EXISTING CONDITIONS SUPPLEMENT MEMO – BEND EMPLOYMENT CENTERS

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To: COIC, Project Management Team

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Subject: Existing Conditions Supplement Memo – Bend Employment Centers (Bend TMP Scope Task 3.1 to 3.3)

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INTRODUCTION

This memorandum describes existing conditions within Bend specific to transit access to existing and future employment centers as well as the bicycle and pedestrian access to existing transit routes. The memorandum includes:

- Existing commute patterns
- Job work hours relative to existing transit hours (e.g., service sector jobs, hospital jobs)
- Areas with significant past or projected employment growth
- Minimum concentration of jobs for an employment "center"
- Underserved employment and/or residential areas with respect to job access via transit
- Proposed performance measures combining jobs served and number of transit trips provided
- Bicycle and pedestrian infrastructure gaps relative to access to transit and jobs

EMPLOYMENT

This section identifies guidelines for local transit service types and frequency within the CET service area, with an emphasis on local services that connect residents and workers in Bend and surrounding communities to key employment and activity centers. It then analyzes the distribution of population and jobs in Bend along with the presence of existing transit service and identifies existing and potential future underserved areas.

TRANSIT MARKET LAND USE GUIDELINES

Public transportation service is generally designed to be compatible with the surrounding land use context and intensity of development, which is often measured using population and employment densities. These densities reflect the presence of residential locations and activity centers where people need to get to and from on a regular basis. Setting development density guidelines provides transit agencies with quantifiable benchmarks that they can use to most efficiently target public transportation resources where there is the greatest likelihood people will choose to use transit.

Local transit service can be categorized into the following three types:

- **Productivity-oriented services** are relatively high frequency routes designed to operate to maximize ridership per hour of service. These routes aim to provide quick, convenient trips that provide high convenience and mobility to the busiest activity centers and highest concentrations of residences and jobs.
- **Coverage-oriented services** are lower frequency services typically designed to serve fewer riders over a relatively large area. Service types in this category may provide transit-dependent customers not living near bus routes with reliable mobility options that may require reservations and less direct travel.

Figure 1 summarizes the local transit route types, with a description, typical transit service type and vehicle used to serve the routes, and population and employment density threshold guidelines for both route and activity center scales.

LAND USE			TRANSIT	
Land Use Type	Residents per Acre	Jobs per Acre	Appropriate Types of Transit	Frequency of Service
Urban Mixed-Use	20+	15+	BRT, Rapid Bus, Local Bus	10-15 minutes
Neighborhood & Surburban Mixed-Use	10-20	10-15	Local Bus	15-30 minutes
Mixed Neighborhoods	10-15	5-10	Local Bus, On-Demand	30-60 minutes or on-demand
Low Density	2-10	2-5	On-Demand, Rideshare, Volunteer Driver Pgm	60 mins or less or on-demand

Figure 1: Local Transit Service Design Policy Guidelines Summary

Source: Nelson\Nygaard

In addition, **intercity services** such as the CET Community Connector routes typically connect cites, serving relatively few major stops at key activity or employment centers and connecting to local service with each city. Intercity frequency is based on market size and can be scaled to meet demand.

POPULATION DENSITY

An important factor for transportation planning is how densely developed residential areas are as it helps match bus service to the expected number of riders.

The Bend Metropolitan Planning Organization (BMPO) maintains a travel demand model used to forecast transportation needs throughout the region. The model includes forecasted population and employment based on county- and city-level forecasts prepared by the State of Oregon and Portland State University's (PSU) Population Research Center. The forecasts are based on historical data from the State and the U.S. Census Bureau and are updated annually. The current model years are 2010 (base year) and 2040 (horizon year).

Figure 2 shows the population density throughout Bend in the years 2010 and 2040 relative to a quarter-mile walkshed from existing transit service. The City of Bend's population is forecast to reach 125,000 people by the year 2040 – a 65% increase – within current city limits.[1] Population within the Bend Urban Growth Boundary (UGB) – including outside current city limits – is projected to increase to nearly 145,000 people – by 87%.[2]

Moderate or higher residential density is an indicator of an adequate concentration of population to support reasonably frequent fixed-route transit service. Some areas of moderate residential density in Bend include north of Greenwood Road east of Pilot Butte, along NE 27th Avenue, Downtown and Old (Central) Bend, and in western Bend along Newport Avenue. The population forecasts suggest increased densities in these areas plus eastern Bend (Mountain View neighborhood), near NE Butler Market Road (Orchard District), southwest Bend, and the Old Farm / southeast Bend districts.

[1] Bend MPO (Population data by TAZ)
[2] Portland State University Population Research Center, Deschutes County Coordinated Population Forecast, 2015-2065

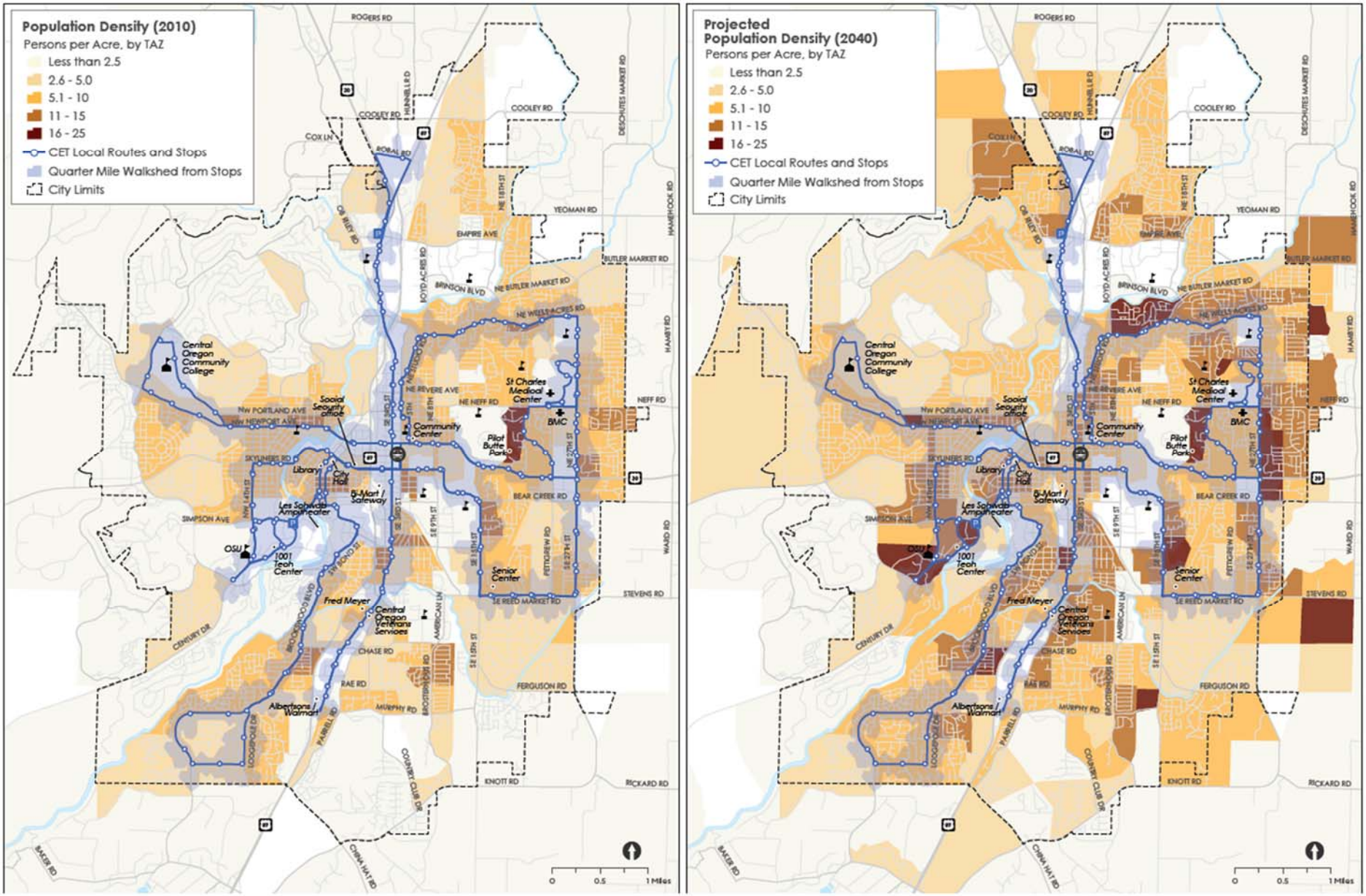

Figure 2: Population Density, 2010 and 2040

WHERE WORKERS LIVE

The U.S. Census Bureau compiles Longitudinal Employer-Household Dynamics (LEHD) data that provides an understanding of work commute patterns. Analyzing where people live and work (both people who live and work in Bend and people who live in Bend but commute outside Bend for work) helps point to where different route types may be most needed to connect people to their jobs. Figure 3 shows home locations for people working in Bend (left panel) and outside Bend (right panel).

In general, the geographic distribution of worker home locations is consistent with the distribution of the population as a whole, with greater concentrations of workers living in eastern, northeastern, and southern Bend, and in the Downtown area. People who live and work in Bend have relatively short-distance commutes and providing well-timed transfers or single-seat transit rides and improving walking access to transit are likely important to increasing the appeal of local transit service. There are fewer Bend residents working outside the city, and their density is in the same corridors and neighborhoods as those working in Bend, in particular in eastern Bend on Highway 20, in northeastern Bend on NE Butler market Road, and near Downtown. Efficiently connecting Bend residents who work outside of Bend to Hawthorne Station (or another Community Connector stop) at convenient times could help increase the appeal of CET's longer-distance intercity connections.

Most home locations are within a quarter mile of existing transit service. Several exceptions with moderate or higher concentrations of workers include portions of the Summit West (northwest), Old Farm District (southeast), and Boyd Acres (northeast) neighborhoods. Transit service gaps are discussed in more detail below.

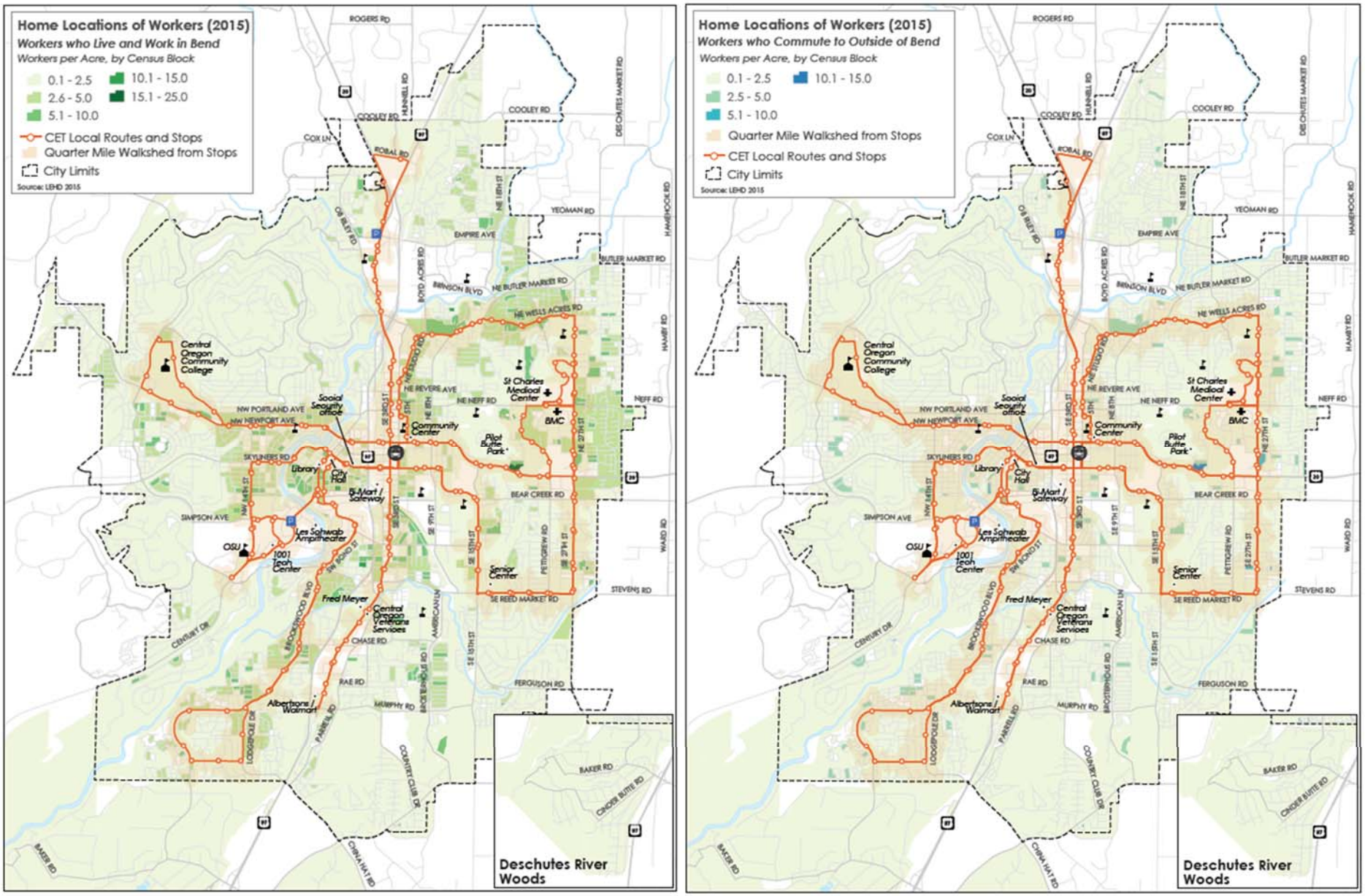

Figure 3: Worker Home Locations: Work and Live in Bend (left) and Work Outside Bend (right)

Table 1 summarizes the cities where Bend residents work. Most workers both live and work in Bend (67%). Over 5% of Bend residents work in Redmond with approximately 1% each working Sunriver, Prineville, and Sisters. The data also indicates commuting to cities in the Willamette Valley, which may be a limitation of the data, e.g., people who work for an employer based in another city, although they may work at an office or home office location in or near Bend.

Table 1: Where Bend Residents Work (Top 10)

Work Location	Persons	Share of total workers
Bend	24,974	67.0%
Redmond	1,890	5.1%
Portland	1,195	3.2%
Salem	497	1.3%
Eugene	448	1.2%
Sunriver CDP	376	1.0%
Prineville	305	0.8%
Sisters	238	0.6%
Medford	236	0.6%
Tigard	219	0.6%
All Other Places	6,870	18.4%

Source: U.S. Census Bureau, 2015

EMPLOYMENT DENSITY

Understanding job locations and densities is equally important to informing transit service priorities in Bend. Figure 4 below illustrates employment densities in Bend from the BMPO travel demand model. The year 2010 and 2040 maps show the distribution of employment in the City relative to a quarter-mile walkshed from existing transit service. Overall the employment in the region is forecast to increase 115% between the years 2010 and 2040. In the City of Bend, employment is forecast to increase about 80% in that period, from nearly 40,000 jobs to over 70,000. Bend's share of employment is forecast to decrease 10 percentage points to about 65%.

In 2010 the moderate (or higher) density employment areas include:

- Downtown Bend and the Central District along 3rd Street east of downtown
- St. Charles Medical Center area and health services office locations in the near vicinity
- Oregon State University Campus
- Central Oregon Community College Campus (northwest)
- The Old Mill District in southwestern Bend

The employment forecasts to the year 2040 indicate each of the areas listed above growing/intensifying with medium- to high-density of employment. Other emerging employment areas include:

- Southern Bend, in the Highway 97 Corridor
- North-central Bend between NE Butler Market Road and Empire Avenue (Orchard / Boyd Acres Districts)
- Northern Bend in the Highway 97 / Highway 20 triangle (central Boyd Acres District)
- Juniper Ridge area in northeastern Bend, north of Cooley Road (north Boyd Acres District)

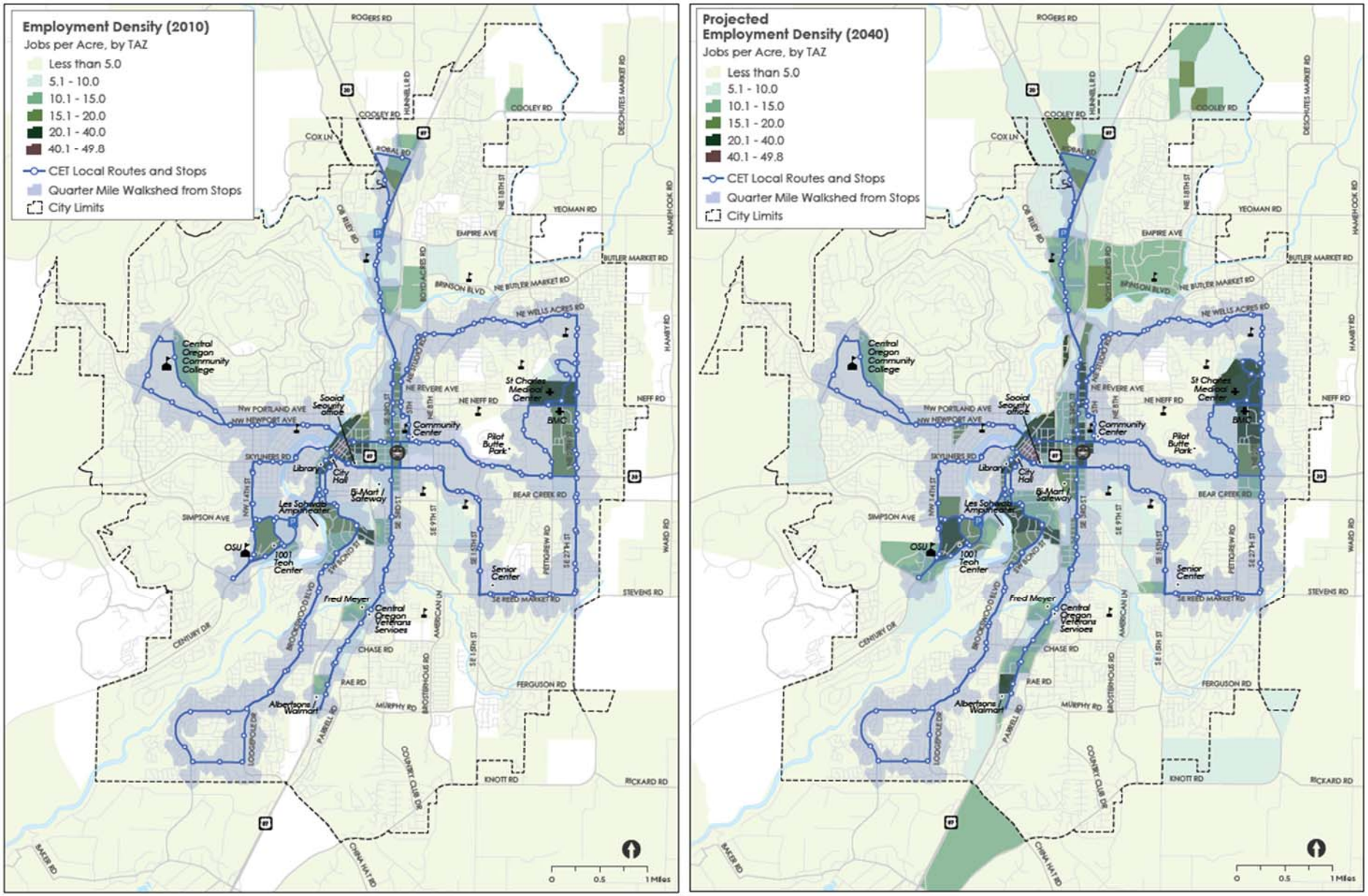

Figure 4: Employment Density, 2010 and 2040

WORK COMMUTE PATTERNS

As noted above, LEHD data helps understand work commute patterns and informs how transit service may be designed to support those travel patterns. Figure 5 shows the work locations for people who commute into Bend from outside the city (by any mode). The densest employment areas are at Central Oregon Community College, in Downtown and the Old Mill, near St. Charles Medical Center, at OSU and adjacent employment areas, and along 3rd Street (e.g., Bend River Promenade). The transit market potential for in-commuters can be maximized by providing interlined (single-seat) or well-timed local connections from Community Connector routes at times that are convenient for workers.

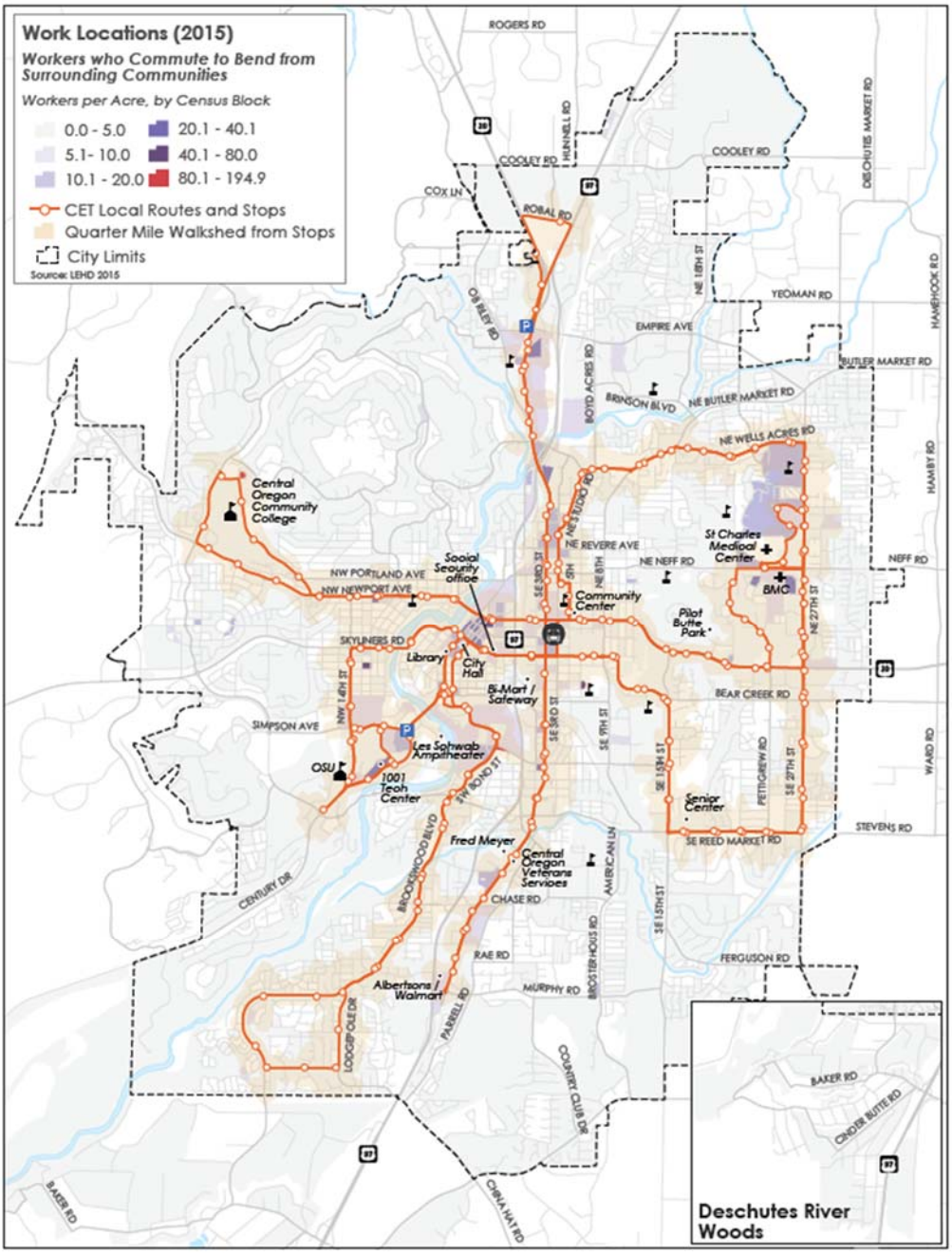

Figure 5: Work Locations for People Living Outside Bend

Table 2 summarizes where people who work in Bend live. Over half of workers live in Bend. Other concentrations of workers are in Redmond (7.2%), Deschutes River Woods (3.3%, located just outside Bend city limits), and Prineville (1.2%). A relatively small share number of works commute from Madras (less than 1%). Taken together with work commute patterns from Bend to the region (see Table 1), the data show that about twice as many people commute from Redmond to Bend for work, as from Bend to Redmond, and the combined data suggests that Redmond is a relatively large potential transit commute market for CET, while other markets (such as Prineville-Bend) have only a moderate market size. See the *Needs Memo Supplement* for additional information on origins and destinations for trips between Redmond and Bend.

Table 2: Where People Working in Bend Live, 2015

Home Location	Persons	Share of total workers
Bend	24,974	53.1%
Redmond	3,392	7.2%
Deschutes River Woods	1,561	3.3%
Portland	692	1.5%
Prineville	556	1.2%
Eugene	418	0.9%
Three Rivers	285	0.6%
Madras	242	0.5%
Salem	232	0.5%
Eagle Crest	222	0.5%
All Other Places	14,476	30.8%

Source: U.S. Census Bureau, 2015

COMMUTE START TIMES

This section describes commute start times based on 2017 American Community Survey (ACS) data for those leaving for work from individual origins throughout the day. Table 3 summarizes the share of regional, Bend, and Redmond commuters leaving for work during specific time blocks. The list below provides key observations of commute start times. Most routes in Bend currently operate from approximately 6 a.m. to 7:00-7:30 p.m.

- The largest share of early commuters leaves between 6 a.m. and 7 a.m.
- The highest share of commuters leaves for work between 7 a.m. and 9 a.m.
- There doesn't appear to be a consistent regional pattern in this data for commuters who leave for work very early. Although a larger share of La Pine and Metolius residents reported leaving for work prior to 6 a.m., the sample size for these communities is relatively low.
- The ACS does not provide data for when people get off work but has broad categories that likely include people who leave work in the later evening. Similar to early commuters, there doesn't appear to be a consistent regional pattern.

Table 3: Share of Commuters Leaving for Work at Certain Times by Region, Bend, and Redmond (All Modes)

Geography/Category	# of People	% of Geography
REGIONAL (All Cities)		
Share of Regional Commuters Leaving for work between 5 and 6 am.	4,473	7%
Share of Regional Commuters Leaving for work between 6 and 7 am.	10,440	16%
Share of Regional Commuters Leaving for work between 7 and 9 am	30,524	47%
Share of Regional Commuters Leaving for work between 4 pm and 12 am.	3,380	5%
Share of Regional Commuters Leaving for work between 12 and 5 am.	3,163	5%
BEND		
Share of Bend Commuters Leaving for work between 5 and 6 am.	2,157	6%
Share of Bend Commuters Leaving for work between 6 and 7 am.	6,356	16%
Share of Bend Commuters Leaving for work between 7 and 9 am.	19,054	49%
Share of Bend Commuters Leaving for work between 4 pm and 12 am.	1,823	5%
Share of Bend Commuters Leaving for work between 12 and 5 am.	966	2%
REDMOND		
Share of Redmond Commuters Leaving for work between 5 and 6 am.	1,057	9%
Share of Redmond Commuters Leaving for work between 6 and 7 am.	2,056	17%
Share of Redmond Commuters Leaving for work between 7 and 9 am.	5,251	43%
Share of Redmond Commuters Leaving for work between 4 pm and 12 am.	870	7%
Share of Redmond Commuters Leaving for work between 12 and 5 am.	1,024	8%

Source: American Community Survey, 2013-2017, Table B08302

The following list summarizes origins having the top number of commuters leaving during early and late hours of the day.

- Top places with commuters leaving between 5 and 6 a.m.
  - Bend (2,157), Redmond (1,057), Deschutes River Woods (374), and Prineville (318)
- Top places with commuters leaving between 4 p.m. and 12 a.m.
  - Bend (1,823), Redmond (870), Deschutes River Woods (162), and Prineville (156)
- Top shares of commuters leaving between 5 and 6 a.m.
  - Deschutes River Woods (14%), Culver (13%), Metolius (11%), and Warm Springs (11%)
- Top shares of commuters leaving between 4 p.m. and 12 a.m.
  - Terrebonne (13%), Sunriver (10%), Culver (8%), and Redmond (7%)

Table 4 summarizes the estimate of the time residents leave home to commute to work, by city or town.

Table 4: Number of Residents Leaving Home to Commute to Work by Time of Day (All Modes)

Place	Total	12 a.m. to 5 a.m.	5 a.m. to 6 a.m.	6 a.m. to 7 a.m.	7 a.m. to 9 a.m.	9 a.m. to 12 p.m.	12 p.m. to 4 p.m.	4 p.m. to 12 a.m.
Bend city	**38,706**	966	2,157	6,356	19,054	6,001	2,349	1,823
Culver city	**661**	73	88	95	231	81	43	50
Deschutes River Woods CDP	**2,700**	137	374	321	1,199	347	160	162
La Pine city	**693**	55	70	161	226	95	57	29
Madras city	**2,343**	272	84	374	1,044	158	321	90
Metolius city	**413**	55	44	93	119	21	59	22
Prineville city	**3,437**	292	318	480	1,365	528	298	156
Redmond city	**12,205**	1,024	1,057	2,056	5,251	1,287	660	870
Sisters city	**1,058**	22	83	120	542	165	114	12
Sunriver CDP	**258**	-	-	-	222	-	9	27
Terrebonne CDP	**476**	25	36	17	197	-	140	61
Three Rivers CDP	**1,536**	173	62	275	596	236	167	27
Warm Springs CDP	**880**	69	100	92	478	40	50	51

Note: Top 20 Time Blocks with the highest estimated commute starts, across all 13 places, are shaded grey.
Source: American Community Survey, 2013-2017, Table B08302

Based on the estimates in Table 4 above, Table 5 summarizes the percentages of the time residents leave home to commute to work, by city or town.

Table 5: Percentage of Residents Leaving Home to Commute to Work by Time of Day (All Modes)

Place	Total	12 a.m. to 5 a.m.	5 a.m. to 6 a.m.	6 a.m. to 7 a.m.	7 a.m. to 9 a.m.	9 a.m. to 12 p.m.	12 p.m. to 4 p.m.	4 p.m. to 12 a.m.
Bend city	**38,706**	2%	6%	16%	49%	16%	6%	5%
Culver city	**661**	11%	13%	14%	35%	12%	7%	8%
Deschutes River Woods CDP	**2,700**	5%	14%	12%	44%	13%	6%	6%
La Pine city	**693**	8%	10%	23%	33%	14%	8%	4%
Madras city	**2,343**	12%	4%	16%	45%	7%	14%	4%
Metolius city	**413**	13%	11%	23%	29%	5%	14%	5%
Prineville city	**3,437**	8%	9%	14%	40%	15%	9%	5%
Redmond city	**12,205**	8%	9%	17%	43%	11%	5%	7%
Sisters city	**1,058**	2%	8%	11%	51%	16%	11%	1%
Sunriver CDP	**258**	0%	0%	0%	86%	0%	3%	10%
Terrebonne CDP	**476**	5%	8%	4%	41%	0%	29%	13%
Three Rivers CDP	**1,536**	11%	4%	18%	39%	15%	11%	2%
Warm Springs CDP	**880**	8%	11%	10%	54%	5%	6%	6%

American Community Survey, 2013-2017, Table B08302

EMPLOYMENT CENTERS

The concentration of jobs at existing and future employment centers in Bend is important to understanding where public transportation can provide the most effective mobility services, and which types of services and strategies should be considered. Table 6 presents guidelines for employment center types based on density and employment characteristics that are analyzed in this section for different employment centers in Bend. These are intended to help understand what type or level of transit service is (or will be) needed.

Employment density provides a quantitative measure that directly relates to the ability to support transit service. Other factors that could be considered include job type or industry sector (e.g. retail, manufacturing, office), major academic institutions, typical shift hours, and parking availability. For some types of employment uses, the number of jobs can also act as a proxy for the number of customers, another potential public transportation market.

Table 6: Employment Center Guidelines

Area Type	Description	Density Guideline at Activity Centers (jobs per acre)
Tier 1 – Anchor	Highest daytime work population and consistent customer volumes	20+ jobs
Tier 2 – Major	High work population, and/or significant customer volumes	10 – 20 jobs
Tier 3 - Local	Moderate trip generator; fewer jobs (senior center, event venue)	5-10 jobs

Figure 6 identifies areas in the city of Bend that could be considered employment centers based on job density thresholds. These areas include employment and opportunity areas identified by the City of Bend's Comprehensive Plan and Core Area Project. Table 7 provides the number of jobs and job density in the zones based on current and forecast conditions. Current conditions were based on LEHD data for 2015, which is the most recent available, while forecast conditions were from Bend MPO projections.

Downtown Bend and St. Charles Medical Center stand out as employment anchors, both today and in the future. Several other major employment centers today include the Old Mill, Central Westside, and Central Eastside. These areas along with the Forum Shopping Center see forecast growth through 2040, although the most significant growth areas are forecast to be Cascade Village, Juniper Ridge, along Empire Avenue, and far south US 97. Other local employment areas include the COCC and OSU campuses, where the student population (commuter or residential) would be an additional indicator of transit demand.

These current and emerging employment centers indicate where expanded and improved public transportation service is likely to see the strongest demand in the future. This is evident in the employment density analysis, analysis of local travel patterns, and City plans to continue encouraging development in these areas.

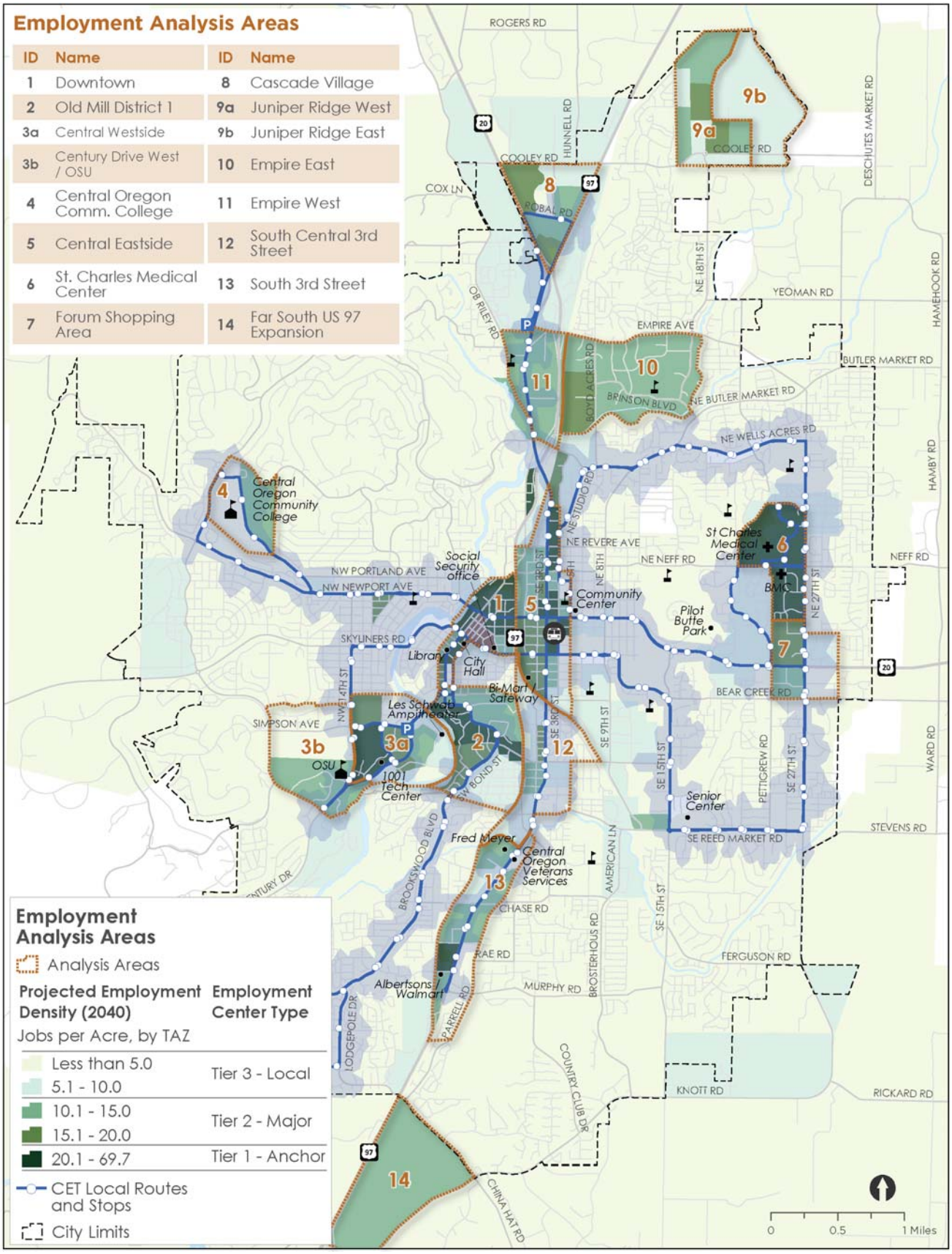

Figure 6: Bend Employment Analysis Areas Map

Table 7: Potential Employment Analysis Areas Jobs and Jobs Density, 2015 and 2040

#	Employment Center	Number of Jobs [2]		Density of Jobs		Area Type in 2015
		2015	2040	2015	2040	
1	Downtown	4,300	4,900	25	30	Tier 1 - Anchor
2	Old Mill District [1]	3,700	4,900	12	15	Tier 2 - Major
3a	Central Westside	2,800	3,700	10	13	Tier 2 - Major
3b	Century Drive West (OSU)	1,200	2,000	4	7	Tier 1 - Local
4	Central Oregon Community College	1,000	1,100	6	6	Tier 3 - Local
5	Central Eastside	3,900	4,300	12	13	Tier 2 - Major
6	St. Charles Medical Center	6,400	5,800 [2]	33	33	Tier 1 - Anchor
7	Forum Shopping Area	1,600	1,900	9	11	Tier 3 - Local
8	Cascade Village	1,200	2,400	6	12	Tier 3 - Local
9a	Juniper Ridge West	100	3,000	0.3	12	--
9b	Juniper Ridge East	-	1,900	-	7	--
10	Empire East	2,800	5,400	7	14	Tier 3 - Local
11	Empire West	1,300	2,100	7	11	Tier 3 - Local
12	South Central 3rd Street	1,300	1,800	5	7	Tier 3 - Local
13	South 3rd Street	3,300	2,600 [2]	11	11	Tier 2 - Major
14	Far South US 97 Expansion	-	3,900	-	10	--

Notes: [1] Includes KorPine site [2] The total employment appears to be less in 2040 in two of the areas analyzed, St. Charles Medical Center and South 3rd Street. This is likely due to different data sources that were used for current and forecast conditions; since the base year of the Bend MPO model is 2010 (nine years old), more recent LEHD data for 2015 was used to analyze current conditions. The data are also aggregated using different underlying zones, which may have contributed to the discrepancy. Future densities were manually adjusted based on an expectation that density is not expected to decrease in the future.

Source: Analysis of [2] U.S. Census Bureau LEHD Data (2015) and [3] Bend MPO Projections (2040)

TRANSIT-UNDERSERVED AREAS

CET provides good transit coverage in many parts of the City of Bend, offering important mobility to major population and employment centers. There are several different types of areas the City and CET may consider for short- and long-term service coverage expansion.

- *Areas just beyond existing bus stop access.* Research has shown that most people consider walking about ¼-mile to a bus stop is a reasonable access distance, although they will often walk longer distances, e.g., ½ mile (as seen in on-board survey data). This is particularly true where frequency is higher and the stops are developed with quality amenities (e.g., shelters). However, there are employment and population areas beyond this distance yet still within a mile of the route. While changing routes or stops may improve access, other solutions include improving the active transportation network, which may reduce walking distance or provide a safer and more comfortable walk to transit or providing micromobility solutions such as electric scooter- and bike-share. These areas may have near-term mobility needs.
- *Low density development areas.* Some areas have low density development both today and in the future that may not support fixed route transit services. Emerging transportation service and technology models can provide potential future mobility options for people in these areas, such as micromobility and accessible demand response services. These areas may have near-term mobility needs.
- *Future development areas.* There are several areas that are expected to see significant development over the next 20 years that are beyond the existing transit services. These developments can be planned in ways that more easily facilitate future transit service expansion. The City and CET can monitor development to ensure the transportation system keeps pace with growth.

Table 8 and Figure 8 summarize areas of Bend that are underserved by existing transit services, e.g., are beyond an approximately ¼ to ½ mile walk of a transit stop, showing population and employment density by TAZ for 2010 and 2040.

Depending on the potential mobility needs, different transportation services may provide relevant solutions, as suggested in the table. (These are preliminary assessments and will be refined further in the next phase of the project.)

- **Fixed route service** is relevant for areas meeting the population or employment density guidelines presented in Figure 1, with average population density above 10 people per acre or average employment density above five jobs per acre (combined population and employment densities can also be considered).
- **Deviated fixed-route (or flex-route) service** is relevant for areas near or at fixed route service guidelines, that may be just beyond existing fixed routes, such that occasional route deviations may provide sufficient mobility to certain areas. This service type can also include **shared-ride shuttles**, such as regularly scheduled trips between transit stops/stations and significant employment areas at key times of the day or trips with a demand-responsive element to major shopping and medical centers to help people meet non-work transportation needs on selected days/times. (CET currently provides demand-responsive service within Bend city limits to people will disabilities and low-income seniors. Demand-response service costs more to provide per trip, which limits the amount of service that can be provided.) New technology and service models may make it possible to expand the availability of services in this category.
- **Micromobility** includes shared active transportation vehicles such as scooters and bicycles, possibly with electric assist motors; this service type may be considered for low density areas within 1 mile of a fixed route stop or development centers to increase the access area.
- **Mobility hubs** may also be part of transit service and micromobility solutions in some areas.
- **Low stress active transportation** networks may be sufficient in some areas just beyond the existing transit access area and are critical to support any public transportation services.

Table 8: Transit Underserved Areas

#	Potential Service Area	Description	Population Density		Employment Density		Potential Services (Preliminary Assessment of Feasibility)					
			2010	2040	2010	2040	Fixed route		Deviated fixed-route (flex-route) or Shuttle		Micro-mobility	Low stress active transport
							Assess-ment	Time Frame	Assess-ment	Time Frame		
1	North Triangle	Low density future growth	0.4	5.6	0.1	4.7	✓	Future	✓	Future	✓	-
2	Juniper Ridge	Emerging employment	0.0	0.1	0.8	9.8	✓	Future	✓	Current	✓ with fixed-route ext.	-
3	North of Empire (Boyd Acres)	Moderate density residential	4.7	7.6	0.2	0.4	✓	Future	✓	Current	✓	✓
4	Northwest	Low density population	2.5	3.8	0.2	0.3		N/A	✓	Current	✓	-
5	South of Empire	Emerging employment area	1.4	1.4	4.6	11.1	✓	Future	✓	Current	✓	✓
6	Northeast Butler Market Rd	Moderate residential beyond existing fixed route	8.0	10.6	0.2	1.1	-	N/A	-	N/A	✓	✓
7	Northwest Crossing	Moderate residential	5.7	8.1	0.3	1.2	✓	Current	✓	Current	✓	-
8	Neff Road, north of Pilot Butte	Moderate residential beyond existing fixed route	5.7	8.0	0.4	0.7	✓	Current	✓	Current	✓	✓
9	East of 27th	Future residential	3.6	6.6	0.2	0.4	-	N/A	✓	Future	✓	-
10	West of Bond / Brookswood	Moderate residential beyond existing fixed route	6.8	9.9	1.6	3.1	-	N/A	-	N/A	✓	✓
11	Kiwanis Park	Moderate residential beyond existing fixed route	6.2	7.8	1.4	2.0	-	N/A	✓	Current	✓	✓
12	Larkspur	Moderate residential beyond fixed route	5.8	9.3	0.0	0.4	-	N/A	✓	Current	✓	✓
13	Old Farm (Murphy / Brosterhous)	Moderate residential	4.0	8.0	0.6	1.0	✓	Current	✓	Current	✓ with fixed-route ext.	-
14	South of Reed Market	Low residential beyond fixed route	4.1	5.0	0.1	0.3	-	N/A	✓	Current	✓	✓
15	Stevens Road	Future residential area	0.2	9.6	0.0	1.3	✓	Future	✓	Future	✓	-

#	Potential Service Area	Description	Population Density		Employment Density		Potential Services (Preliminary Assessment of Feasibility)					
			2010	2040	2010	2040	Fixed route		Deviated fixed-route (flex-route) or Shuttle		Micro-mobility	Low stress active transport
							Assess-ment	Time Frame	Assess-ment	Time Frame		
16a	South 15th Street – North zones	Future residential or mixed-use area	1.4	6.4	0.1	1.0	✓	Future	✓	Future	✓	✓
16b	South 15th Street – South zones	Future employment area	0.3	4.5	0.0	7.3	✓	Future	✓	Future	✓	✓
17	South US 97	Future employment area	0.0	3.5	0.0	10.2	✓	Future	✓	Future	✓	✓
18	Deschutes River Woods	Low density residential area	1.3	1.7	0.1	0.1	-	N/A	✓	Current	✓	-

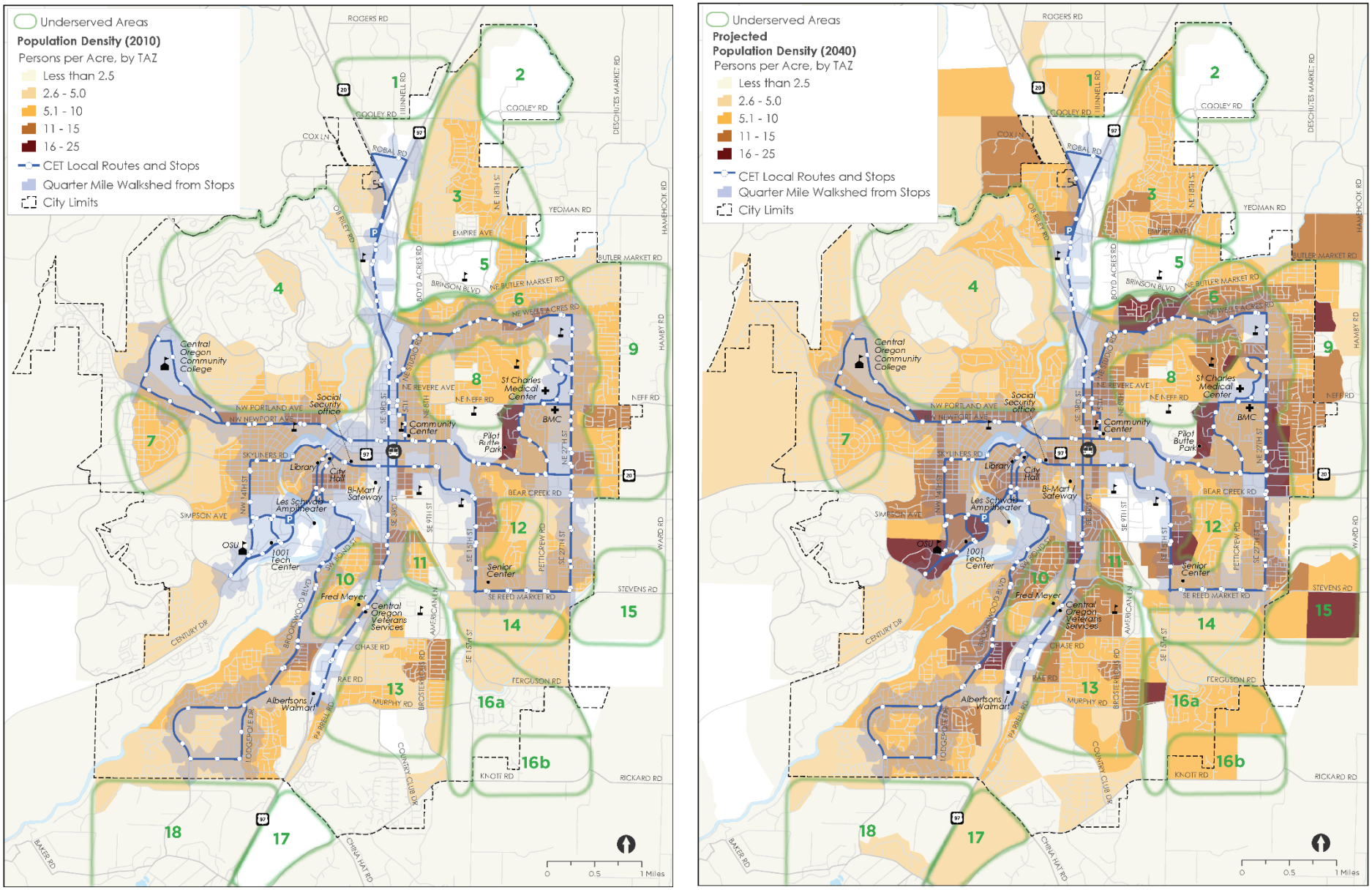

Figure 7: Underserved Transit Areas, 2010 and 2040 Population Density

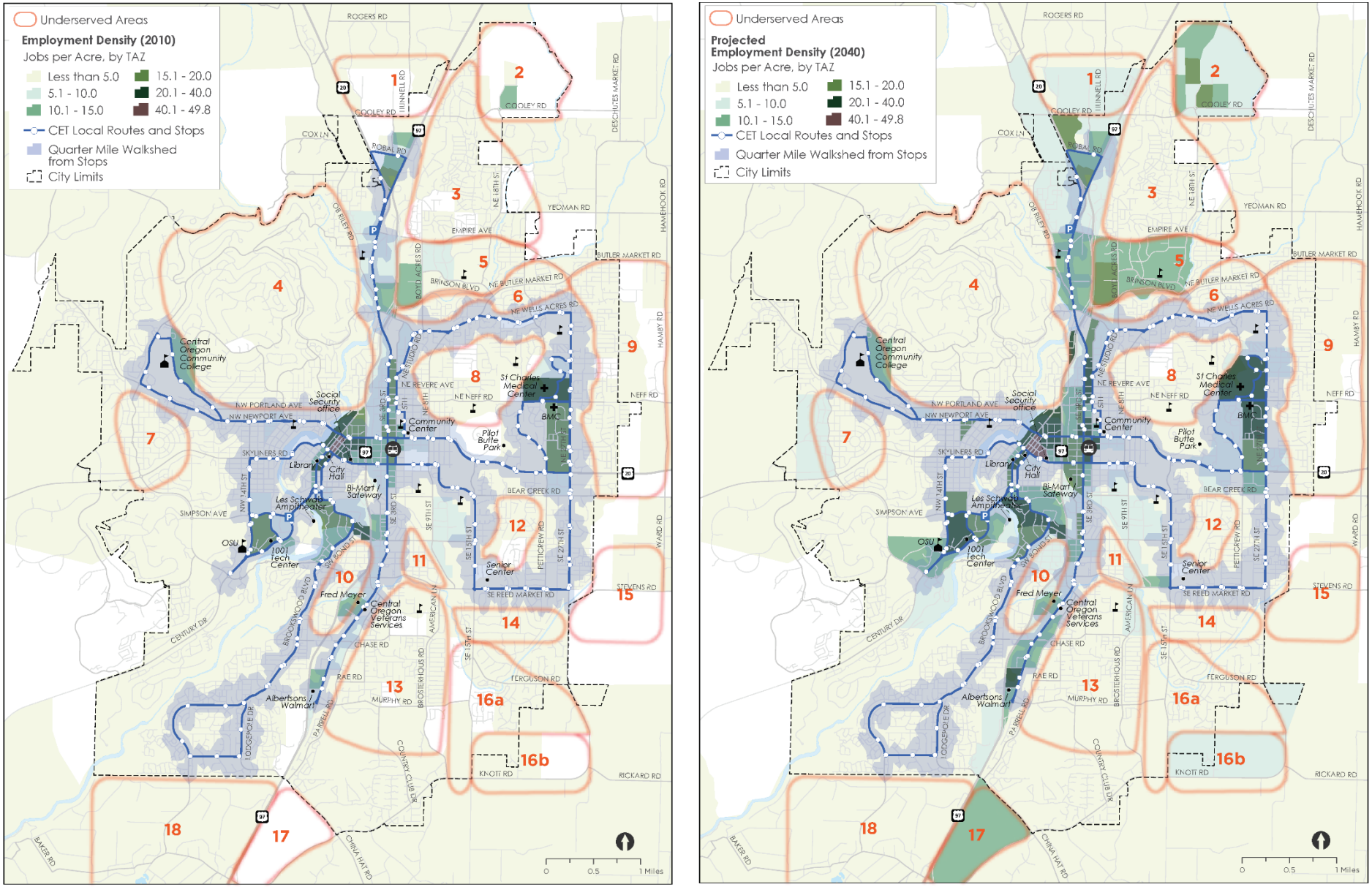

Figure 8: Underserved Transit Areas, 2010 and 2040 Employment Density

PERFORMANCE MEASURES

Transit service scenarios for serving employment centers/areas such as those described above will be evaluated during the next phase of the project using a comparative measure of the number of potential transit trips serving each area, weighted by the number jobs served. This will be calculated by multiplying the projected number of daily transit trips (i.e., number of buses) within a quarter-mile distance of each area by the number jobs those trips would serve.

BICYCLE AND PEDESTRIAN FACILITIES AND ACCESS

This section identifies bicycle and pedestrian infrastructure gaps relative to access to transit and jobs.

BICYCLE FACILITIES

The current Bend TSP Update has identified several low-stress network (LSN) streets and projects throughout Bend, as shown in Figure 9A through Figure 9D. These streets and projects serve as a foundation for determining the deficiencies and needs for bicycle facilities providing access to CET's existing fixed-route service within Bend.

Population and employment densities (Figure 2 and Figure 4) in conjunction with these LSN streets and projects inform the proposed priority for addressing bicycle facility deficiencies and needs regarding the facility's role providing access to transit. Based on these factors, Table 9 identifies and prioritizes bicycle facility deficiencies and needs for non-LSN key routes and Table 10 prioritizes bicycle facility deficiencies and needs with respect to identified LSN projects.

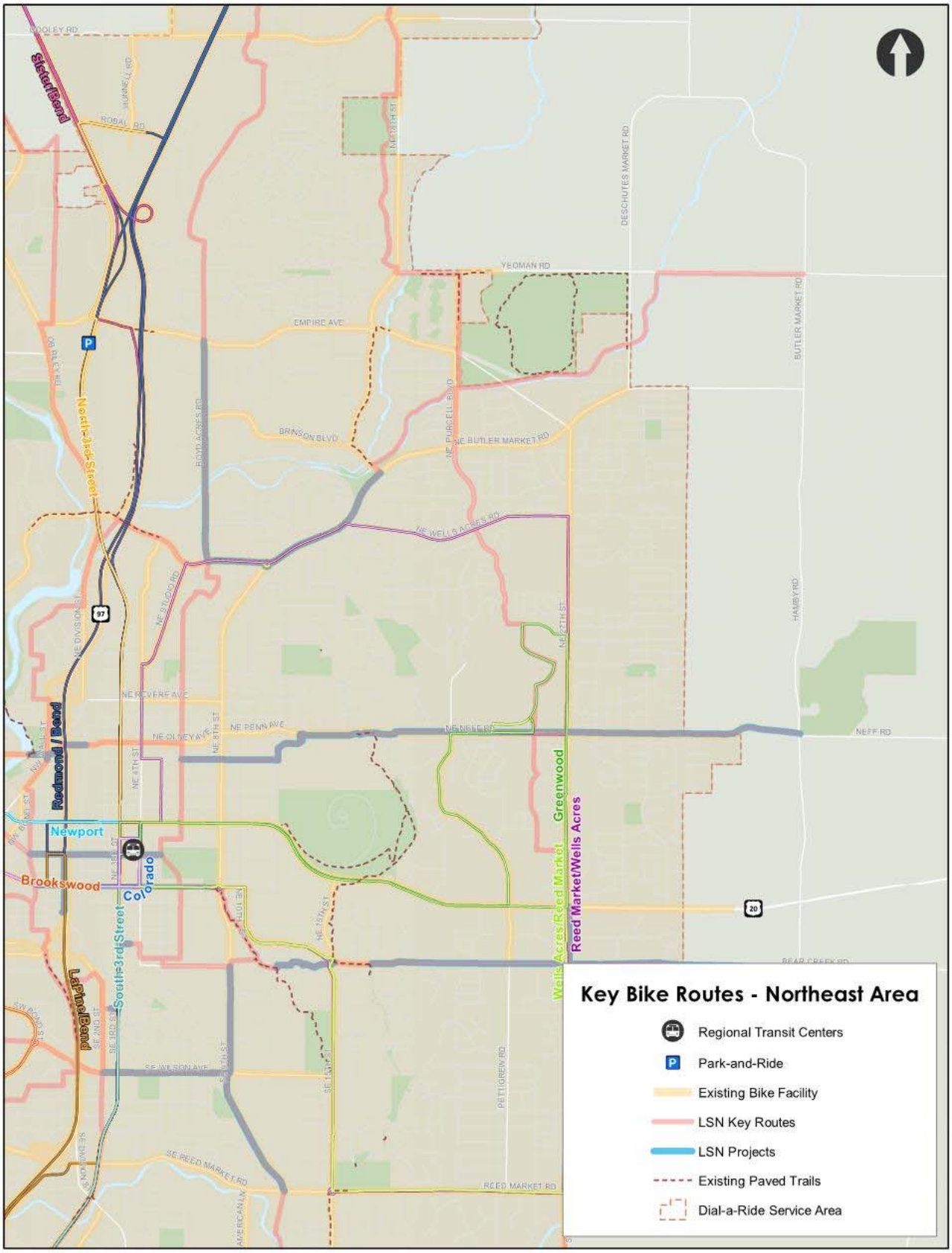

Figure 9A: Key Bike Routes - Northeast Area

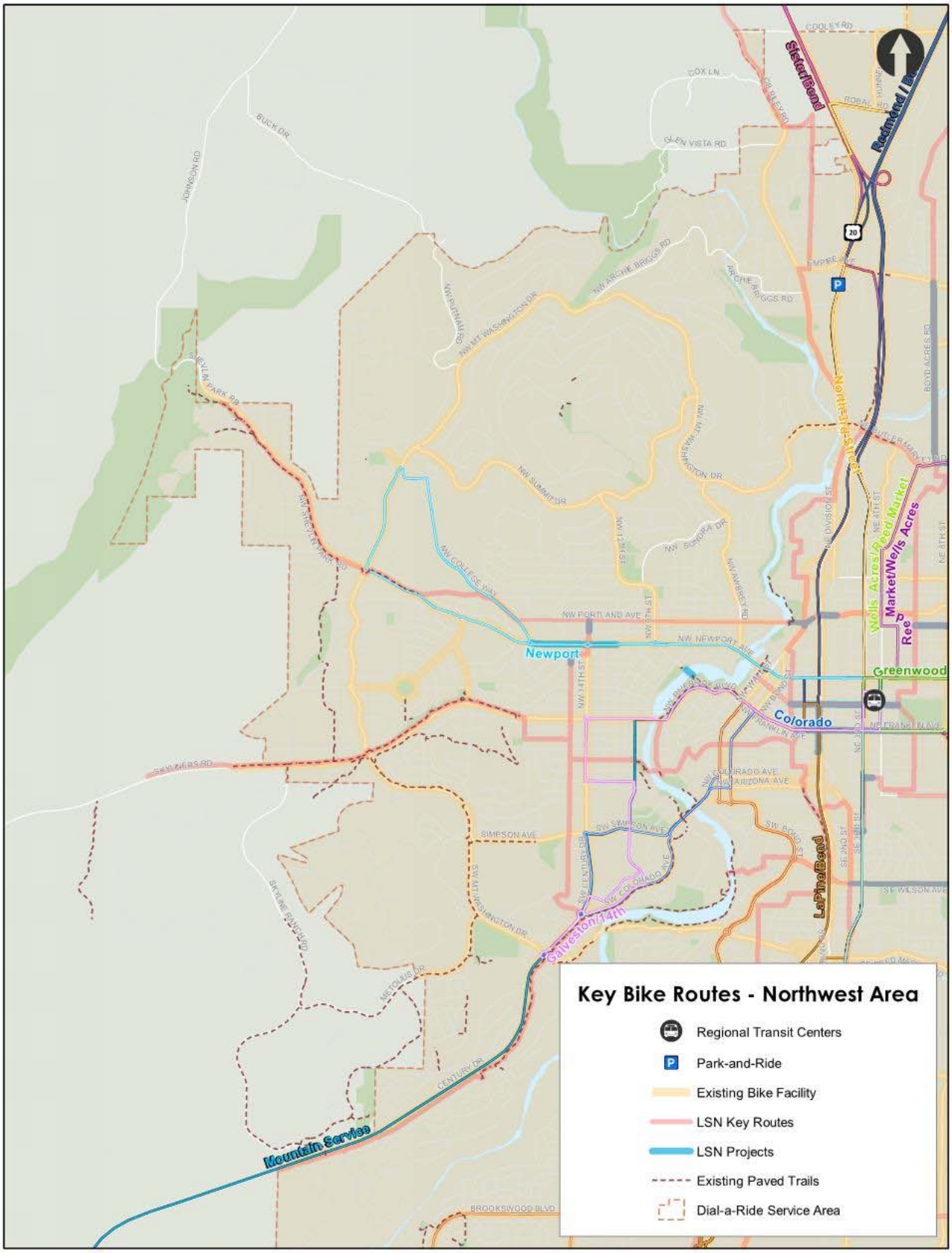

Figure 9B: Key Bike Routes - Northwest Area

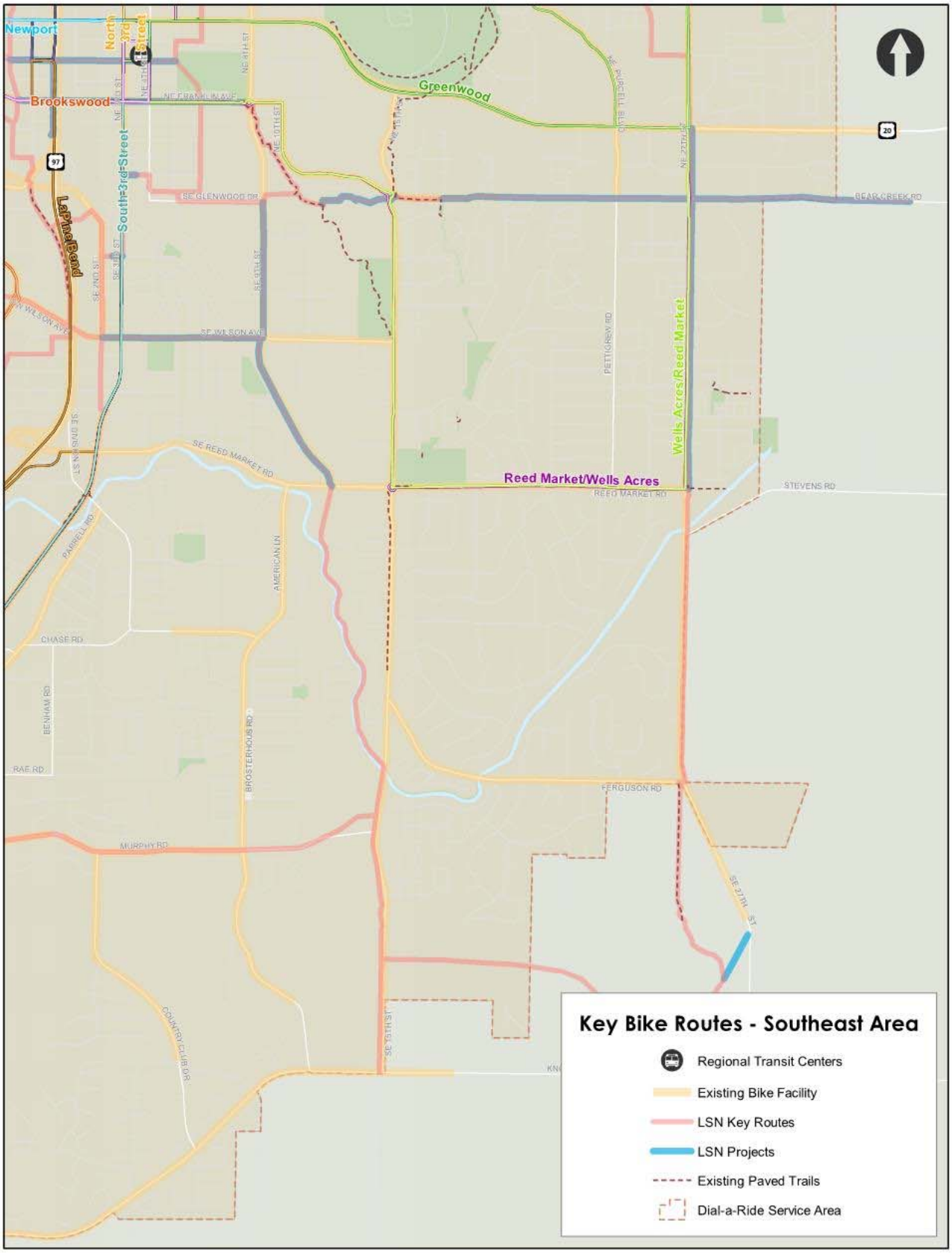

Figure 9C: Key Bike Routes - Southeast Area

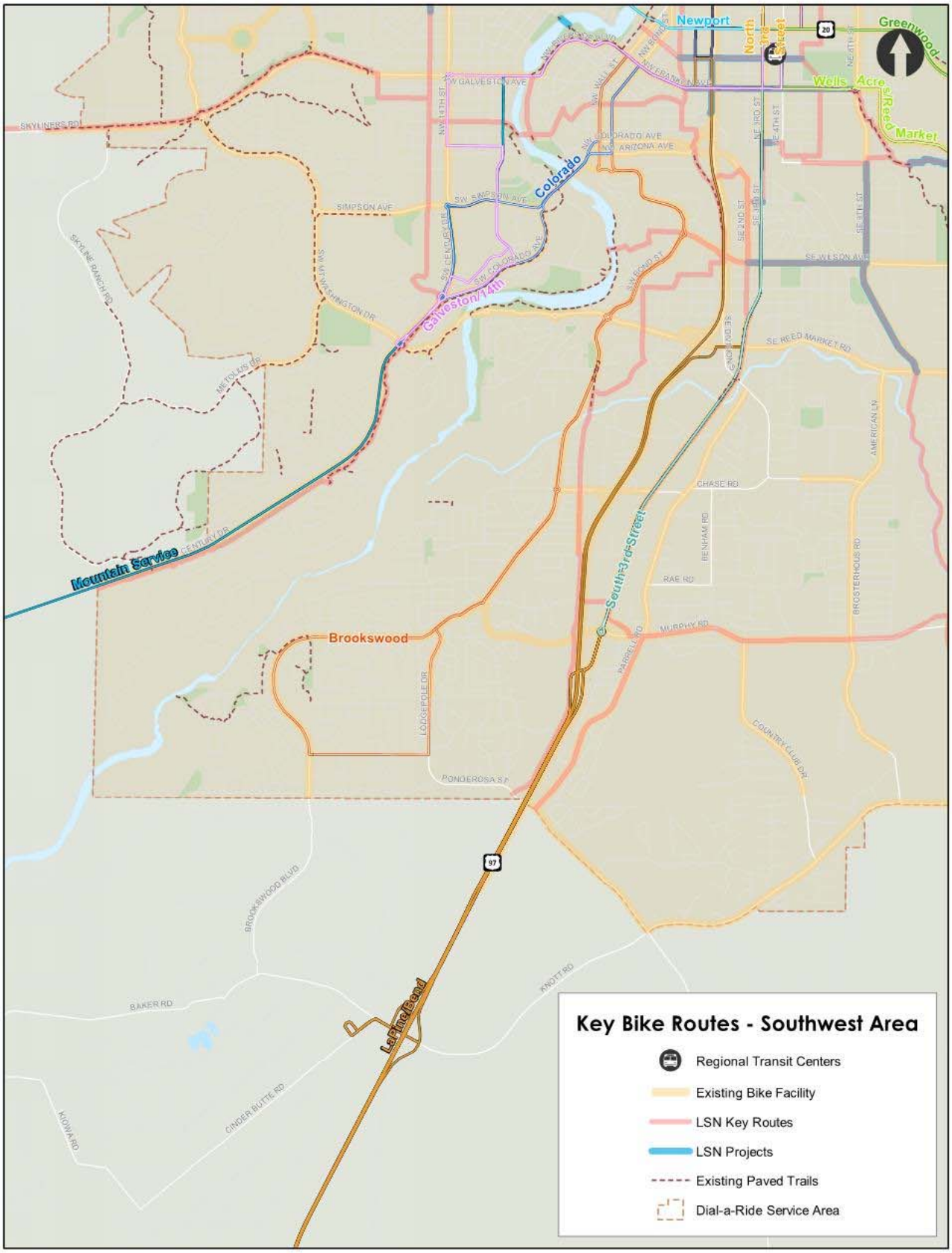

Figure 9D: Key Bike Routes - Southwest Area

Table 9: Bicycle Facility Deficiencies and Needs for Non-LSN Key Routes

Quadrant	Street	From	To	2040 Population Density[1]	2040 Employment Density[2]	Transit Access Priority
Northeast	NE Wells Acres Rd	NE Butler Market Rd	NE 27th St	Medium	Low	**Low**
	NE Courtney Dr	NE Conners Ave	NE 27th St	Medium	High	**High**
	NE 3rd St	NE Greenwood Ave	NE Webster Ave	Low to Medium	Medium to High	**Mid**
	NE 5th St	NE Greenwood Ave	NE Norton Ave	Medium	Low	**Low**
	NE Norton Ave	NE 4th St	NE 5th St	Medium	Low	**Low**
	NE 4th St	NE Norton Ave	NE Revere Ave	Medium	Medium	**Mid**
	NE Greenwood Ave	US 97	NE 3rd St	Medium	Medium	**Mid**
	NE 4th St	NE Franklin Ave	NE Greenwood Ave	Medium	High	**High**
	NE Irving Ave	NE 3rd St	NE 4th St	Medium	High	**High**
Northwest	NW College Way	NW Mt. Washington Dr	NW Portland Ave	Low	Low to Medium	**Low**
	NW Newport Ave	NW Wall St	US 97	Low to Medium	High	**Mid**
	NW Hill St	NW Franklin Ave	NW Newport Ave	Medium	Medium to High	**Mid**
	NW Columbia St	NW Commerce Ave	NW Riverside Blvd	Medium	Low to Medium	**Mid**
	NW Albany Ave	NW 14th St	NW Columbia St	Medium	Low to Medium	**Mid**
Southeast	SE 3rd St	SE Cleveland Ave	SE Miller Ave	Medium to High	Low to Medium	**Mid**
Southwest	SW Columbia St	SW Colorado Ave	NW Commerce Ave	High	Medium to High	**High**
	SW Donovan Ave	SW Century Dr	SW Emkay Dr	High	High	**High**
	SW Emkay Dr	SW Donovan Ave	SW Columbia St	High	High	**High**
	Poplar St	Brookswood Blvd	Lodgepole Dr	Medium	Low	**Low**
	Lodgepole Dr	Poplar St	Mahogany St	Medium	Low	**Low**

[1]**Low Population Density**
Less than 2.5 to 5.0 persons per acre
Medium Population Density
5.1 to 15.0 persons per acre
High Population Density
16.0 to 25.0 persons per acre

[2]**Low Employment Density**
Less than 5.0 to 10.0 jobs per acre (by TAZ)
Medium Employment Density
10.1 to 20.0 jobs per acre (by TAZ)
High Employment Density
20.1 to 49.8 jobs per acre (by TAZ)

Table 10: Bicycle Facility Deficiencies and Needs for LSN Projects

Quadrant	Street	From	To	2040 Population Density[1]	2040 Employment Density[2]	Transit Access Priority
Northeast	Boyd Acres Rd	NE Butler Market Rd	Empire Ave	Low to Medium	Low to Medium	**Low**
	NE Butler Market Rd	Boyd Acres Rd	Brinson Blvd	Medium to High	Low to Medium	**Mid**
	NE Norton Ave	NE 6th St	NE Neff Rd	Medium	Low	**Low**
	NE Neff Rd	NE Parkridge Dr	Hamby Rd	Medium to High	Low to Medium	**Mid**
	NE Olney Ave	US 97	NE 1st St	Medium to High	Medium to High	**High**
	NE Hawthorne Ave	US 97	NE 5th St	Medium	Medium to High	**Mid**
	NE Franklin	US 97	NE 8th St	Medium	Low to Medium	**Mid**
	US 97		NE Hawthorne Ave	Medium	Medium to High	**Mid**
	NE Burnside Ave	NE 3rd St	NE 4th St	Medium	Low	**Low**
	NE Burnside Ave	Multi-use path	NE Bear Creek Rd	Low	Low	**Low**
	NE Bear Creek Rd	NE Alpenview Ln	East of UGB	Medium to High	Low	**Mid**
Northwest	NW 14th St	NW Ogden Ave	NW Portland Ave	High	Low	**Mid**
	NW Newport Ave	NW College Way	NW 12th St	Medium to High	Low	**Mid**
	NW 15th St	NW Lexington Ave	NW Milwaukee Ave	Medium to High	Low	**Low**
	NW Portland Ave	Deschutes River	US 97	Low to Medium	Medium	**Mid**
	NW Nashville Ave Ped Bridge	NW Nashville Ave	NW Riverside Blvd	Medium	Low	**Low**
	NW Hawthorne Ave	NW Harriman St	US 97	Medium to High	Medium to High	**High**
	NW Franklin Ave	NW Harriman St	US 97	Medium to High	Medium to High	**High**
Southeast	SE Miller Ave	SE 3rd St	SE Heyburn St	High	Low	**Mid**
	SE Wilson Ave	SE 2nd St	SE 9th St	High	Low	**Mid**
	SE 9th St	SE Reed Market Rd	SE Glenwood Dr	Low	Low	**Low**
	SE 27th St	SE Reed Market Rd	Greenwood Ave	Medium to High	Low	**Mid**

[1]**Low Population Density**
Less than 2.5 to 5.0 persons per acre
Medium Population Density
5.1 to 15.0 persons per acre
High Population Density
16.0 to 25.0 persons per acre

[2]**Low Employment Density**
Less than 5.0 to 10.0 jobs per acre (by TAZ)
Medium Employment Density
10.1 to 20.0 jobs per acre (by TAZ)
High Employment Density
20.1 to 49.8 jobs per acre (by TAZ)

PEDESTRIAN FACILITIES

The current Bend TSP Update has also identified existing sidewalks and sidewalk gaps along most or all streets within Bend. Figure 10A through Figure 10D focus on sidewalks along major streets and illustrates where sidewalks exist either on one side of the roadway or not at all; these facilities are located within a 0.25-mile and 0.50-mile walkshed of existing CET bus stops. These existing sidewalk maps show deficiencies and needs for pedestrian facilities within CET bus stop walksheds within Bend. Evaluating population and employment densities in conjunction with existing sidewalk gaps inform the proposed priority for addressing pedestrian facility deficiencies and needs regarding the facility's role providing access to transit. Table 11 identifies and prioritizes pedestrian facility deficiencies and needs based on these factors.

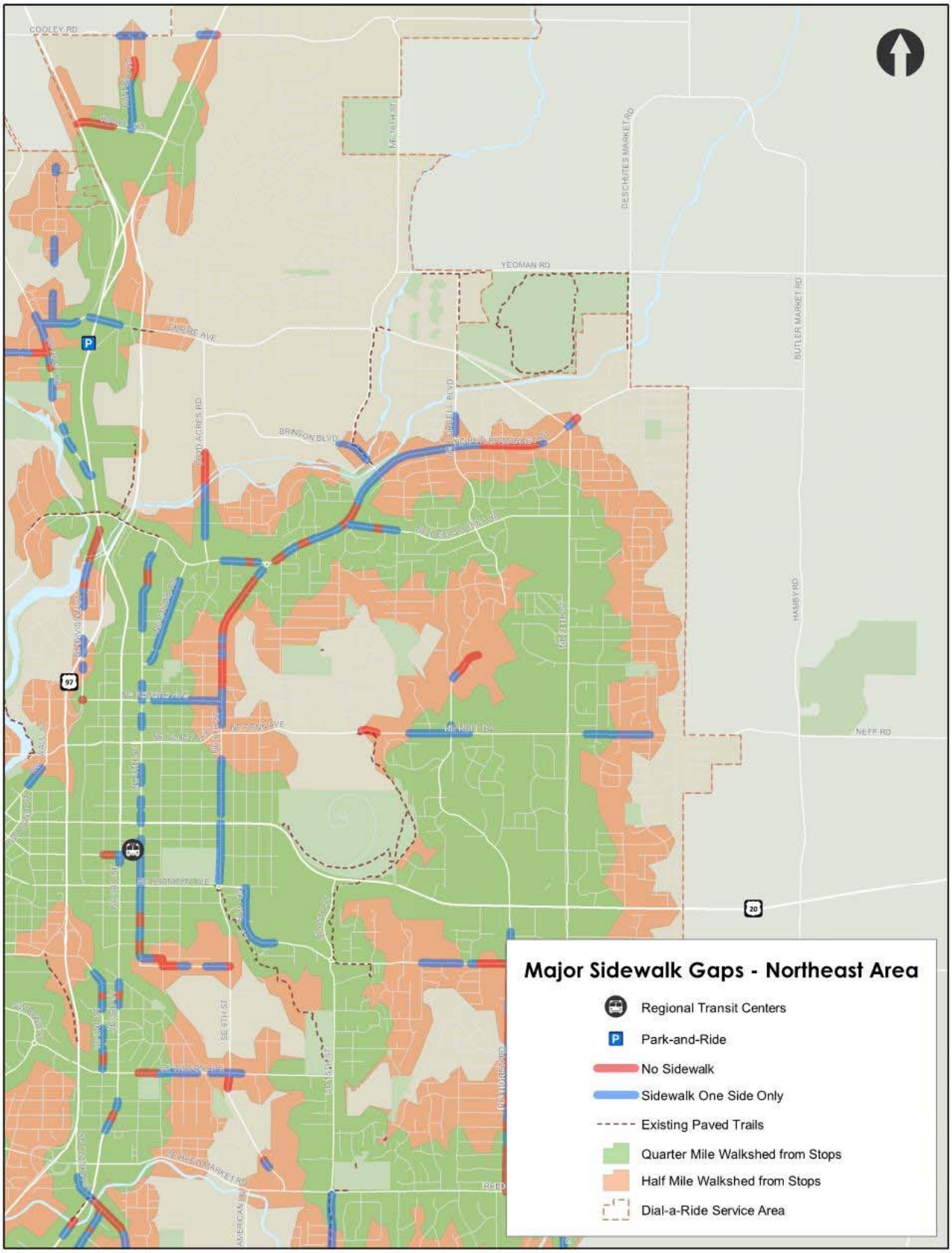

Figure 10A: Major Sidewalk Gaps – Northeast Area

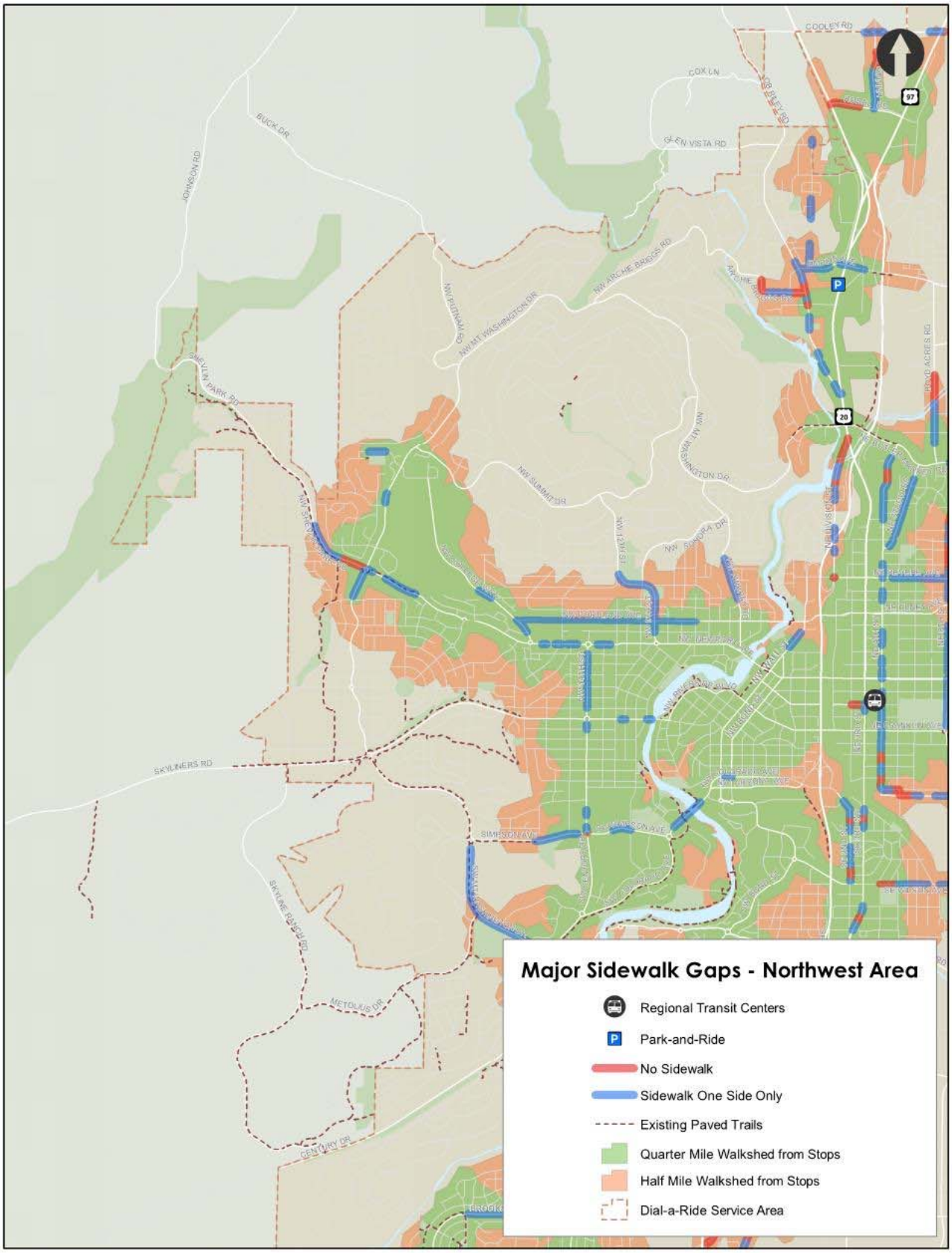

Figure 10B: Major Sidewalk Gaps – Northwest Area

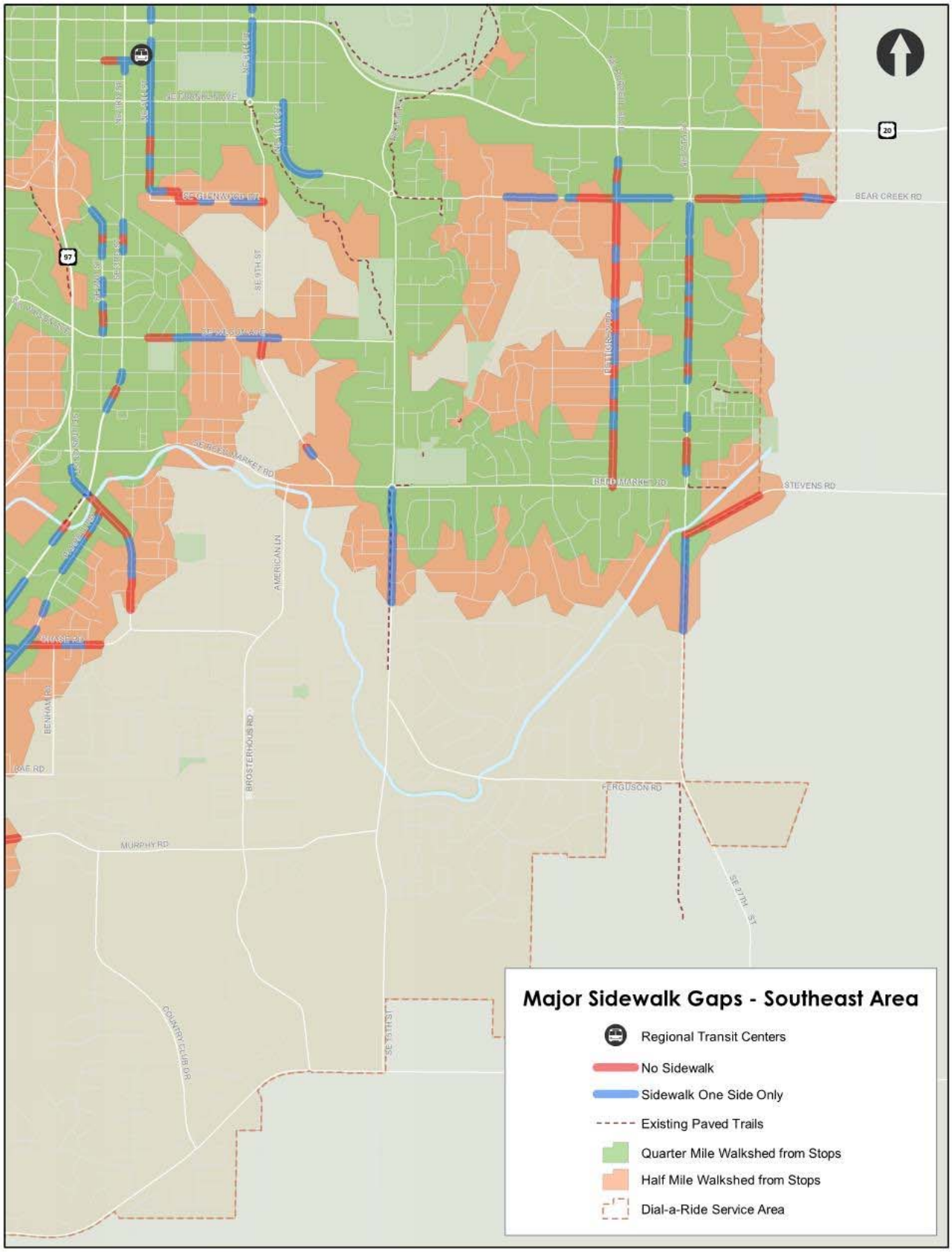

Figure 10C: Major Sidewalk Gaps – Southeast Area

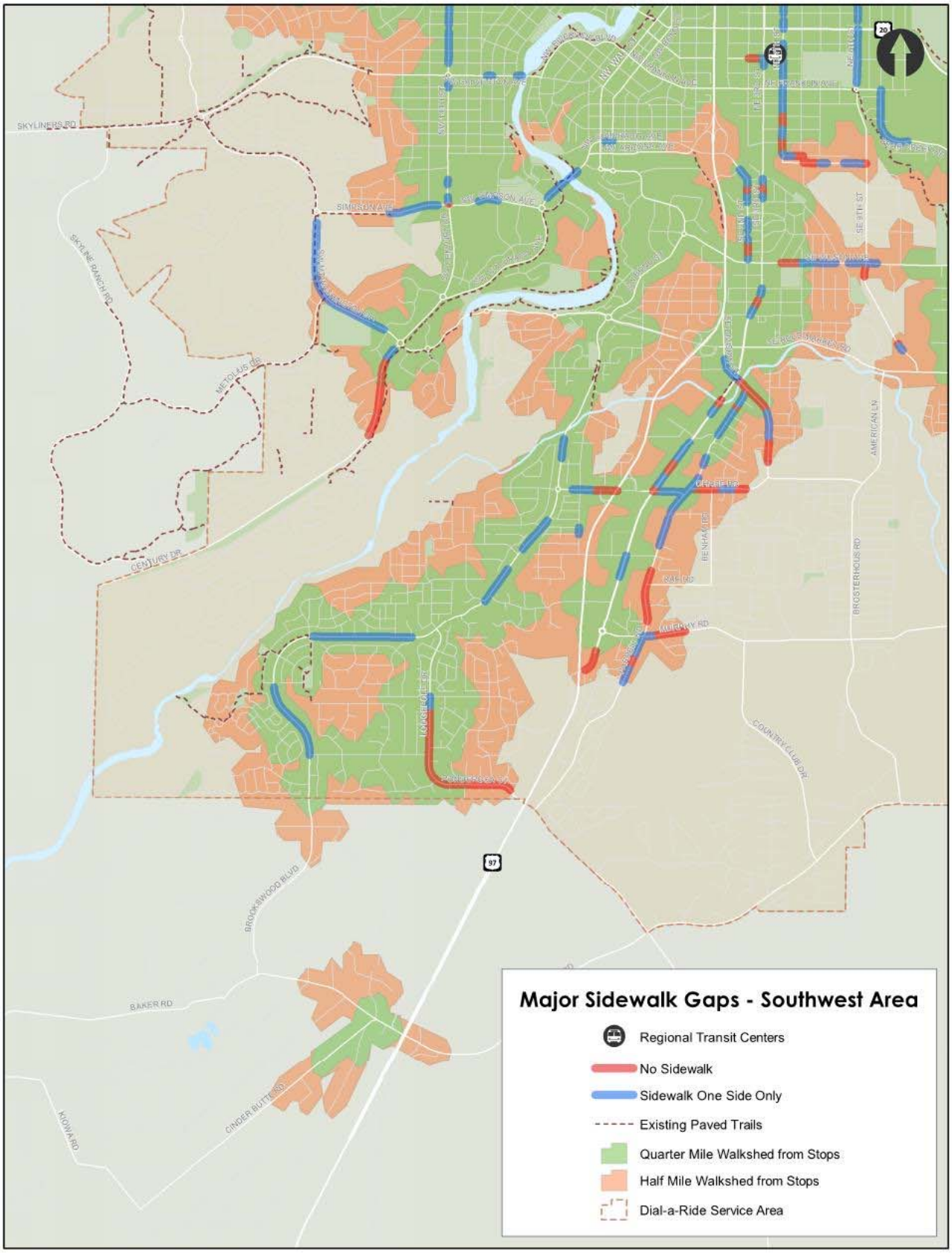

Figure 10D: Major Sidewalk Gaps – Southwest Area

Table 11: Pedestrian Facility Deficiencies and Needs

Quadrant	Street	From	To	Gap	2040 Population Density[1]	2040 Employment Density[2]	Transit Access Priority
Northeast	Hunnell Rd	Robal Rd	Cooley Rd	One side/both sides	Low	Low to Medium	**Mid**
	Cooley Rd	West of Berg Ln	East of Berg Ln	One side	Low	Medium to High	**Low**
	Cooley Rd	West of US 97	East of US 97	One side/both sides	Low	Low	**Low**
	Robal Rd	US 29	Hunnell Rd	Both sides	Low	Medium to High	**High**
	Boyd Acres Rd	North of NE Butler Market Rd	South of Brinson Blvd	One side/both sides	Medium to High	Medium to High	**High**
	NE Butler Market Rd	East of Boyd Acres Rd	East of NE 27th St	One side/both sides	High	Low to Medium	**Mid**
	NE Wells Acres Rd	NE Butler Market Rd	NE Daggett Ln	One side/both sides	Medium to High	Low	**Mid**
	Brinson Blvd	West of NE 18th St	West of NE Butler Market Rd	One side	Low	Medium	**Low**
	NE Purcell Blvd	North of NE Butler Market Rd	NE Cradle Mountain Way	One side	Medium	Low	**Low**
	NE 4th St	NE Alden Ave	South of NE Butler Market Rd	One side/both sides	Medium	Medium to High	**Mid**
	NE Division St	NE 2nd St	US 97	One side/both sides	Low to Medium	Medium	**Mid**
	NE Studio Rd	NE 4th St	South of NE Butler Market Rd	One side	Medium	Low	**Low**
	NE Revere Ave	NE 4th St	NE 8th St	One side	High	Low	**Mid**
	NE 8th St	NE Franklin Ave	NE Butler Market Rd	One side/both sides	Medium to High	Low	**Mid**
	NE Alden Ave	NE 4th St	NE 5th St	One side/both sides	Medium	Low	**Low**
	NE 10th St	NE Franklin Ave	NE Alden Ave	One side	Low	Low	**Low**
	NE Neff Rd	West of NE Purcell Blvd	East of NE Purcell Blvd	One side	High	Medium	**Mid**
	NE Purcell Blvd	NE Moonlight Dr	End of NE Purcell Blvd	One side/both sides	Medium to High	Medium	**Mid**
	NE Neff Rd	East of NE 27th St	NE Providence Dr	One side	High	Low	**Mid**
	NE Bear Creek Rd	SE Cessna Dr	East of Dantili Rd	One side/both sides	Medium	Low	**Low**
	NE Purcell Blvd	NE Bear Creek Rd	North of NE Twin Knolls Dr	One side/both sides	Low to Medium	Low to Medium	**Mid**
Northwest	NW Shevlin Park Rd	North of NW Shevlin Meadow Dr	West of NW Silas Pl	One side/both sides	Low to Medium	Low	**Low**
	NW Mount Washington Dr	NW Shields Dr	NW Shevlin Park Rd	One side	Low to Medium	Low	**Low**
	NW College Way	West of Saginaw Ave	West of NW Shevlin Park Rd	One side	Low to Medium	Low	**Low**
	NW Newport Ave	NW College Way	NW 13th St	One side	Medium to High	Low	**Low**
	NW Portland Ave	NW College Way	NW 6th St	One side	Medium to High	Low	**Low**
	NW 12th St	NW Ogden Ave	NW Vicksburg Ave	One side	Medium	Low	**Low**
	NW Awbrey Rd	NW Sagina Ave	North of NW Wilmington Ave	One side	Medium	Low	**Low**
	NW 14th St	NW Fresno Ave	NW Newport Ave	One side	Medium to High	Low	**Low**
Southeast	SE Glenwood Dr	NE Logsden St	SE 9th St	One side/both sides	Low to Medium	Low	**Low**
	SE Pettigrew Rd	SE Reed Market Rd	NE Bear Creek Rd	One side/both sides	Medium	Low	**Low**
	SE 27th St	Nouth of SE Reed Market Rd	NE Bear Creek Rd	One side/both sides	Medium to High	Low	**Mid**
	SE 2nd St	SE Wilson Ave	SE Aune St	One side/both sides	Low	Low to Medium	**Low**
	SE 3rd St	SE Miller Ave	SE Railroad St	One side/both sides	Medium	Low to Medium	**Mid**
	SE 3rd St	SE Cleveland Ave	SE Roosevelt Ave	One side/both sides	Medium to High	Low to Medium	**Mid**
	SE 3rd St	West of canal	East of canal	One side/both sides	Medium	Low to Medium	**Mid**
	SE 3rd St	Powers Rd	Reed Ln	One side/both sides	Low	Medium	**Low**
	SE 3rd St	North of Pinebrook Blvd	Badger Rd	One side	Low	Medium	**Low**
	SE 3rd St	US 97 on-ramp	South of Murphy Rd	Both sides	Low to Medium	Low to Medium	**Mid**
	SE Wilson Ave	SE 4th St	East of SE 9th St	One side/both sides	High	Low	**Mid**
	Brosterhous Rd	Rolen Ave	SE Hayes Ave	One side/both sides	High	Low	**Mid**
	Parrell Rd	Knightsbridge Pl	Brosterhous Rd	One side/both sides	Medium	Low to Medium	**Mid**
	Chase Rd	Parrell Rd	East of Mowitch Dr	One side/both sides	Medium to High	Low	**Mid**
	SE 15th St	South of SE Westview Dr	SE Reed Market Rd	One side	Low to Medium	Low	**Low**
Southwest	SW Simpson Ave	West of SW Century Dr	SW Columbia St	One side	High	Medium	**Mid**
	Cascade Lakes Scenic Byway	East of SW Simpson Ave	West of SW Industrial Way	One side	Low	Low	**Low**
	SW Mt Washington Dr	SW Yates Dr	SW Simpson Ave	One side	Medium	Low to Medium	**Mid**
	SW Century Dr	West of Elder Ridge St	SW Mt Washington Dr	One side/both sides	Low to Medium	Low	**Low**
	Brookswood Blvd	Poplar St	Rock Bluff Ln	One side	Medium to High	Low	**Mid**
	Powers Rd	West of Blakely Rd	US 97	One side/both sides	Medium to High	Low	**Mid**
	Ponderosa St/Lodgepole Dr	West of US 97	Mahogany St	One side/both sides	Medium to High	Low	**Mid**

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