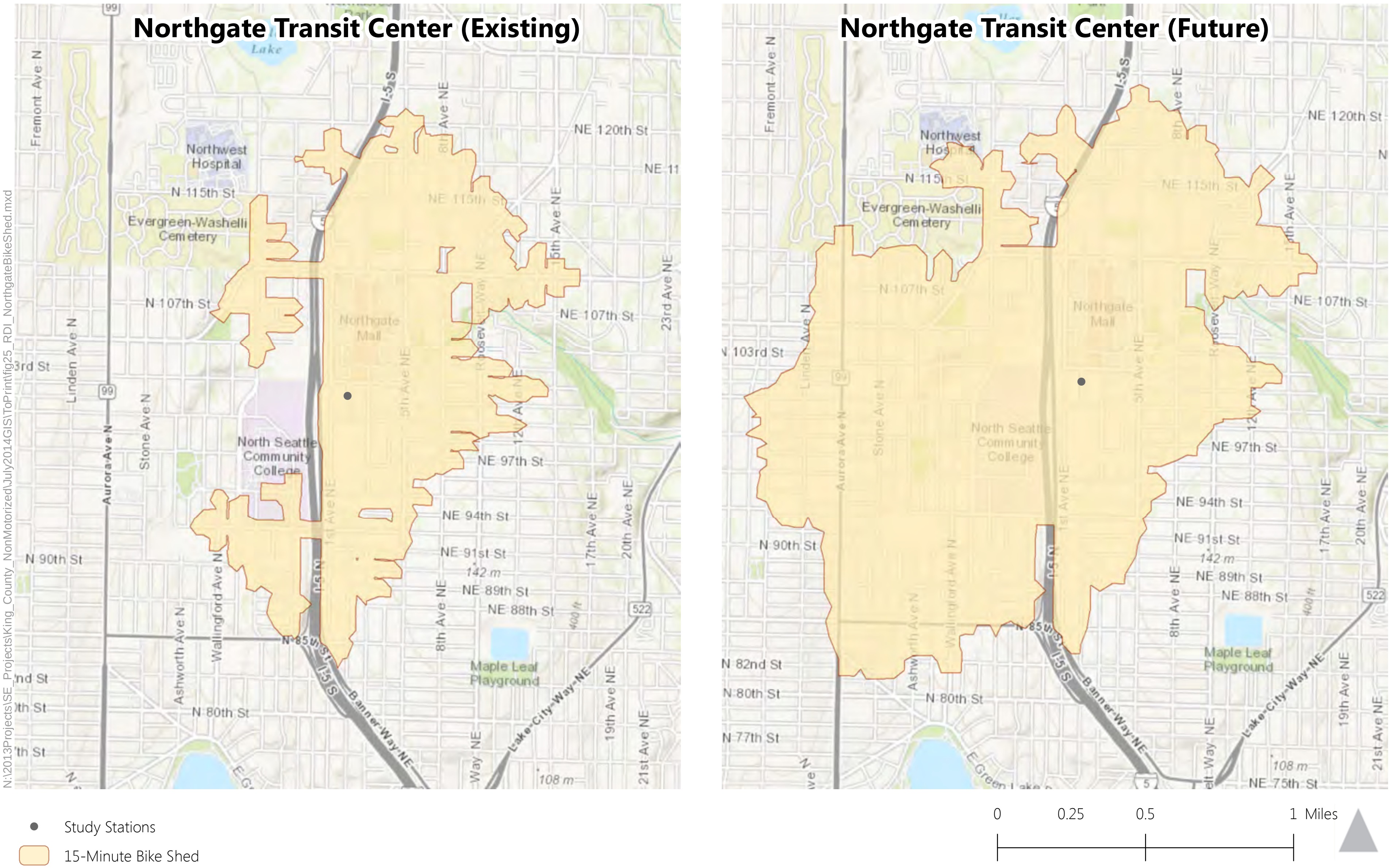


Figure 25

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.

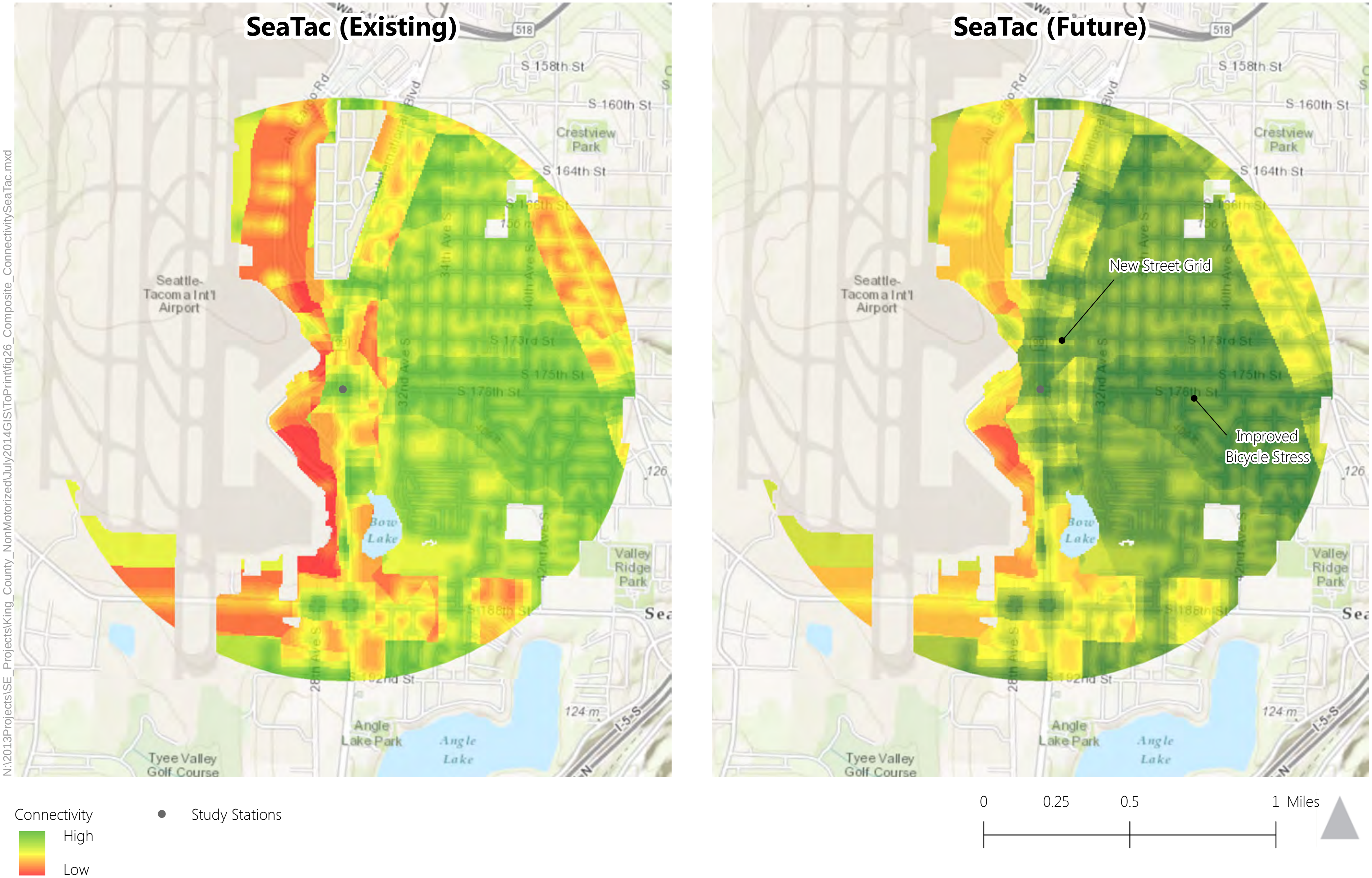


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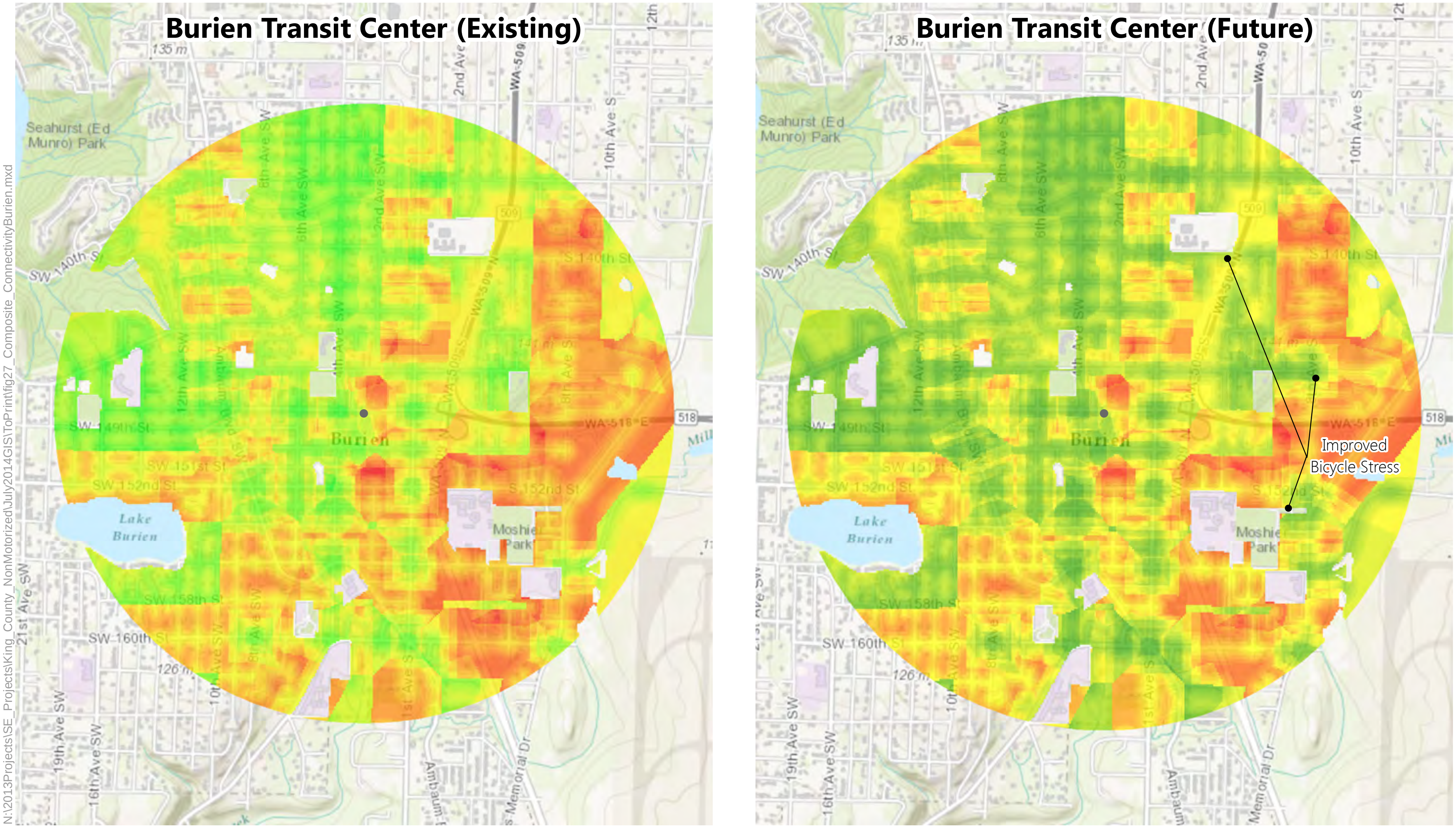
Figure 26

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

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.

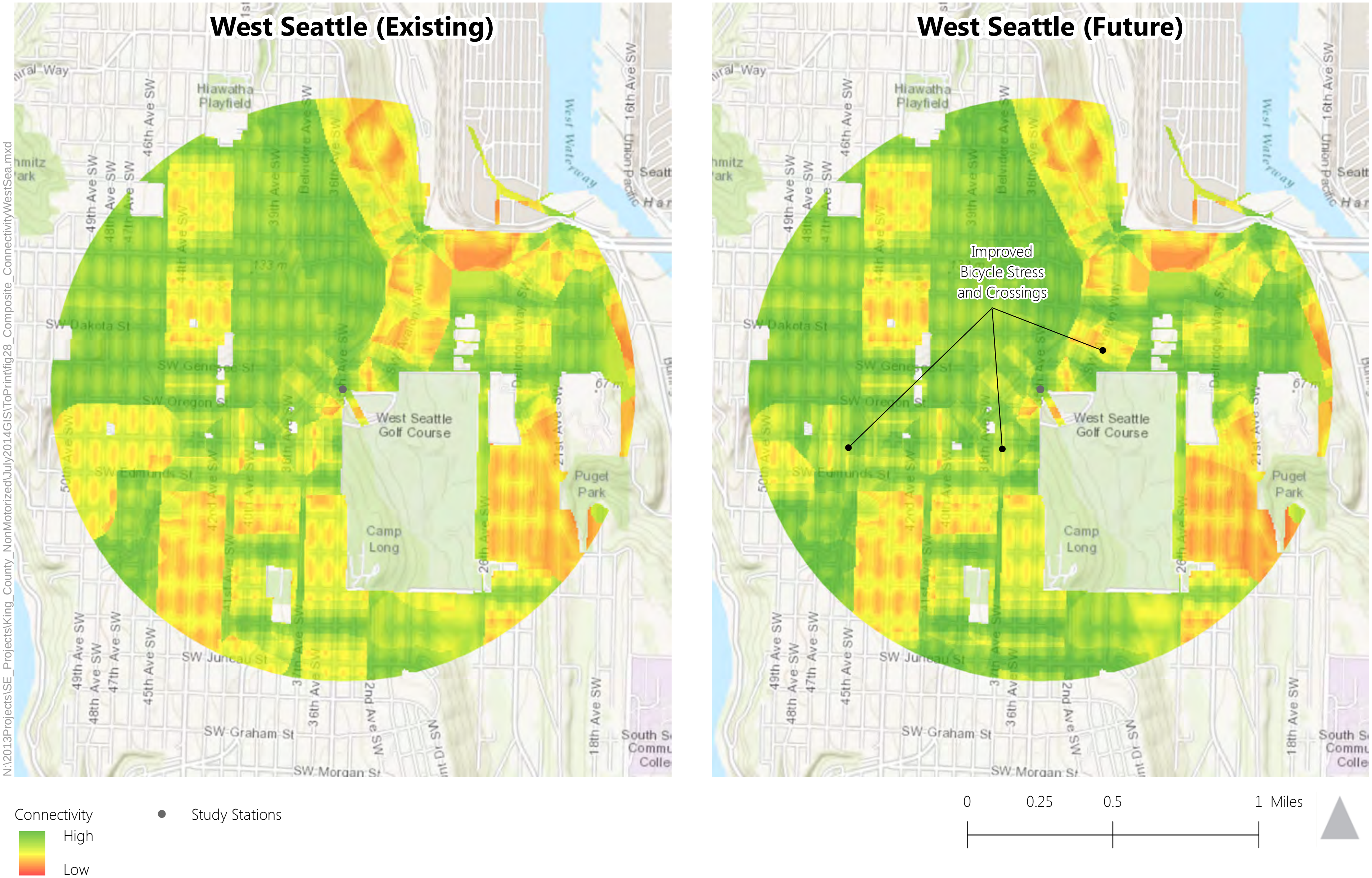


Figure 28

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.

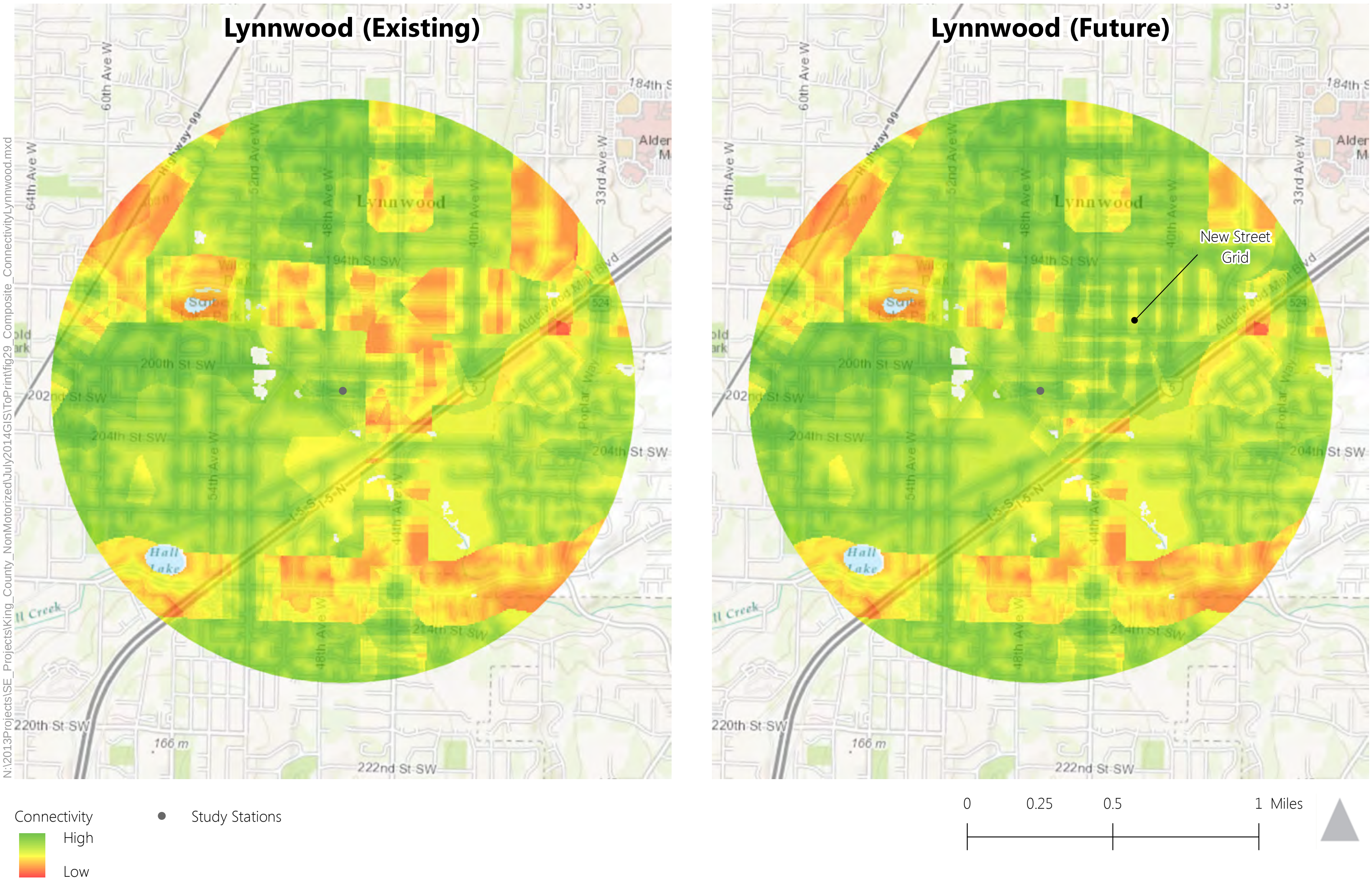
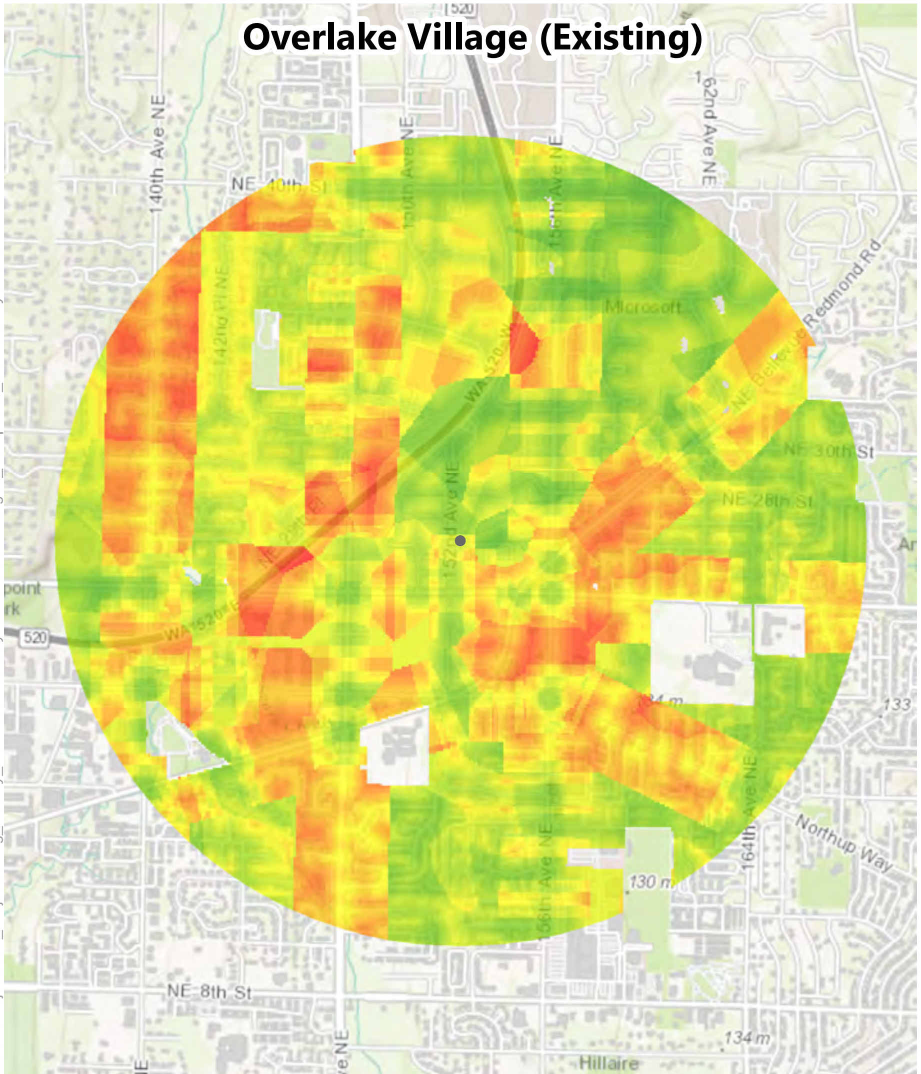
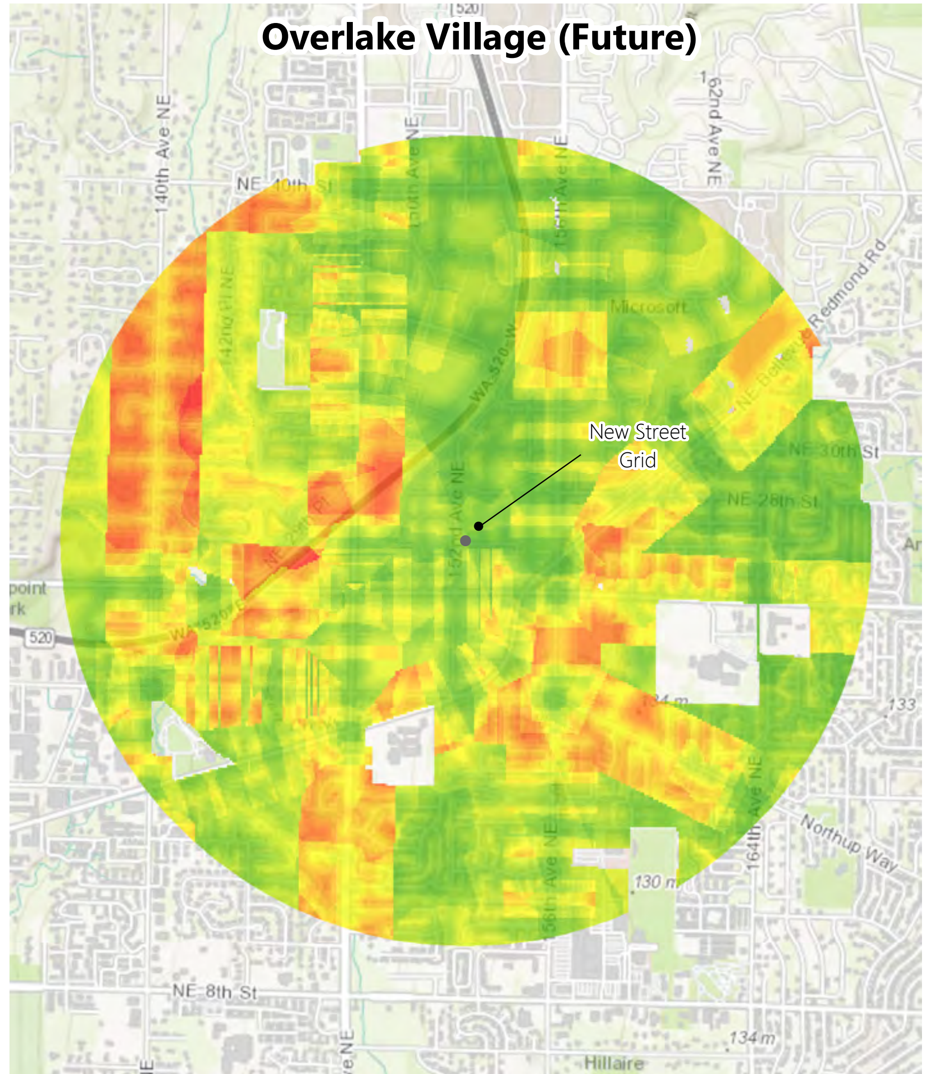


Figure 29

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.