Environmental Assessment of the Emerald Express Gateway Corridor

Spring 2019
Lane Transit District

RJ Theofield • Dr. Yizhao Yang

Advanced GIS PPPM 408/508

UNIVERSITY OF OREGON

SCI Sustainable Cities Institute

SCYP Sustainable City Year Program

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Thomas Schwetz, Director of Planning and Development
Jennifer Zankowski, Senior Development Planner

Contents

About SCI

The Sustainable Cities Institute (SCI) is an applied think tank focusing on sustainability and cities through applied research, teaching, and community partnerships. We work across disciplines that match the complexity of cities to address sustainability challenges, from regional planning to building design and from enhancing engagement of diverse communities to understanding the impacts on municipal budgets from disruptive technologies and many issues in between.

SCI focuses on sustainability-based research and teaching opportunities through two primary efforts:

1. Our Sustainable City Year Program (SCYP), a massively scaled university-community partnership program that matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals; and

2. Our Urbanism Next Center, which focuses on how autonomous vehicles, e-commerce, and the sharing economy will impact the form and function of cities.

In all cases, we share our expertise and experiences with scholars, policymakers, community leaders, and project partners. We further extend our impact via an annual Expert-in-Residence Program, SCI-China visiting scholars program, study abroad course on redesigning cities for people on bicycle, and through our co-leadership of the Educational Partnerships for Innovation in Communities Network (EPIC-N), which is transferring SCYP to universities and communities across the globe. Our work connects student passion, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCYP

The Sustainable City Year Program (SCYP) is a year-long partnership between SCI and a partner in Oregon, in which students and faculty in courses from across the university collaborate with a public entity on sustainability and livability projects. SCYP faculty and students work in collaboration with staff from the partner agency through a variety of studio projects and service-learning courses to provide students with real-world projects to investigate. Students bring energy, enthusiasm, and innovative approaches to difficult, persistent problems. SCYP's primary value derives from collaborations resulting in on-the-ground impact and expanded conversations for a community ready to transition to a more sustainable and livable future.

About Lane Transit District

LTD provides more than 10 million trips per year on its buses and EmX Bus Rapid Transit line in Lane County, Oregon. Encompassing the Eugene-Springfield metro area, LTD is a special district of the state of Oregon and led by a seven-member board of directors appointed by Oregon's Governor.

LTD also operates RideSource, a paratransit service for people with disabilities, and numerous transportation options programs to promote sustainable travel county wide, and Point2Point, an initiative that provides community members with the necessary information and resources to assist them in identifying opportunities to drive less by discovering transportation choices that meet their individual lifestyles.

Course Participants

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Executive Summary

The Emerald Express (EmX) Gateway Corridor is a Bus Rapid Transit (BRT) line developed and operated by Lane Transit District (LTD) that connects main centers in the cities of Eugene and Springfield.

BRT is a high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services. BRT achieves this through the provision of dedicated lanes, off-board fare collection, and more frequent service. LTD's EmX is one of only a few BRT lines currently available in the United States (Lane Transit District, 2019). In 2011, LTD expanded EmX service by developing and constructing the EmX Gateway line. The EmX Gateway line provides daytime service between Springfield Station, Gateway Station, and Sacred Heart Station.

Nearly a decade later, the EmX Gateway Corridor experiences the lowest ridership of LTD's three EmX system lines. To better understand why, LTD partnered with the University of Oregon's Sustainable Cities Institute to reexamine the corridor and conduct a multi-scale environmental study. To develop this report, undergraduate and graduate students enrolled in the University of Oregon's Advanced Geographic Information Systems course collaborated with LTD staff to provide a summary of neighborhood characteristics, accessibility and connectivity, and land use mix for neighborhoods along the EmX Gateway Corridor. Throughout the research, a mix of data collection and analysis methods were used. ArcGIS's ArcMap software was used extensively to create the maps found within this report and perform spatial analyses. Data for this report were provided by the Lane Council of Governments, collected from the American Community Survey (ACS), or collected by students using the survey instrument Survey123. Students collected these survey data at each station, its walkshed, and connecting street segments on May 17, 2019.

Overall, this report finds the EmX Gateway Corridor suffers not from issues of inadequate facilities or amenities, but from incompatible land uses nearby and the absence of a well-connected transportation system. In response to this finding, we recommend LTD consider the following actions outlined in Table X, which are organized by neighborhood, accessibility and connectivity, and land use mix. Specific recommendations for each station can be found later in the report in the Stations and Vicinity section.

NEIGHBORHOOD CHARACTERISTICS	Coordinate with the City of Springfield to encourage further infill development in the EmX Gateway Neighborhood to increase population and housing densities to support ridership.
	Consider reducing financial barriers (e.g. fare waiver) for households below the poverty line to encourage ridership and reduce household transportation costs.
	Evaluate bus stops in areas where there are high female populations (i.e. Census Block Groups 2, 10, and 12) to ensure adequate amenities are in place to facilitate female ridership.
	Coordinate with the City of Springfield to ensure the areas in the EmX Gateway Corridor meet the housing needs of people aged 25 to 54 to match the EmX Gateway line's capacity for likely riders.
ACCESSIBILITY & CONNECTIVITY	Coordinate with the City of Springfield to prioritize the siting of bike facilities around EmX Gateway Corridor stations to improve accessibility and street connectivity.
	Re-evaluate the viability of very poorly connected and accessible EmX Gateway line stations, such as Postal Way Station and Kruse Way Station, where no facilities exist, the PCR is 0.00, and no bus stops are within a one-quarter mile or one-half mile radius.
	Further evaluate the travel behavior of users to identify frequented destinations to prioritize station and station service area improvements.
	Build upon the success at Springfield Station Bay B to increase ridership by focusing resources to further enhance the pedestrian experience/increase PCR to make the surrounding facilities more accessible.
LAND USE MIX	Coordinate with the City of Springfield to increase the intensity of uses and mix of uses in station service areas.
	Focus on up-zoning areas where current information shows ridership potential based on existing land use mix and accessibility and connectivity attributes.

FIG. 1
Recommendations

Introduction

This report was produced for the Spring 2019 PPPM 408/508 Advanced Urban GIS Sustainable City Year Program (SCYP) project. In this term's SCYP project, the class worked in collaboration with Lane Transit District (LTD) to conduct a multi-scale environment study of the Emerald Express (EmX) Gateway Corridor.

The purpose of this report is to provide a summary of neighborhood characteristics, accessibility and connectivity, and land use mix for neighborhoods along the EmX Gateway Corridor. This report is organized into two sections: (1) Findings and (2) Summary of Analyses and Recommendations.

Overview: Emerald Express Gateway Corridor

The EmX Gateway Corridor is a Bus Rapid Transit (BRT) line developed and operated by LTD that connects main centers in the cities of Eugene and Springfield. BRT is a high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services. BRT achieves this through the provision of dedicated lanes, off-board fare collection, and more frequent service.

LTD's EmX is one of only a few BRT lines currently available in the United States (Lane Transit District, 2019). In 2011, LTD expanded EmX service by developing and constructing the EmX Gateway line. The EmX Gateway line provides daytime service between Springfield Station, Gateway Station, and Sacred Heart Station. However, the line's passenger boarding totals are consistently approximately one-half to one-quarter EmX's other two lines—Franklin and EmX West.

As shown in Figure 1, the study area, or EmX Gateway Corridor, is comprised of 12 census block groups that total 4,422 acres or 6.9 square miles adjacent to the EmX Gateway bus route. These census block groups were identified by selecting those within a 500-foot buffer of the EmX Gateway route. The EmX Gateway Corridor is located along the western portion of the city of Springfield and is to the east of the city of Eugene. The EmX Gateway route runs north along Pioneer Parkway West, turns left to Harlow Road, heads north on Gateway Street, west along Beltline Road, and then south on Martin Luther King Jr. Parkway. There are 50 stops along the route within the study area. For clarity, the study area census block groups were each assigned a number from 1 to 12. Full Census Block name details are provided below:

1 Block Group 1, Census Tract 21.02, Lane County, Oregon

2 Block Group 2, Census Tract 33.02, Lane County, Oregon

3 Block Group 3, Census Tract 33.01, Lane County, Oregon

4 Block Group 1, Census Tract 33.02, Lane County, Oregon

5 Block Group 3, Census Tract 21.02, Lane County, Oregon

6 Block Group 1, Census Tract 32.01, Lane County, Oregon

7 Block Group 1, Census Tract 21.01, Lane County, Oregon

8 Block Group 3, Census Tract 32.02, Lane County, Oregon

9 Block Group 2, Census Tract 33.02, Lane County, Oregon

10 Block Group 2, Census Tract 21.02, Lane County, Oregon

11 Block Group 2, Census Tract 21.01, Lane County, Oregon

12 Block Group 1, Census Tract 35.00, Lane County, Oregon

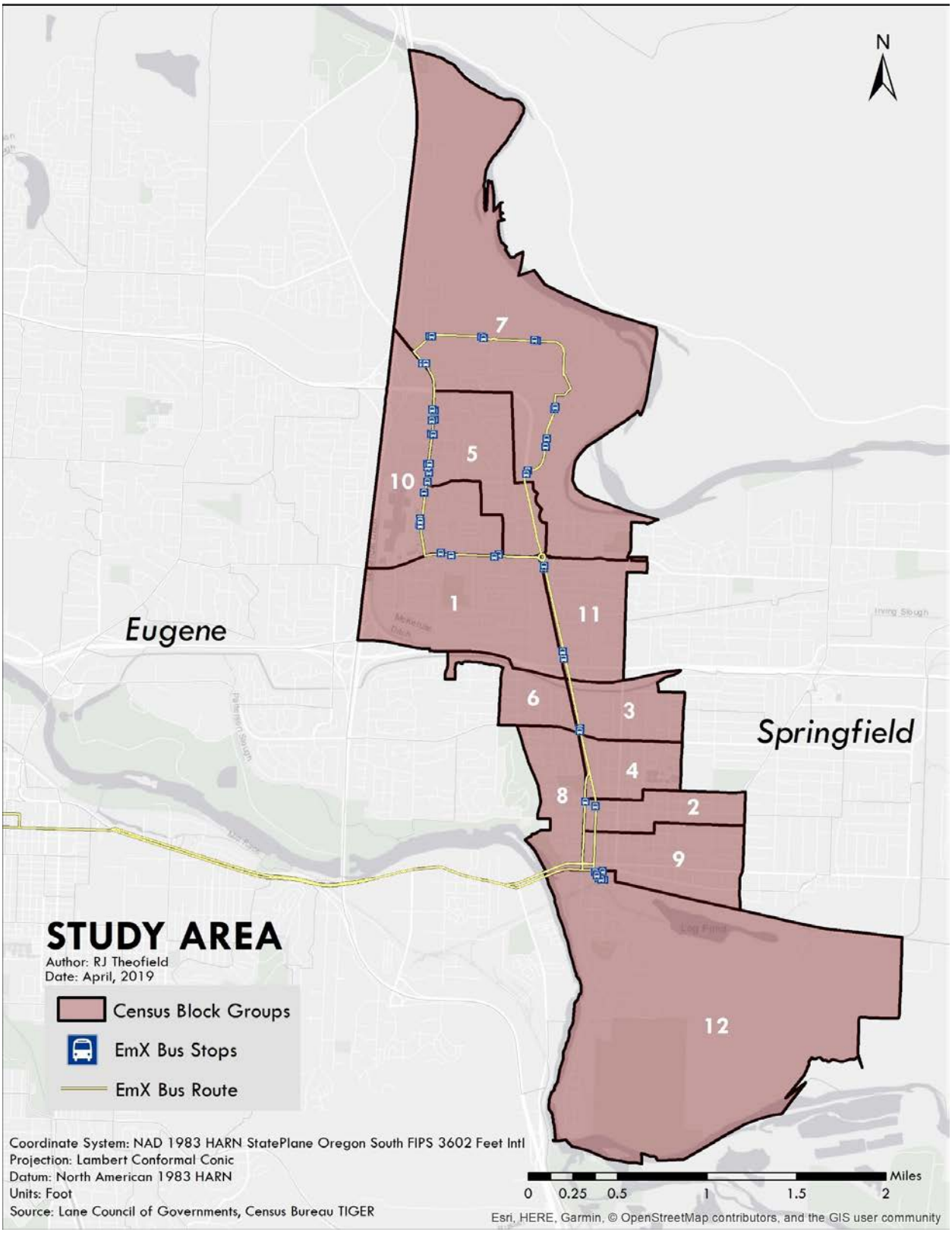


FIG. 2
Study Area

Methodology

For this report, a mix of data collection and analysis methods was used. To create maps and perform spatial analyses, ArcGIS's ArcMap software was used extensively.

Data for this report were provided by the Lane Council of Governments, collected from the American Community Survey (ACS), or collected on-site via a survey instrument called Survey123. The analysis of the study area's neighborhood characteristics was based on 2013-2017 ACS data. The ACS data were analyzed at the census block group level in Microsoft Excel and then visualized cartographically in ArcMap. To analyze the accessibility and connectivity of stations, advanced spatial analyses were conducted. For this, ArcMap's network analyst tool was used to compute quarter- and half-mile service areas for each station in the study area. The land use mix for each station's service areas was then analyzed by calculating its land use mix entropy to understand the balance of the area's land uses. Lastly, for each station, its walkshed, and street segment, an in-person environmental audit was conducted and recorded using Survey123. The survey instrument used for the environmental audit was developed by students to collect data relevant to walkability, road and station safety, accessibility, and public use and public life. A more detailed description of methodology is provided in each corresponding section of the report.

Findings

This section contains the analysis and findings for the EmX Gateway Corridor's neighborhoods and its stations and their vicinity.

Neighborhoods

This section provides a summary of analysis and findings for neighborhood characteristics.

METHODS

To conduct the analysis for this section, data were collected from 2013-2017 American Community Survey datasets and analyzed to generate descriptive information using Excel. This information was then joined with the census block groups located within the study area to identify patterns and themes for findings and recommendations.

POPULATION

The population of the study area is 16,754 people and has an overall population density of 7.0 people per acre. As shown in Map 2 in Appendix A and in Chart 1 below, Census Block Group 8 has the highest population density in the study area with a population density of 11.2 people per acre, while Census Block Group 7 has the lowest population density with 1.1 people per acre. One-third of Census Block Groups have a population greater than 1,500.

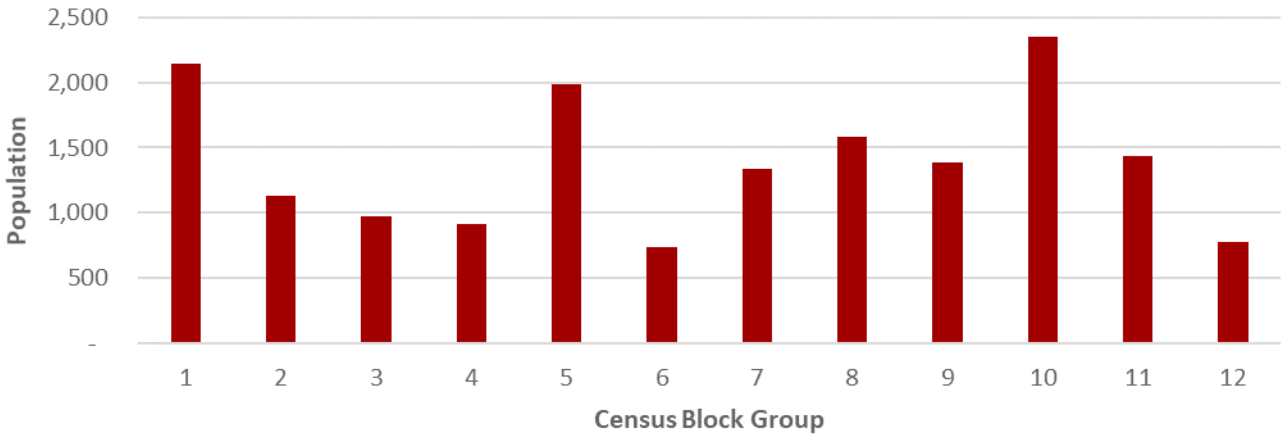


FIG. 3

Population by Census Block Group, 2017

Source: American Community Survey 2013-2017

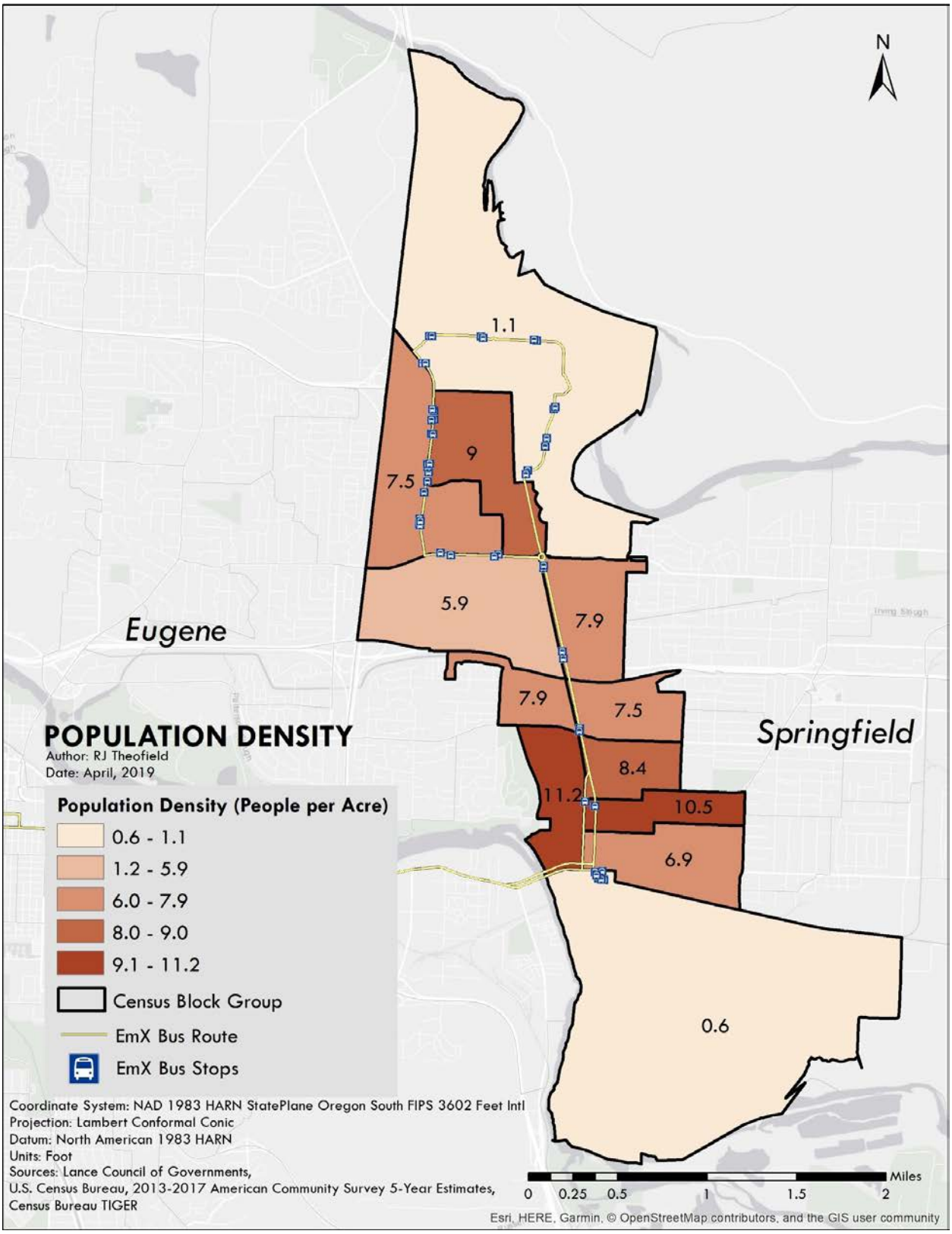


FIG. 4

Population Density by Census Block Group, 2017

HOUSING

Within the study area, there are 7,774 housing units, and on average the housing density is 3.2 units per acre. As shown in Map 3 in Appendix A and in Chart 2 below, Census Block Group 8 has the highest housing density with 5.6 units per acre. Census Block Group 12 has the lowest housing density with 0.3 units per acre. One-third of census block groups have a housing density greater than or equal to 3.0 units per acre, while two-thirds have a housing density less than 3.0 units per acre.

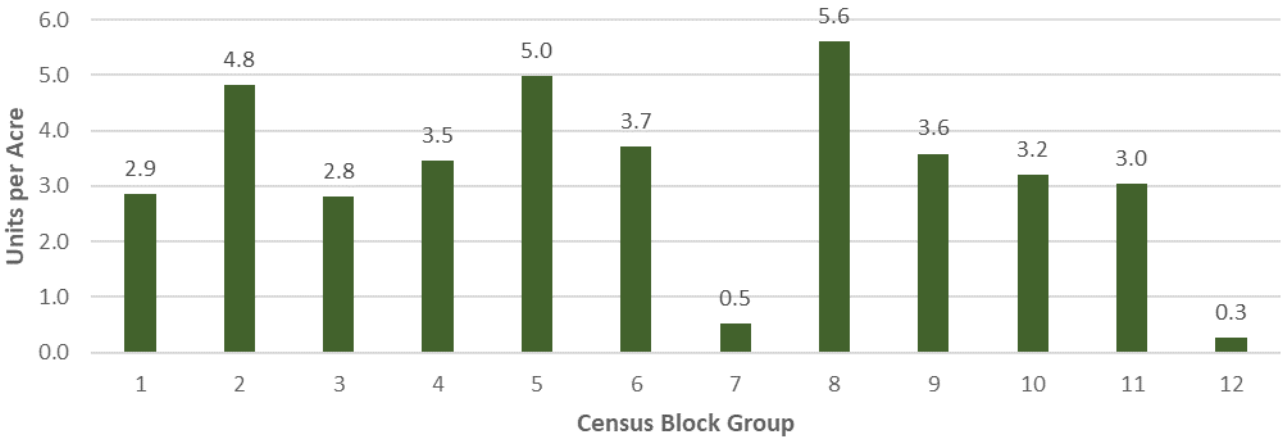


FIG. 5

Housing Density by Census Block Group, 2017

Source: American Community Survey 2013-2017

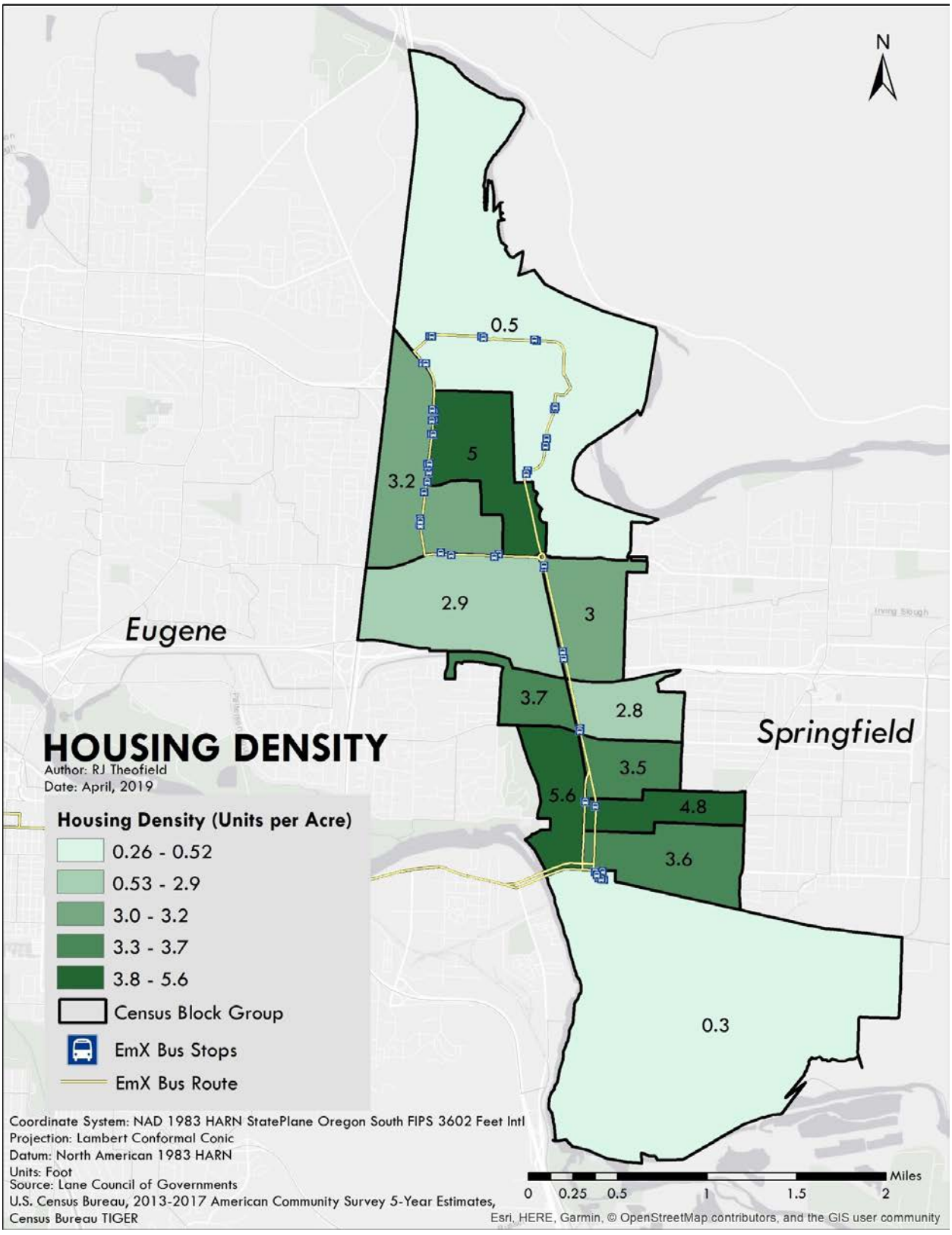


FIG. 6

Housing Density by Census Group Block, 2017

NON-WHITE POPULATION

According to the American Public Transportation Association (APTA), nearly 60 percent of public transportation riders describe themselves as a race other than white. Overall, 12 percent of the study area population identifies as non-white. As shown in Map 4 in Appendix A and in Chart 3 below, Census Block Group 9 has the highest rate of non-white residents with 35 percent of the population identifying as non-white. Census Block 12 has the lowest rate of non-white residents with only 5 percent of the population identifying as non-white.

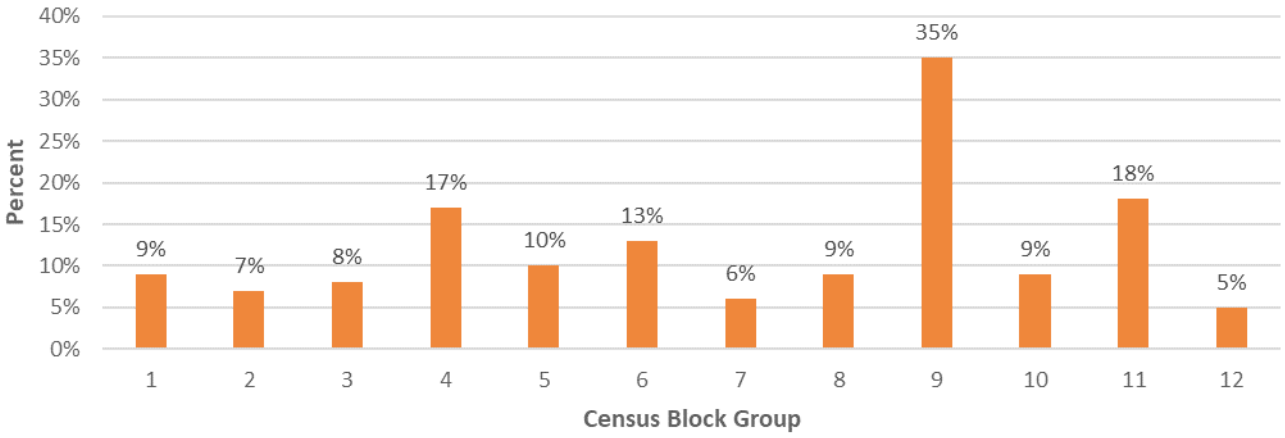


FIG. 7

Percent Non-white by Census Block Group, 2017

Source: American Community Survey 2013-2017

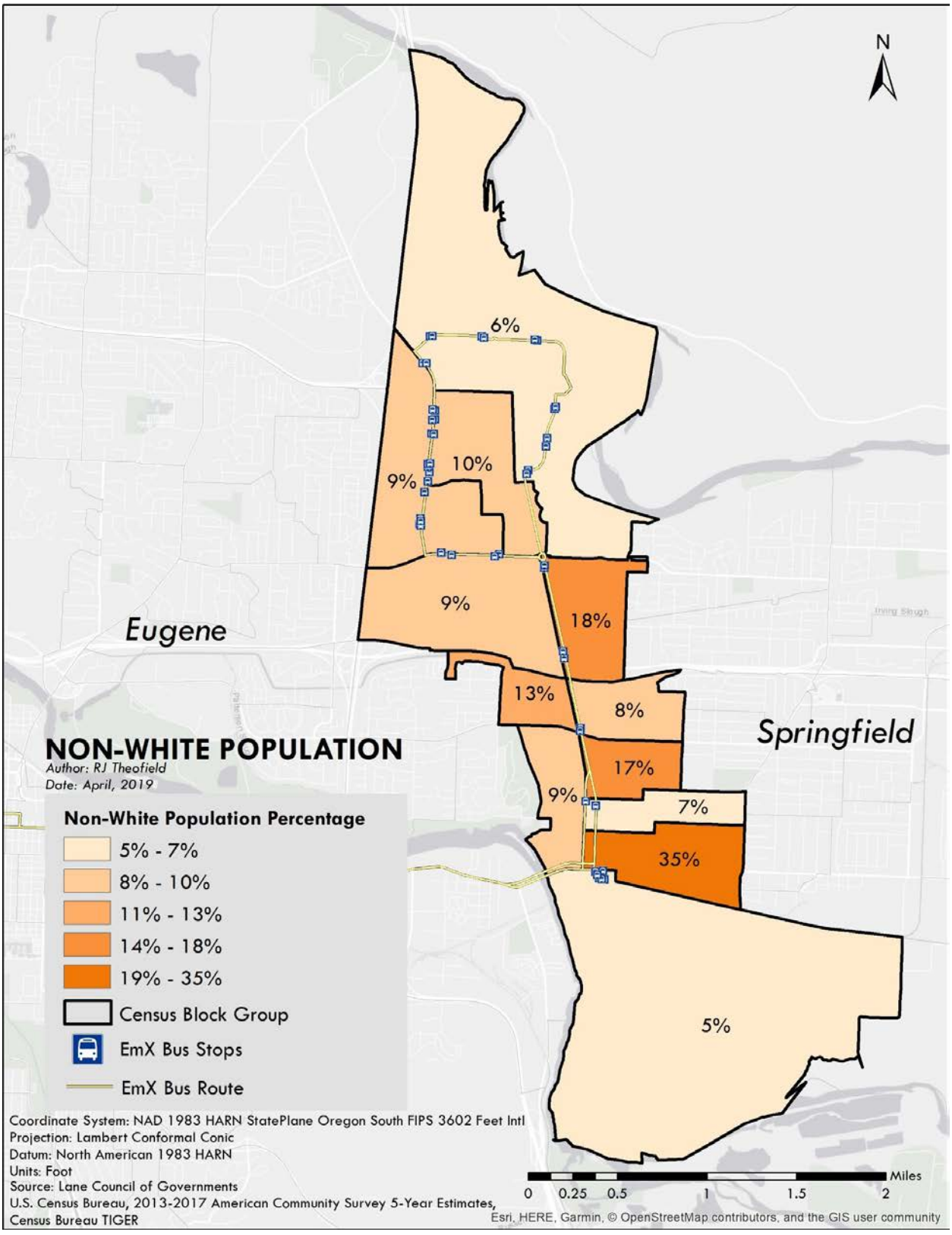


FIG. 8

Non-whte Population
by Census Block Group,
2017

HOUSEHOLD-SIZE DISTRIBUTION

According to the APTA, "two persons is the most common transit rider household size, reported by 26.4 percent of all public transportation riders."[3] Overall, there are 712 two-person households and the average rate of two-person households is 9 percent within the study area. As shown in Map 5 in Appendix A and in Chart 4 below, Census Block Group 5 has the highest rate of two-person households with 18 percent, while Census Block Group 7 has the lowest with a rate of zero percent.

3. American Public Transportation Association, 2007

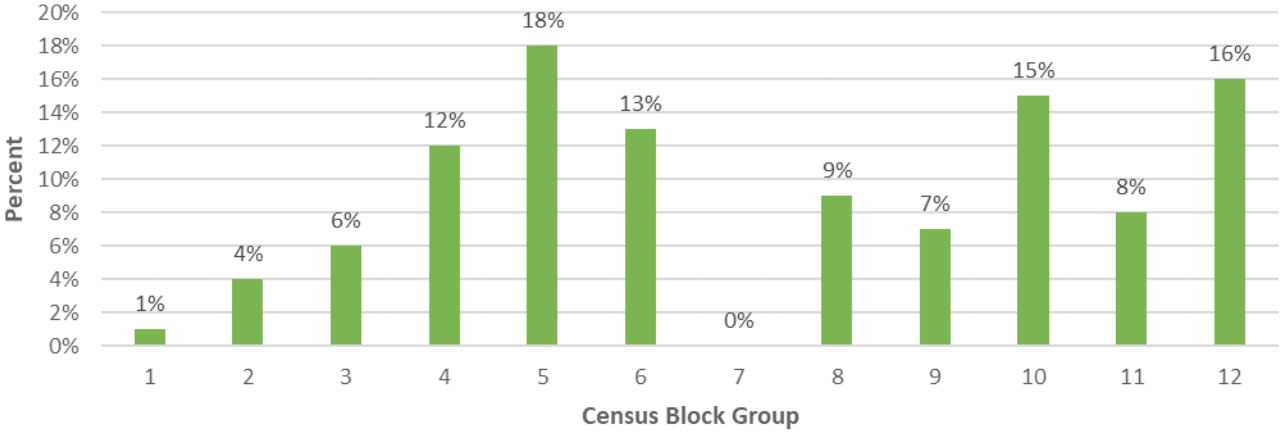


FIG. 9

Percentage of Two-person Households by Census Block Group, 2017

Source: American Community Survey 2013-2017

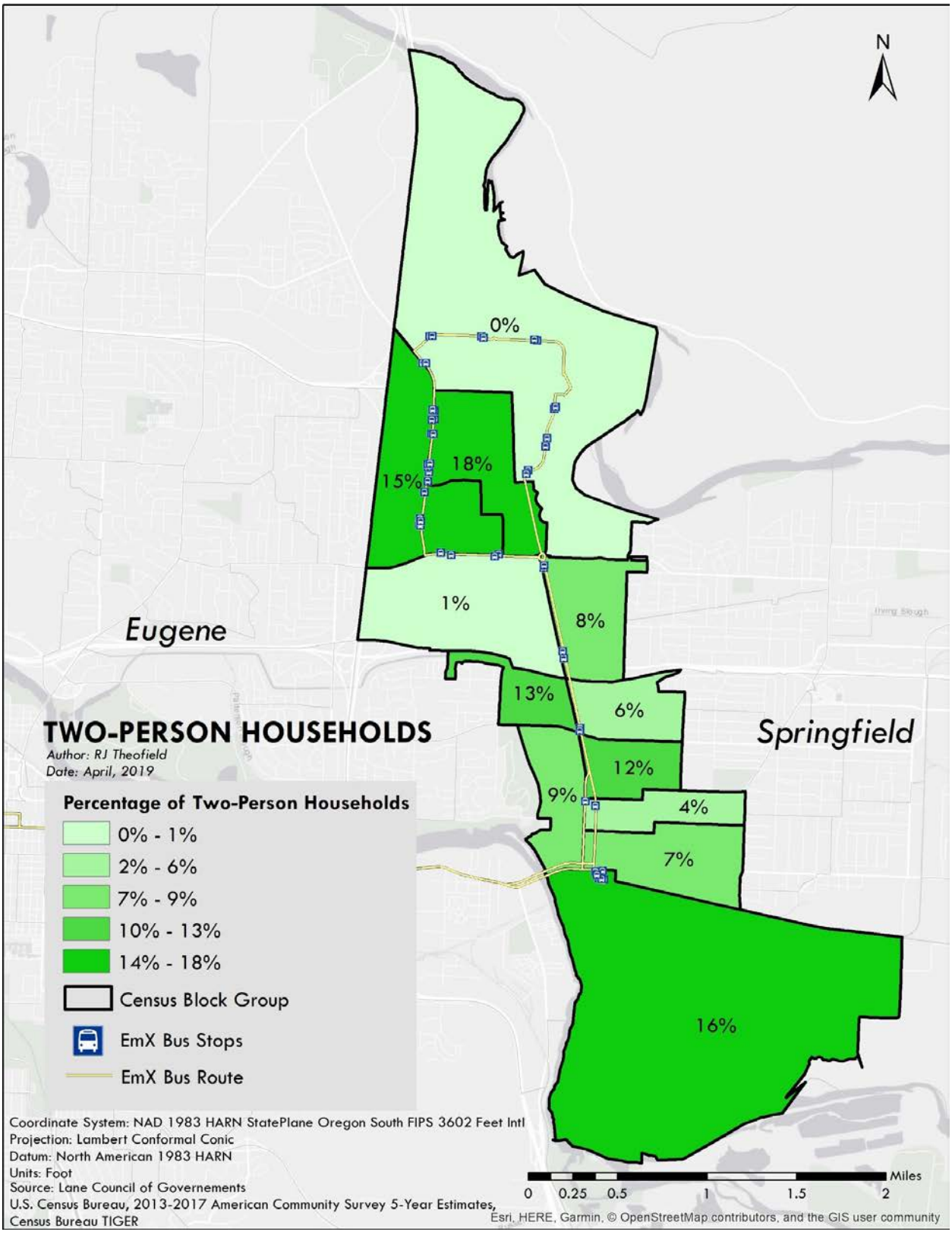


FIG. 10

Percent Two-person Households by Census Block Group, 2017

AGE DISTRIBUTION

According to the APTA, the majority of trips taken on public transportation are taken by people between 25 and 54 years in age.[4] This is higher than the 43.6 percent of Americans who are in the same age group of 25 to 54 years of age. Overall, 39 percent of the study area population is aged 25 to 54 years old. As shown in Map 6 in Appendix A and in Chart 5 below, Census Block Group 3 has the highest rate of residents aged 25 to 54 at 50 percent, while Census Block Group 1 has the lowest rate at 22 percent.

4. American Public Transportation Association, 2007

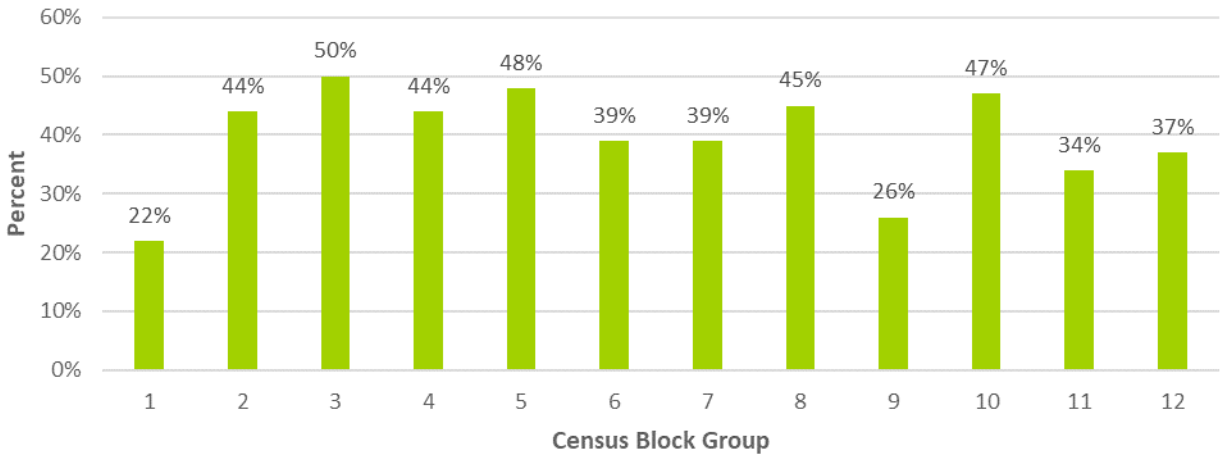


FIG. 11

Percentage of Population Aged 25 to 54 by Census Block Group, 2017

Source: American Community Survey 2013-2017

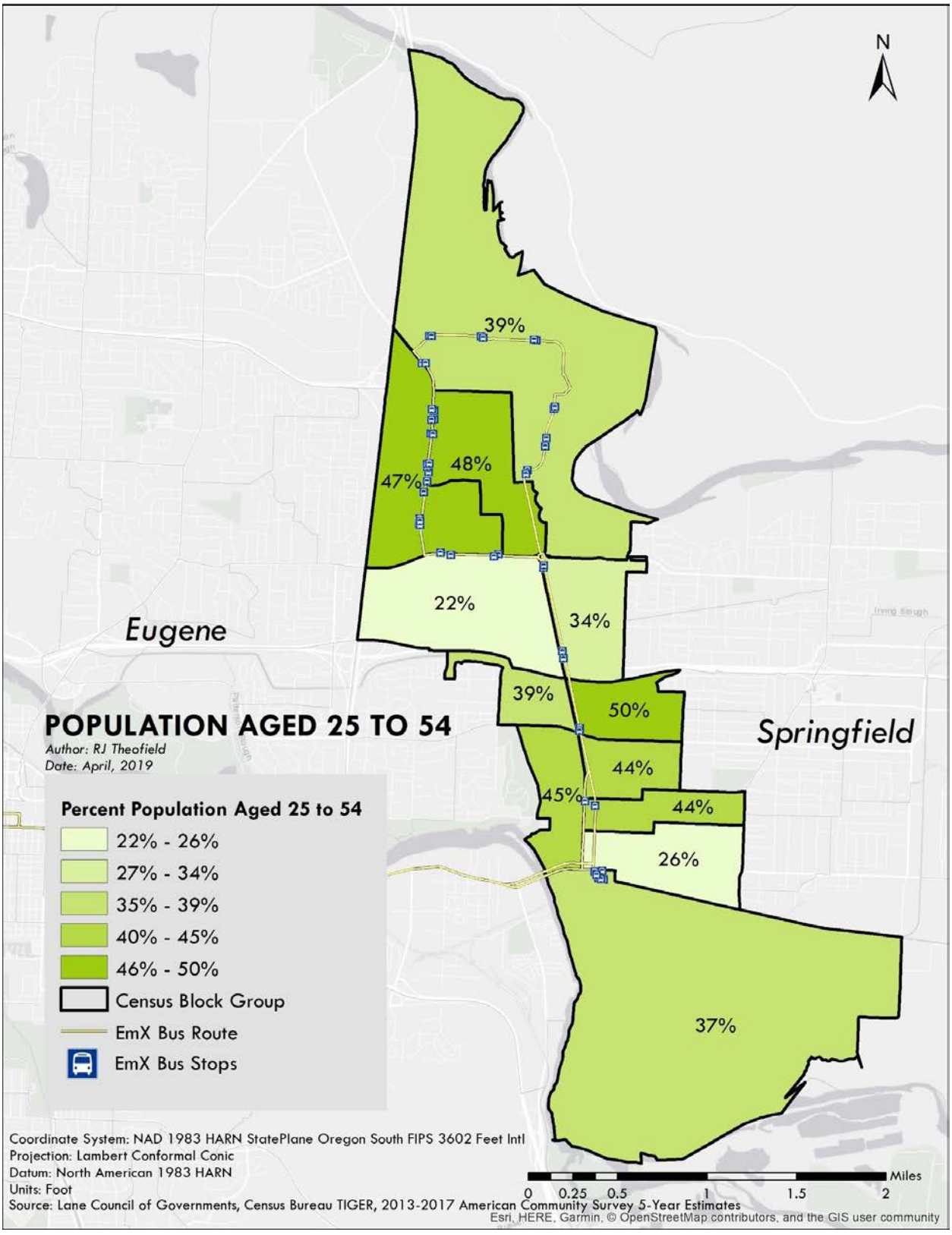


FIG. 12

Population Aged 25 to 54 by Census Block Group, 2017

HOUSEHOLD INCOME DISTRIBUTION

According the ATPA, in the United States the household income of public transportation users is widely varied.[5] The majority (55 percent) of households in the study area earn between $50,000 and $99,000 in income per year. A further 8 percent of the study area population earns an income greater than $100,000. As show in Map 7 in Appendix A and in Chart 6 below, Census Block Group 9 has the highest rate of household income below $15,000, while Census Blocks 7 and 12 have the highest rates of households earning above $100,000. However, within every Census Block Group in the study area except Census Block Group 4, the largest household income group is $50,000 to $99,000.

5. American Public Transportation Association, 2007

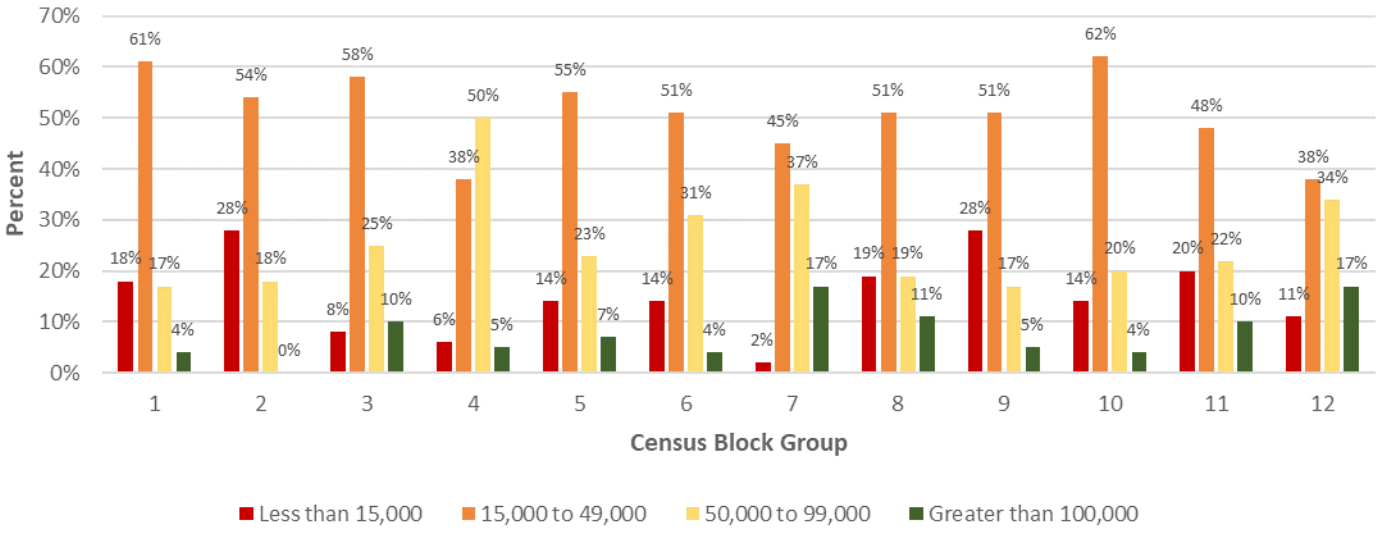


FIG. 13

Household Income by Census Block Group, 2017

Source: American Community Survey 2013-2017

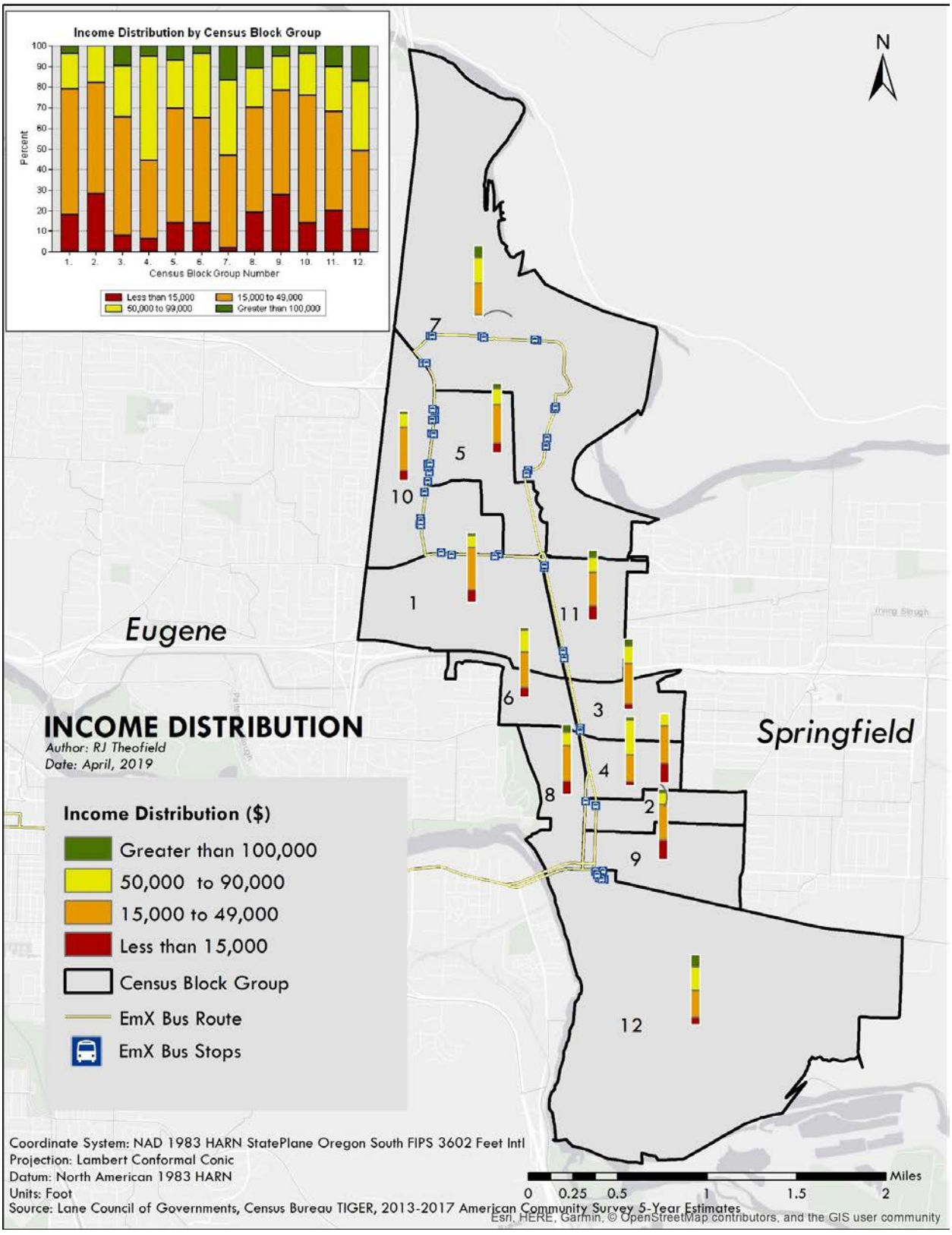


FIG. 14

Income Distribution by Census Block Group, 2017

VEHICLES

Overall, 88 percent of households in the study area own at least one vehicle. Thirty-nine percent own one vehicle, while only 12 percent of households do not own a vehicle. As shown in Map 8 in Appendix A and in Chart 7 below, Census Block 7 has the highest rate of households owning three or more vehicles and the lowest rate of households owning no vehicle—95 percent of households own at least one vehicle. Within all census block groups, the most common vehicle ownership group was one vehicle and the least common was no vehicle.

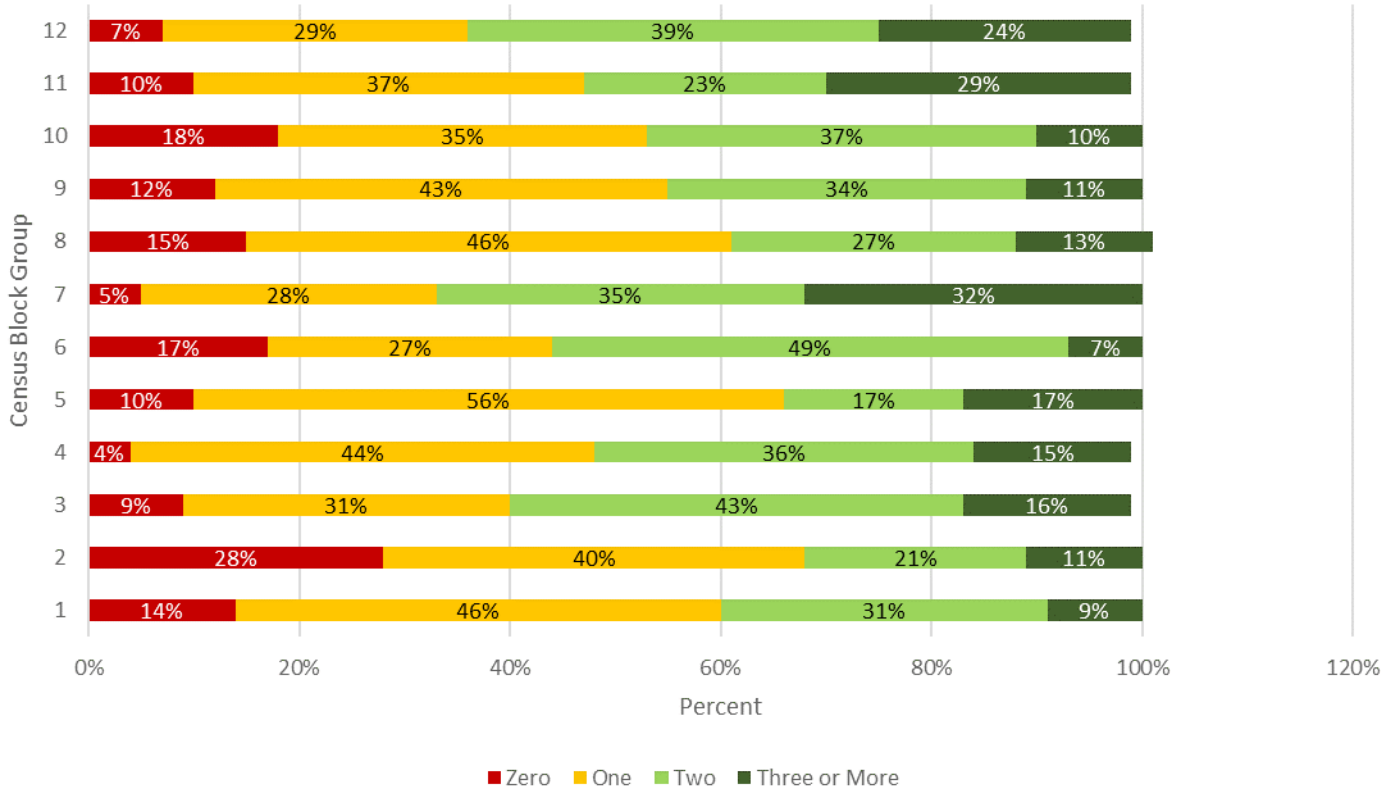


FIG. 15

Vehicle Ownership as a Percent by Census Block Group, 2017

Source: American Community Survey 2013-2017

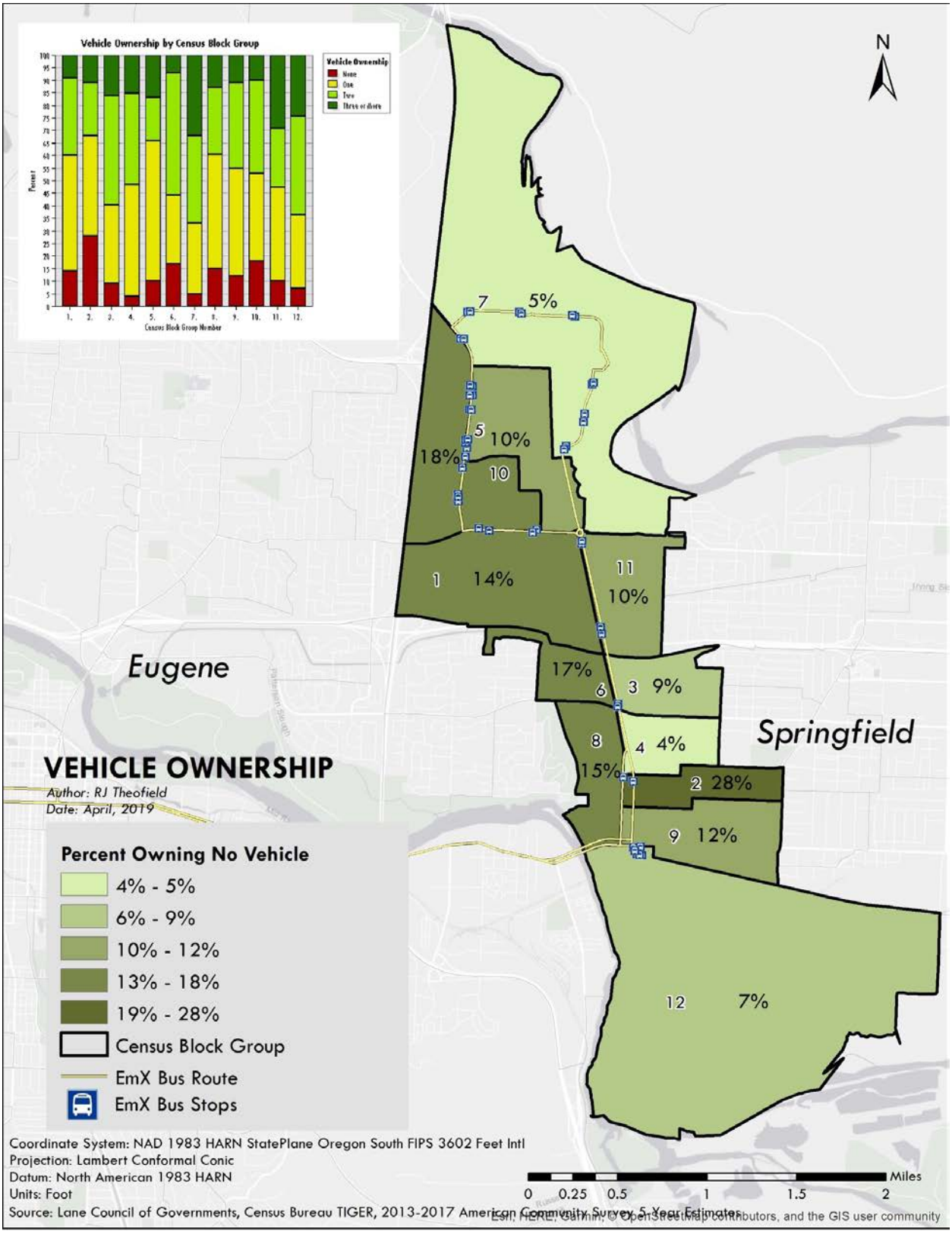


FIG. 16

Vehicle Ownership by Census Block Group, 2017

POVERTY LEVEL

Twenty-five percent of households are below the poverty rate within the study area. As shown in Map 9 in Appendix A and in Chart 8 below, Census Block Group 2 has the highest rate of poverty at 44 percent, while Census Block Group 12 has the lowest rate of poverty. Two-thirds of census block groups in the study area have poverty rates above 20 percent, while only two census block groups have rates below 10 percent.

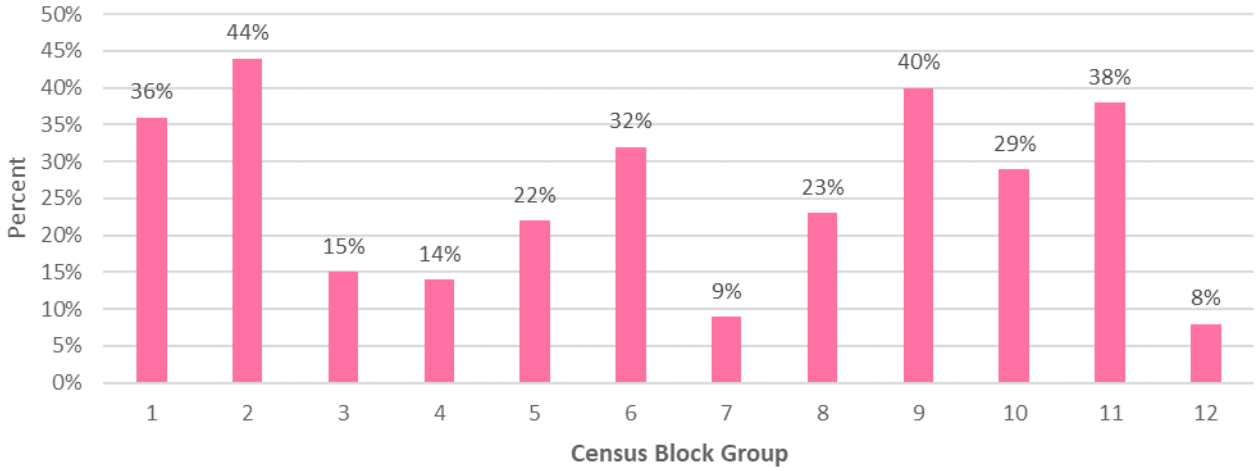


FIG. 17

Poverty Rate by Census Block Group, 2017

Source: American Community Survey 2013-2017

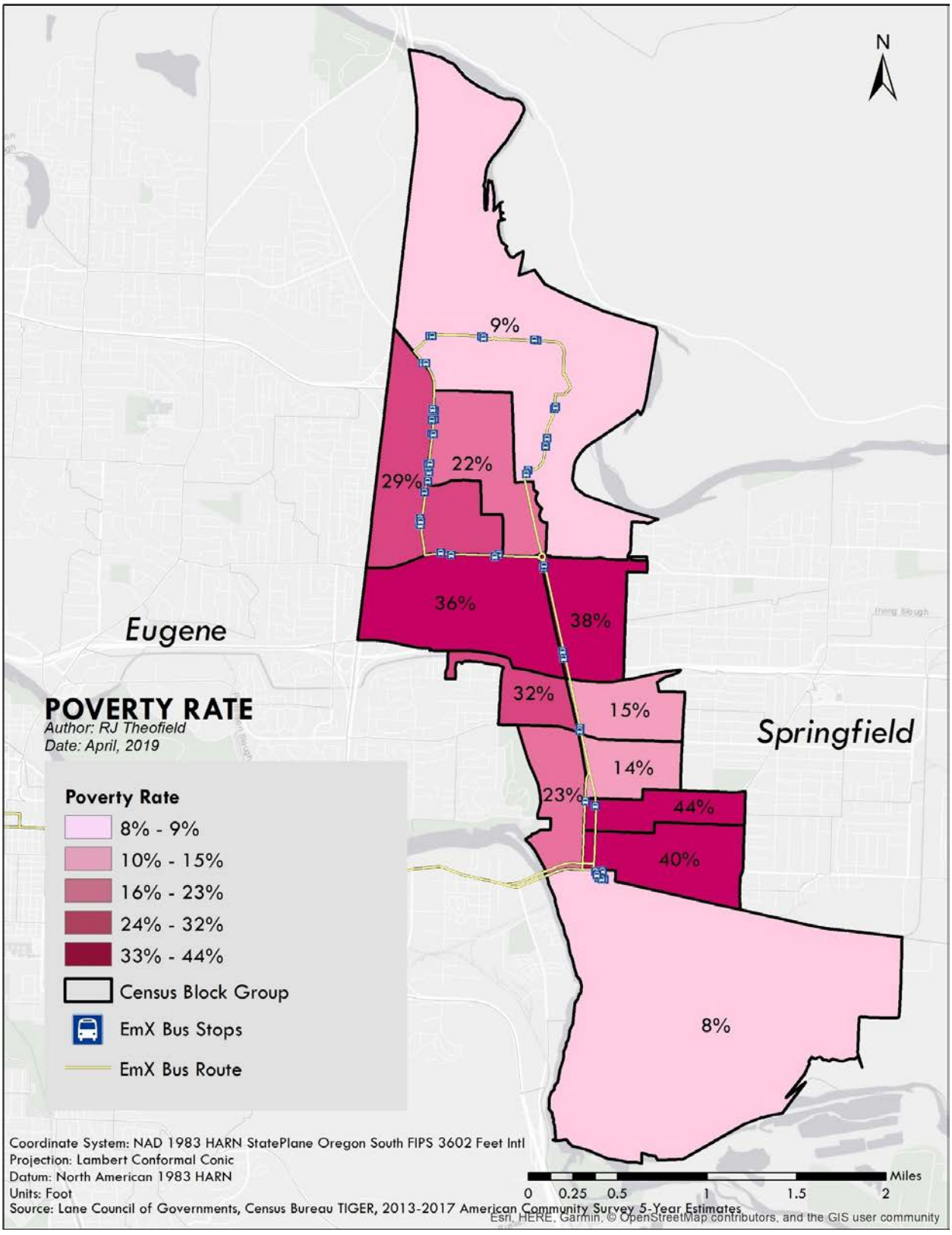


FIG. 18

Poverty Rate by Census Block Group, 2017

FEMALE POPULATION

According the APTA, "over 55 percent of all public transportation trips are taken by women."[6] Overall, 43 percent of the population in the study area is female. As shown in Map 10 in Appendix A and in Chart 9 below, Census Block Group 12 has the highest rate of women residents with 56 percent, while Census Block Group 3 has the lowest rate of women residents with 34 percent. Only one census block group has a female population rate greater than or equal to 50 percent. In fact, 60 percent of the census block groups have female population rates 42 percent or lower.

6. American Public Transportation Association, 2007

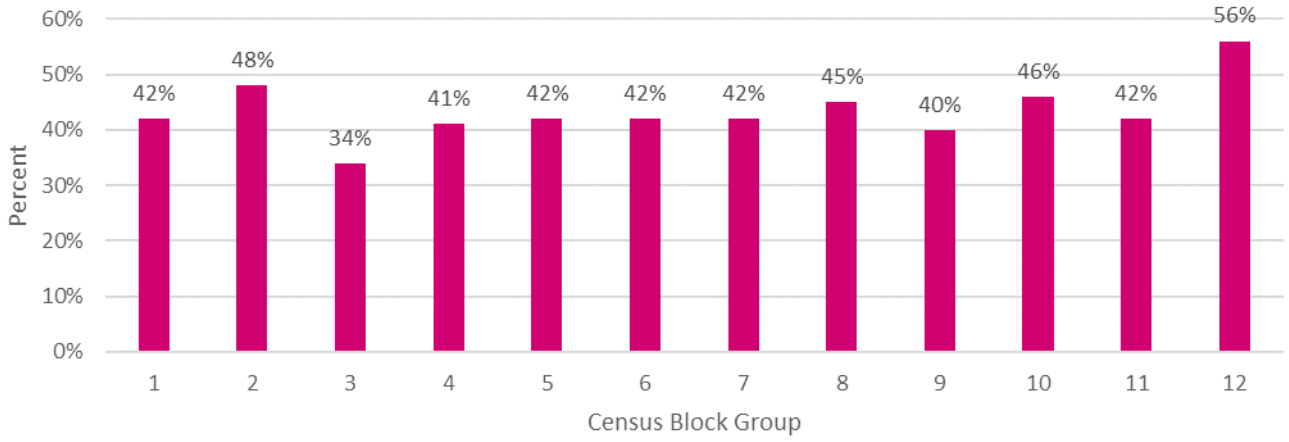


FIG. 19

Percent Female by Census Block Group, 2017

Source: American Community Survey 2013-2017

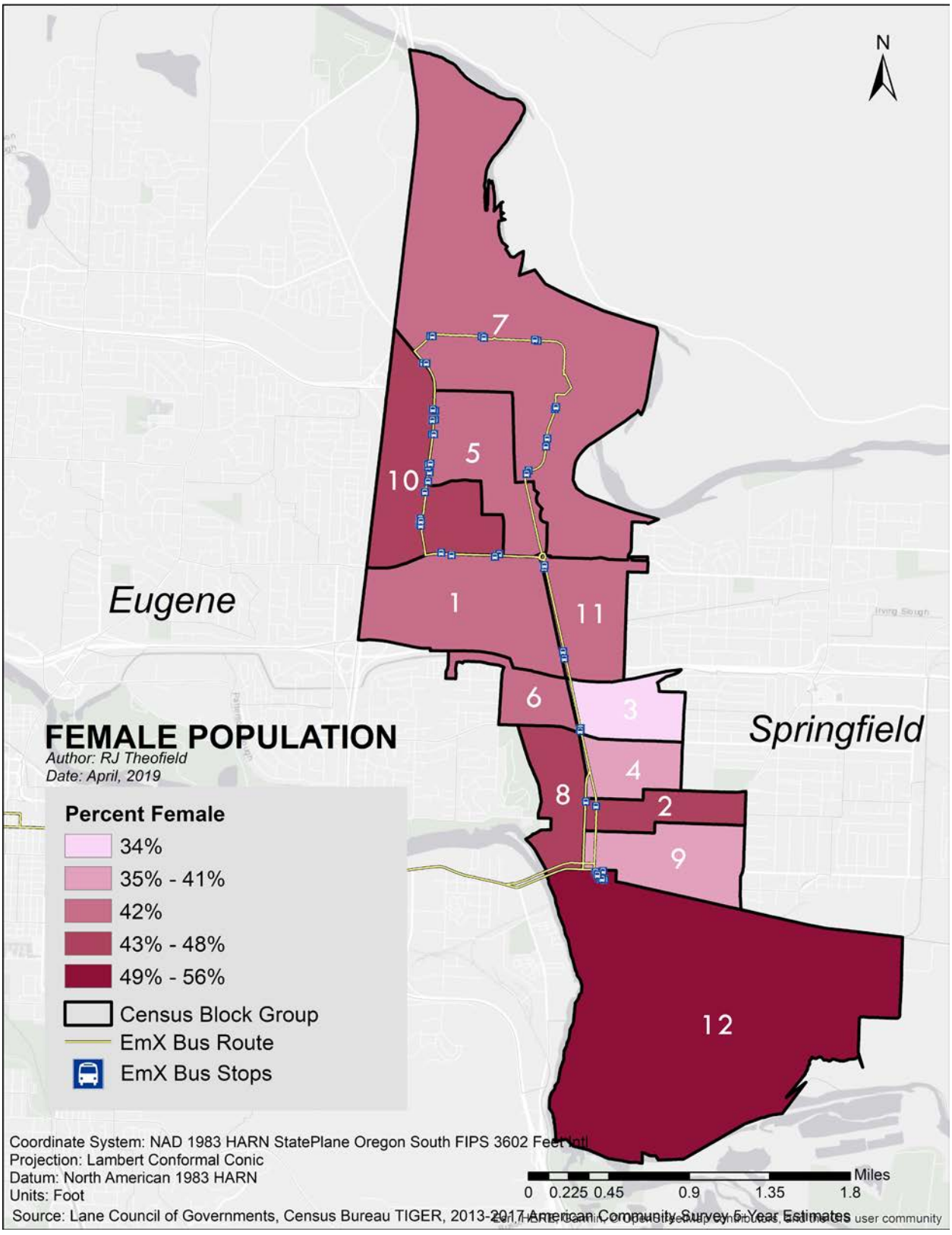


FIG. 20

Female Population by Census Block Group, 2017

Accessibility & Connectivity

This section outlines a summary of the service area, accessibility, and street connectivity analyses conducted for the outbound stations along the EmX Gateway line. The section is organized into three subsections: 1) Methods, 2) Quarter-Mile Service Area, and 3) Half-Mile Service Area. These three areas of analysis were operationalized using the following criteria:

1. Services Zones—defined as areas within walking distance around the EmX facilities; measured as quarter- and half-mile buffer areas based on street network along the corridor and around each station.

2. Accessibility—defined as concentration of destinations within the service areas; measured as the total number of destinations by service type.

3. Street Connectivity—defined as the level of interconnectedness of streets and measured by the Pedestrian Catchment Ratio (PCR). A PCR is the ratio of the walkable zone, or pedestrian catchment area, to the theoretical circle around the same point. The PCR is used to measure the amount of walkable area. Generally, a PCR of 0.60 or higher is considered "good."[7]

7. Stevens, 2005

METHODS

A series of geospatial analyses were conducted using ArcGIS's ArcMap and ArcCatalog for this report. First, ArcGIS Network Analyst was used to generate service areas within the EmX Gateway Corridor. This step used street and outbound EmX Gateway Corridor station data provided by the Lane Council of Governments (LCOG). The service areas around each outbound EmX Gateway stop were calculated at a quarter-mile and half-mile. These distances differ from a typical buffer analysis that would simply produce a ring around the feature class because the service areas account for the street network connectivity around each station. This method yields a more accurate representation of the accessibility of by foot or bike to each station. Next, the Pedestrian Catchment Ratio (PCR) was calculated for each station's quarter-mile and half-mile service area. Then, with both station service areas in place, several clips were conducted to create feature classes showing facilities, LTD bus stops, non-residential buildings, and bike facilities for each. The Spatial Join tool was then used to join the data from each of the aforementioned feature classes with the station service areas. This generated attribute tables where each element was organized by station service area name. Lastly, these attribute tables were summarized and then edited in Microsoft Excel for formatting.

QUARTER-MILE SERVICE AREA

As shown in Table 1 in Appendix B, there are 25 total facilities within the quarter-mile station service area for all stations. Fourteen of the facilities are located in the Springfield Station Bay B service area. Twelve station service areas have no facilities and nine have only one facility, which account for 84 percent of station service areas. LTD Park & Ride facilities are the most common facility type, and three are located within the EmX Gateway station service areas. Overall, facilities were highly dispersed and there were no apparent clusters of facility types by location. In total, there are 131,180 feet of bike facilities within all quarter-mile station service areas. For individual station service areas, bike facilities range from a low of 1,706 feet to a high of 9,456 feet. On average, the PCR is 0.09 within all quarter-mile station service areas. For individual station service areas, the PCR ranges from a low of 0.02 to a high of 0.14. No station service areas have a PCR higher than the 0.60 threshold that indicates a pedestrian-friendly condition. There are only three total LTD bus stops located within the station service areas. Map X below presents this information visually.

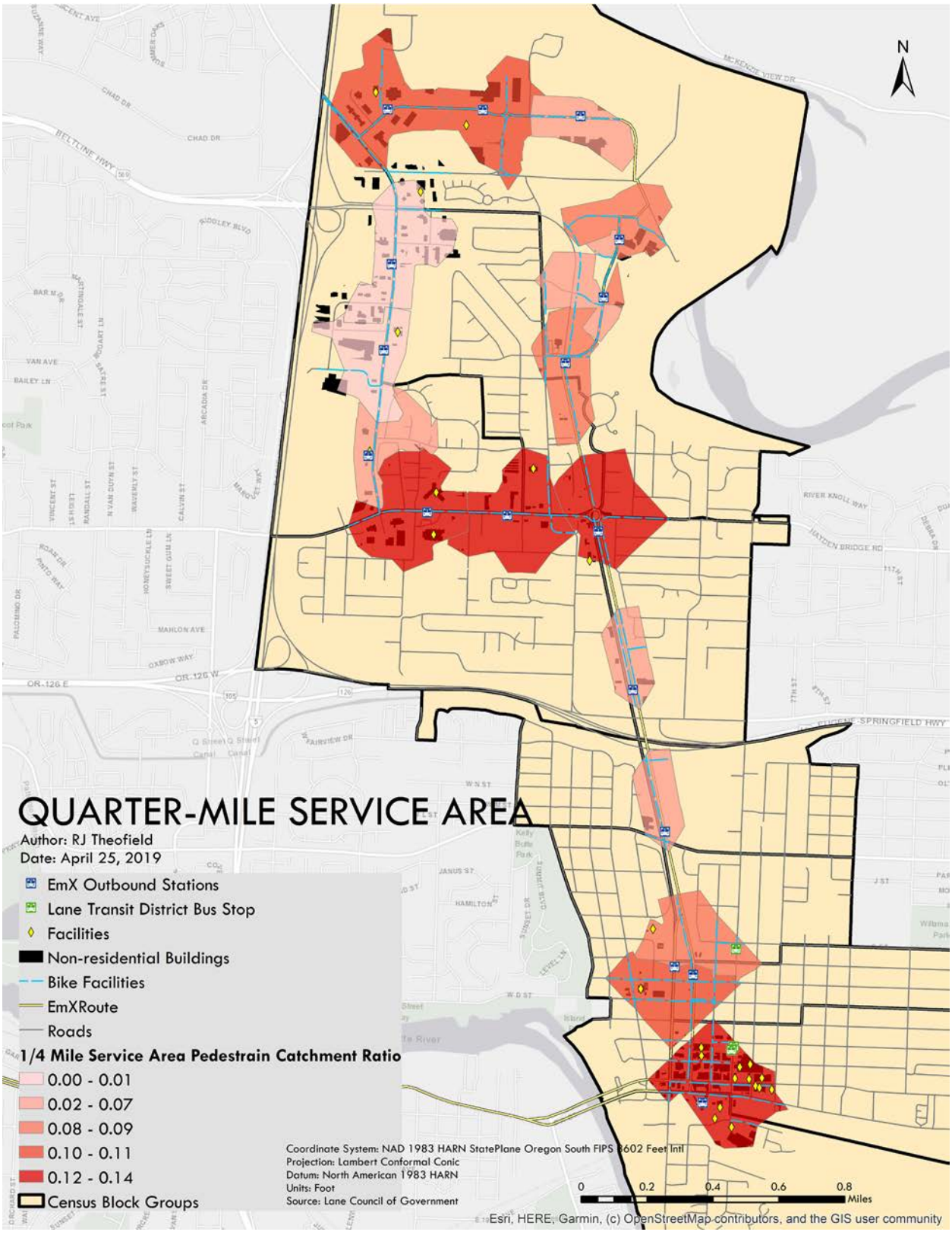


FIG. 21

Quarter-Mile Service Area Accessibility & Connectivity

HALF-MILE SERVICE AREA

As shown in Table 2 in Appendix B, within the half-mile station service area, there are 43 total facilities. The majority of facilities (19) are located within the Springfield Station Bay B service area. All other station service areas have three facilities or less. The most and second-most frequently occurring facilities within the service areas are parks and care facilities, with seven and five, respectively. Both parks and care facilities are dispersed throughout the service areas with one of each located in four separate service areas. In total, there are 199,678 feet of bike facilities. Again, Springfield Station Bay B's service area has the greatest volume of bike facilities with 21,779 feet. International Way East Station Outbound has the lowest distance of bike facilities with 2,185 feet. On average, the PCR for all station service areas is 0.07. This overall PCR indicates the area has poor conditions for pedestrians. Springfield Station Bay B's service area has the highest PCR with 0.12, while Postal Way Station and the west side of Gateway South of North Access have the lowest PCRs with 0.00. There are a total of 18 LTD bus stops located in the station areas. The E Street Station's service area has nine LTD bus stops, and Springfield Station B's service area has six (see Map: X below).

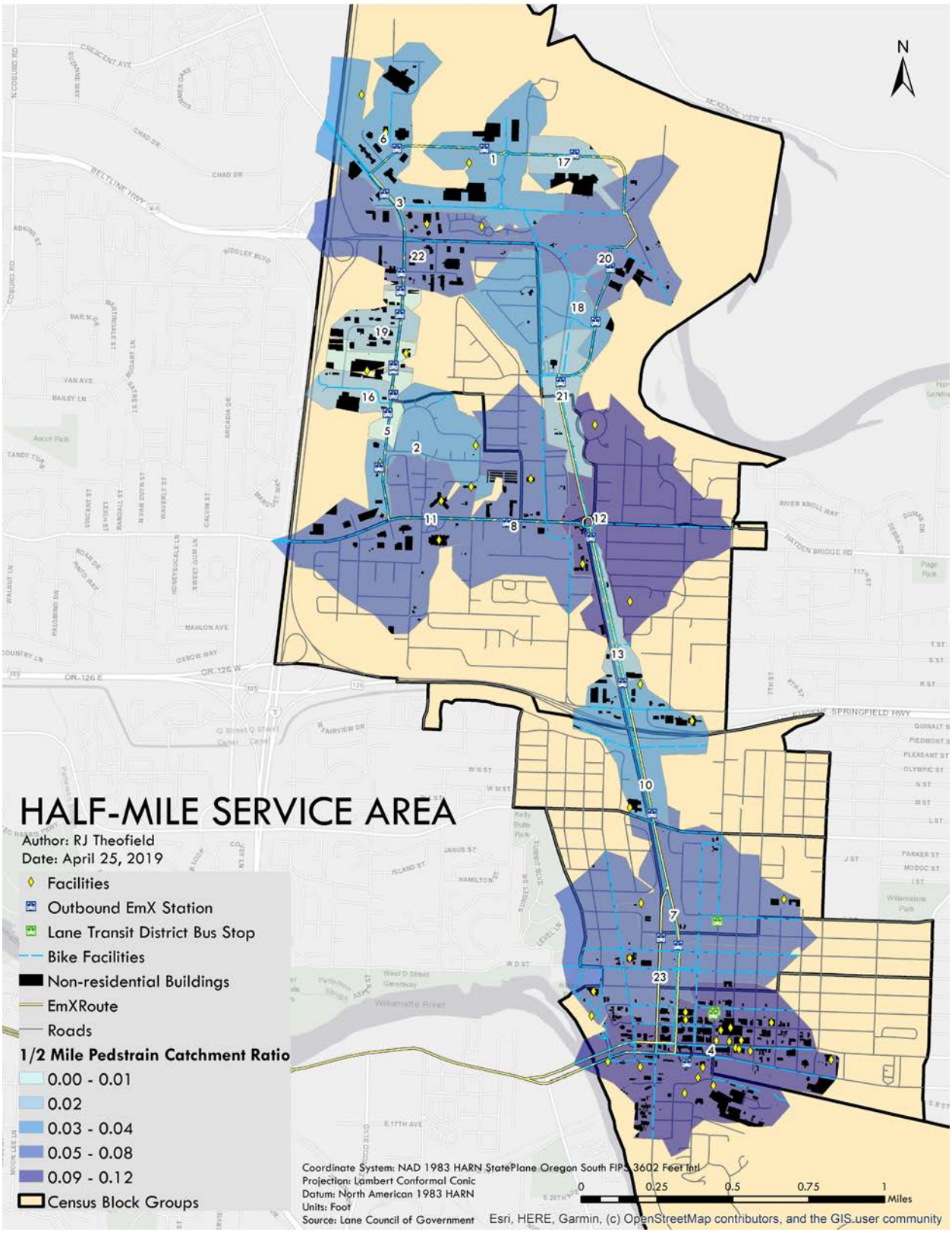


FIG. 22

Half-Mile Service Area Accessibility & Connectivity

Land Use Mix

This section provides a summary of information on the overall land use mix for station half-mile service areas of the EmX Gateway Corridor. This is organized into two subsections: (1) methods and (2) findings.

METHODS

To conduct the analysis for this report, a series of geospatial analyses were conducted using ArcGIS ArcMap. First, the tax lot data were joined with the previously-created station half-mile service station areas. By doing this, the land use data became identified for each of the station service areas, which was essential for this report's analyses. Then, the total number of parcels and total acreage for each land use type (Vacant, Residential, Commercial, and Industrial) was calculated through a series of selections and calculations. Next, the Summarize function was used to create a table that showed these land use data organized by station service area. These data were then exported to an Excel spreadsheet to allow for the calculation of the land use mix entropy for each station service area. The land use mix entropy is the level of distribution of different land uses within an area. A land use mix entropy of 1.00 indicates a perfectly even distribution of land uses, while a land use mix entropy of 0.00 indicates a highly uneven distribution of land uses. The formula used to calculate land use mix entropy is provided below:

$$H_1 = \frac{-\sum_{i=1}^{s}(p_i)\ln(p_i)}{\ln(s)}$$

Where:

1. Pi is area percentage of land use category i within a service zone. Land use categories considered in this analysis included: vacant, residential, commercial, industrial, and other.
2. S is the number of land use categories considered in this analysis.

Last, the land use mix entropy calculation was joined with the station service area shapefile. The maps and tables shown later in this report summarize the findings from this analysis.

FINDINGS

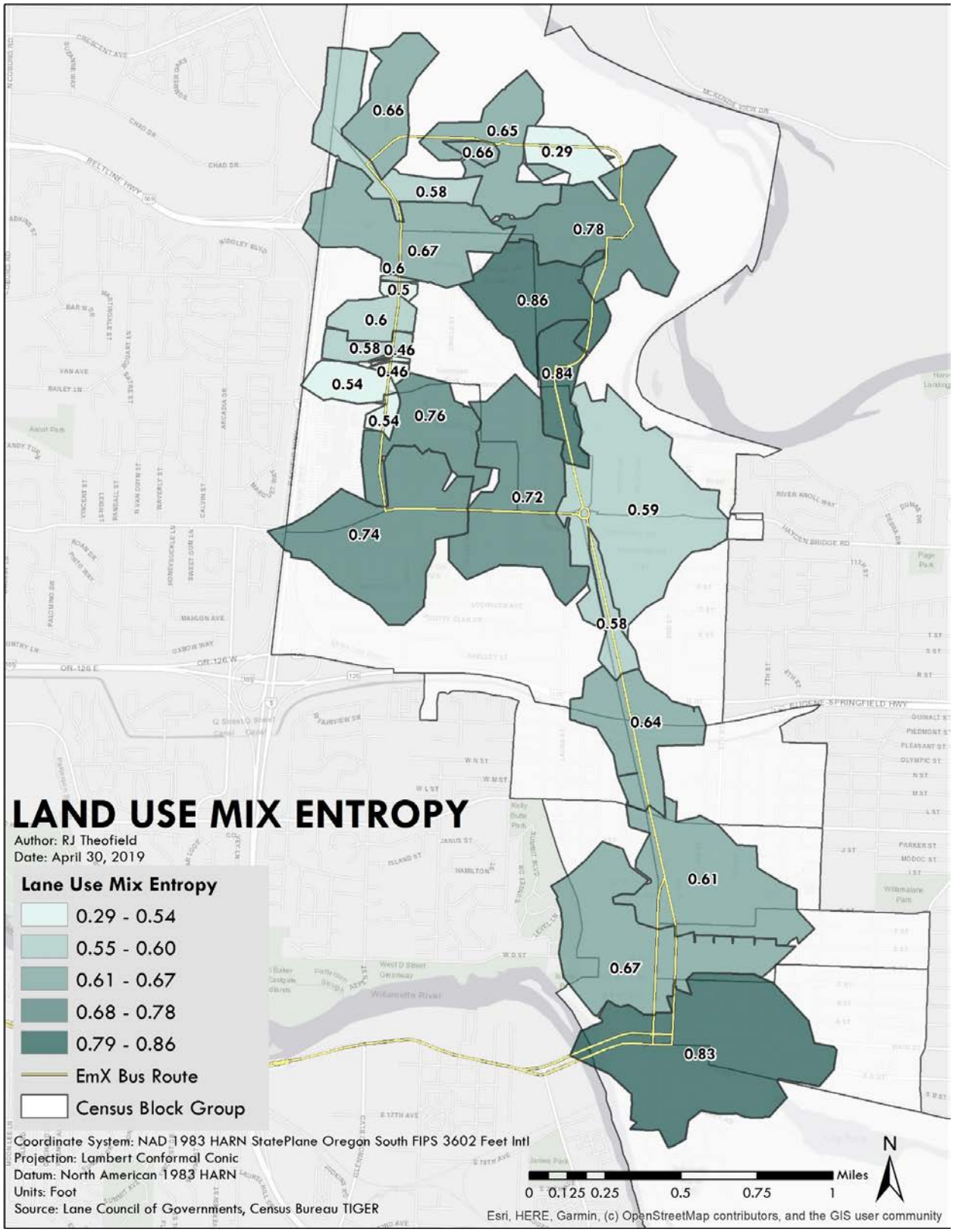
The Sacred Heart Station has the highest land use mix entropy at 0.86, while International Way East Outbound Station has the lowest land use mix entropy at 0.29 (see Appendix A: Figure 13 and Map 13 and Appendix B: Table 3). Springfield Station Bay B has the highest total number of commercial parcels and acreage at 184 parcels and 49 acres, respectively (see Appendix A: Map 14). International Way East Outbound Station also has the lowest total number of commercial parcels and acreage at one parcel and 1.61 acres. Hayden Bridge Station Outbound has the highest total number of residential parcels and acreage at 460 parcels and 112 acres, while International Way East Outbound Station has the lowest with zero parcels and acres (see Appendix A: Map 15).

FIG. 23
Land Use Mix Formula

FIG. 24
Land Use Mix Entropy by Half-Mile Service Area

Springfield Station Bay B also has the highest total number of industrial parcels and acreage at 11 parcels and 37 acres (see Appendix A: Map 16).

Almost two-thirds of the station service areas have zero parcels and zero acres of industrial land.



Stations and Vicinity

This section provides a summary of information for the stations, walksheds, and street segment connections along the EmX Gateway Corridor. For each of these elements, analysis has been conducted to determine the level of safety, accessibility, and comfort.

METHODS

For this section, a comprehensive and detailed environmental audit was conducted at and around EmX Gateway Corridor stations from 1:00 pm to 4:00 pm on May 17, 2019. For this audit, multiple physical environments were analyzed: the EmX stations, walkshed surrounding each station (one-quarter mile and/or one-half mile network service area), and street segments and intersections between two stations.

Students in the course were paired together and organized to ensure each station along the corridor was visited and audited. Students used ESRI's Survey 123 for ArcGIS data collection app to collect text, photographs, and spatial data during the audit. The data collection instrument, the survey, was developed by students based on their own insights and a literature review that analyzed walkability, road and station safety, accessibility, and public use and public life.

Springfield, E Street, and F Street Stations

This section presents the findings for Springfield, E Street, and F Street Stations. It is organized by unit of analysis and individual station, when appropriate.

STATIONS

At each of the three stations, the project team observed the presence of key amenities, as summarized in Figure 6 below. E and F Street Stations are high quality with nearly all observed amenities present, with the exception of significant landscaping or public art. The stations use a shared lane rather than a designated bus lane, and the station itself is under 50 feet from a major intersection along the highly trafficked Pioneer Parkway. The stations are not easily accessible by a bike path but generally are large enough to accommodate peak traffic and are free of undesirable conditions and pollutants. Overall, the stations themselves are well-maintained and provide significant amenities but lack connectivity to safe pedestrian and bike infrastructure.

FIG. 25
Transit Station Amenities Report Card

Transit Station Amenities: Report Card

Amenities	Springfield Station	E Street Station	F Street Station
Shelter ('16 or high capacity)	✓	☐	✓
Trash Recepticals	✓	✓	✓
Artwork Element	✓	☐	☐
Lighting Fixture	✓	✓	✓
Free-Standing Benches	✓	✓	✓
Bike Racks	✓	✓	✓
Trees, landscaping	✓	☐	☐
ADA waiting area	✓	✓	✓
Route Map	✓	✓	✓
Curb extension	✓	✓	☐
ADA ramps	✓	✓	✓
Schedules information	✓	✓	✓
Ticket vending machine	✓	✓	✓

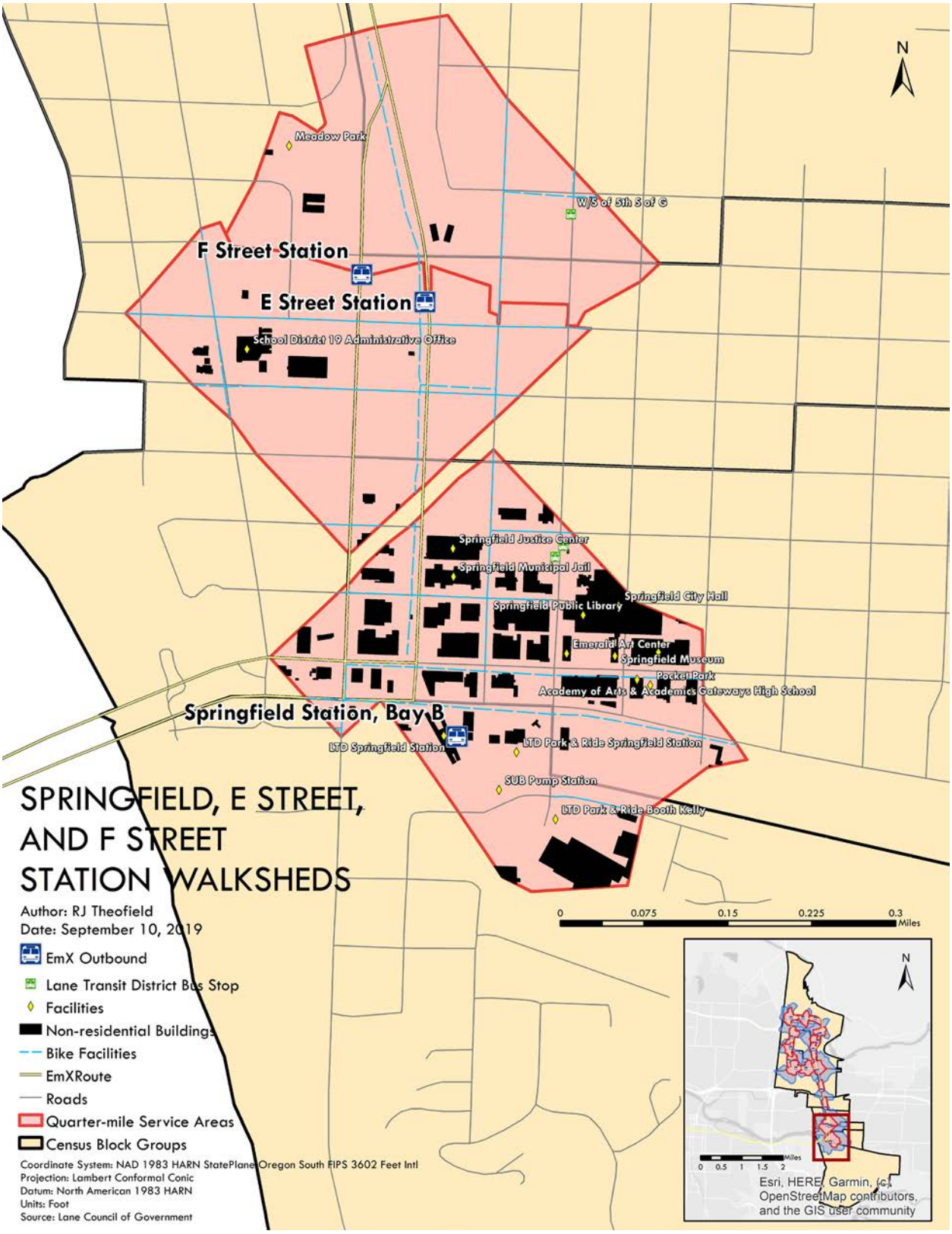


FIG. 26

Springfield, E Street, and F Street Stations

STATION WALKSHEDS AND STREET SEGMENTS

The majority of facilities are concentrated in downtown Springfield near Springfield Station. Within the quarter-mile service area, only nine facilities (35 percent) fall outside of the Springfield Station and E/F Street Station service areas. When extended to a half-mile service area, the number of facilities outside downtown grows to 19 (44 percent). Downtown Springfield follows a grid system, allowing for higher walkability and stations with an improved PCR. When extended to a half-mile service area, Springfield Station is one of only two stations that maintain a PCR above 0.1.

Springfield Station also boasts the greatest number of transportation facilities, including a park and ride and the highest concentration of non-EmX bus stops. Additionally, there is some connectivity to bike facilities within the service areas, including 47,700 feet of bike lanes and paths in the quarter-mile service area and nearly 80,000 feet within the half-mile service area.

Figure 2 displays the summary of land use mix for the E Street, F Street, and Springfield Stations study areas. Of greatest consequence are the entropy value and distribution of commercial and residential parcels. Entropy values across the station service areas vary greatly. The station service areas with the least mix, or lowest entropy values, include the more residential areas of downtown Springfield.

The Springfield Station service area has a significant number of commercial parcels (184), more than seven times the next most concentrated commercial service area. With Springfield Station serving the Main Street business district, this concentration is not surprising. Residential parcels are more evenly distributed along the corridor. Several station service areas, including E and F Streets, include a majority of residential acreage, leading to low entropy values. Only Springfield Station has a high amount of both residential and commercial area, leading to a higher entropy value.

Station Name	Entropy Value	Commercial Parcels	Commercial Acres	Residential Parcels	Residential Acres
E Street Station	0.29	5	559	386	43,146
F Street Station	0.37	23	2,928	387	49,263
Springfield Station	0.81	184	34,006	127	23,472

FIG. 27
Summary Table of Land Use Mix within Half-Mile Service Areas

Springfield Station

For Springfield Station, an on-site observation survey included six street segments. Street segments observed are listed below in Figure 28.

Figure 3 summarizes the quarter-mile and half-mile walkshed and indicates street segment and walkshed survey sites. The majority of data were collected within the quarter-mile service area.

Overall, the aesthetics of the Springfield Station walkshed were observed as "uninviting" or "okay," (55 percent) and amenities included trash receptacles, benches, and planters. The most unpleasant element for the pedestrian experience was traffic (36.36 percent) followed by atmosphere, view, safety, and noise. The biggest improvement to be made is a buffer between the sidewalk and the street. The average building height in the walkshed is 1.4 floors, and there is an average of 4.8 buildings on both sides.

Street Segments
South A Street and 6th Street
6th Street and A Street
Main Street and 7th Street
Main Street and 6th Street
South A Street and 5th Street

FIG. 28
Springfield Station Walkshed Street Segments Observed

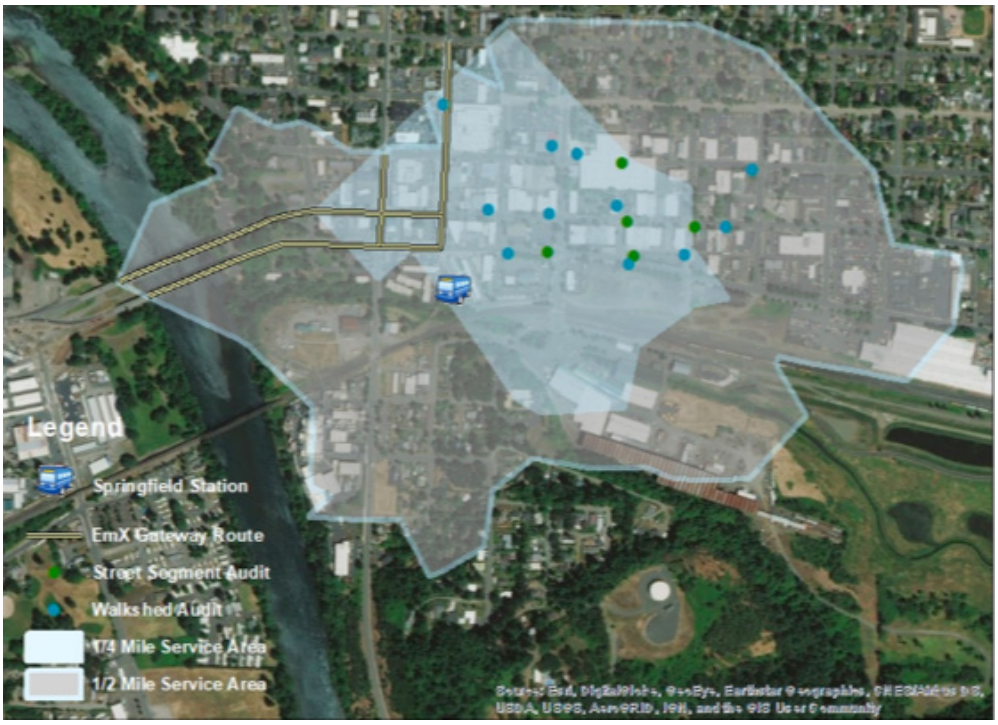


FIG. 29
Springfield Station Walkshed Summary

Aesthetics of Walkshed	Most Unpleasant for Pedestrian Experience
Uninviting or OK: 55%	Traffic: 36%
Comfortable: 18%	Atmosphere: 18%
Pleasant or Good: 18%	View: 18%
	Safety: 18%
	Noise: 9%

FIG. 30
Springfield Station's Walkshed Aesthetics and Pedestrian Experience

Type of Improvements	Percentage of Walkshed
Buffer from Street	38%
Regulated Crosswalk	19%
Shade Trees	19%
Other (Benches or Speed Reduction)	19%
Wider Sidewalks	6%

FIG. 31
Improvements Needed for Springfield Station's Walkshed

The ease of access for wheelchairs within the study area is inconsistent, with observations noting inconvenient wheelchair accessibility, some areas with difficult or dangerous access for wheelchairs, and others designed to facilitate wheelchair access. Additionally, the ADA conditions present include well-placed curb cuts, eight feet of distance between vehicles, and tactile pavement. It is also important to note that there are inconsistencies in visual aids for street crossings.

Throughout the walkshed, there is typically continuous sidewalk on both sides with no obstacles (only minor obstacles were observed) and a minimum path width of three feet. The street segment intersections are mainly modulated by stoplights and include clearly marked crosswalks. There is equal distribution of buffer types, including no buffer from roadway and greater than four feet as a buffer. People were observed mainly driving above the speed limit, which poses a safety concern for pedestrians.

Transportation Connectivity
Springfield Station is noted as being a hub for bike connectivity and access, as shown in Figure 5. However, when the project team observed bike infrastructure and characteristics, there were discrepancies between what was "advertised" and what was actually present. The station lacks clearly marked bike lanes (No bike likes marked: +75 percent) and continuous bike lanes are also largely absent.

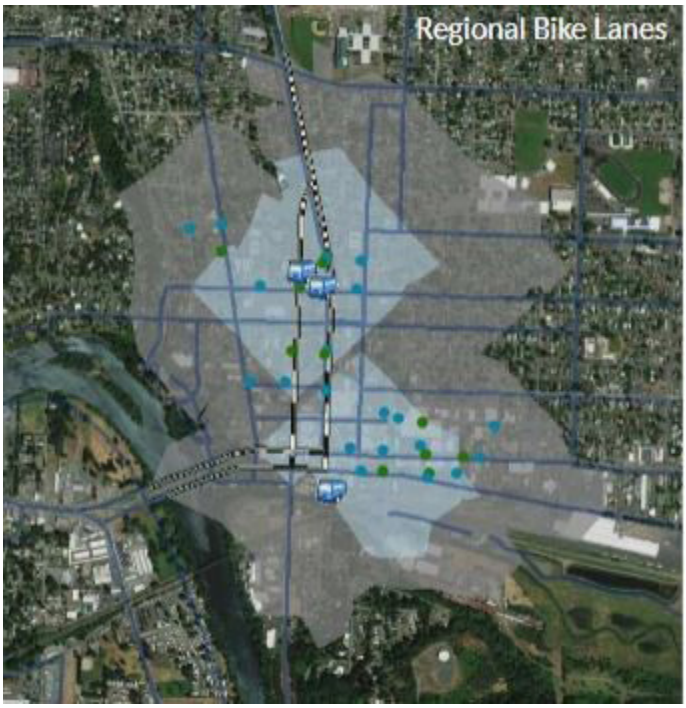


FIG. 32
Regional Bike Lanes

E STREET AND F STREET STATIONS

For E and F Street Stations, the on-site observation survey included six street segments. Street segments observed are listed below in Figure 33.

Street Segment Names
F Street and Pioneer Parkway East
E Street and Pioneer Parkway East
C Street and Pioneer Parkway East
E Street and Pioneer Parkway West
Mill Street and F Street
C Street and Pioneer Parkway West

FIG. 33
E and F Street Stations Walkshed Street Segments Observed

Figure 4 summarizes the quarter-mile and half-mile walkshed and indicates street segment and walkshed survey sites. The majority of data were collected within the quarter-mile service area.

Within the E and F Street walkshed, the aesthetics were equally "comfortable" (36.36 percent) and "uninviting or okay" (36.36 percent). The most unpleasant element for pedestrian experience is traffic (36.36 percent), followed by walking surface, noise, lack of shade, and atmosphere. The highest priority for improvements to the pedestrian experience is regulated crosswalks (40 percent), followed by wider sidewalks, shade trees, buffer, having sidewalks, and more activity. The average height of buildings in this walkshed is 1.33 stories, and the average number of buildings is 2.67. The majority of this walkshed was wheelchair accessible but was missing universal design elements or presented difficult or dangerous conditions for wheelchair access.

FIG. 34
E and F Street Stations Walkshed Summary

Aesthetics of Walkshed	Most Unpleasant for Pedestrian Experience
Uninviting or OK: 36%	Traffic: 36%
Comfortable: 36%	Walking Surface: 27%
Good or Pleasant: 27%	Noise: 18%
	Lack of Shade: 9%
	Atmosphere: 9%

FIG. 35
E Street's and F Street's Walkshed Aesthetics and Pedestrian Experience

Type of Improvement	Percentage of Walkshed
Regulated Crosswalks	40%
Improved Sidewalks	27%
Shade Trees	14%
Buffer	14%
Other (Activity)	5%

FIG. 36
Improvements Needed for E Street and F Street Stations' Walkshed

The ADA conditions at these stations included well-placed curb cuts, eight feet of distance between vehicular and pedestrian traffic, and tactile paving. Some areas were observed with no curb cuts, unpaved sections, and some poorly-placed curb cuts. Additionally, the area lacks visual aids for deaf individuals to safely cross the street.

The presence of suitable walking surface in this study included a majority of sidewalks on both sides of the road, but there were some discontinuities accompanied by minor problems. Some areas (16.66 percent) had no permanent sidewalks. Some areas planting strips as buffers, but other areas have no buffer. One hundred percent of individuals were observed driving above the speed limit.

Recommendations

Based on the outlined findings, the project team recommends the following actions for consideration by LTD and partners at the City of Springfield:

- Partner with downtown businesses to encourage transit use. The three stations within this study area are unique due to Springfield Station's concentration of community facilities and high land use mix. This is due to the concentration of commercial entities in the downtown district. Through creative partnership with these businesses, LTD can improve ridership to and from these destinations.

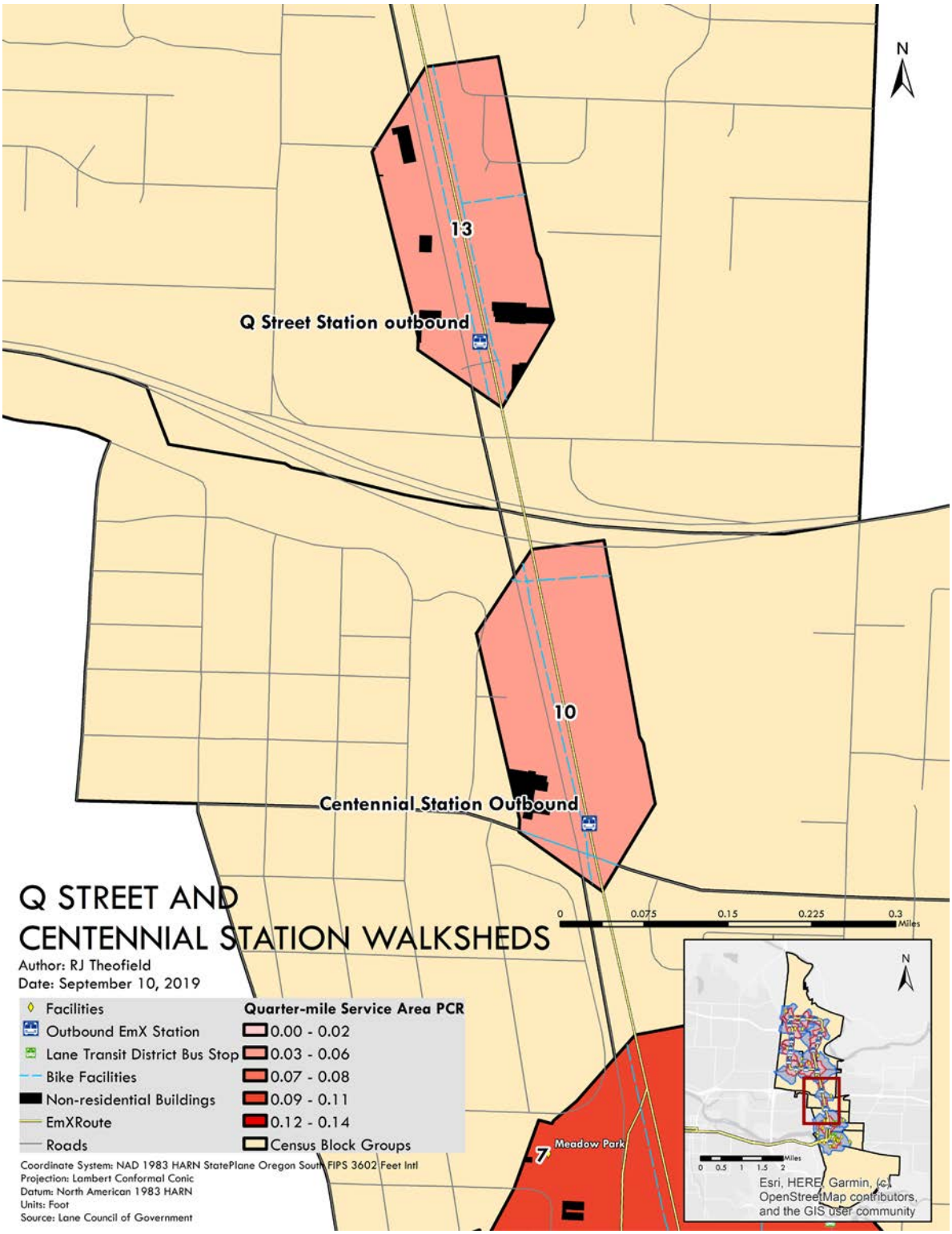
- Promote multi-modal connectivity by leveraging nearby regional bike routes and improved bike infrastructure. LTD can encourage transit ridership by improving first-mile/last-mile connections through active transportation options. This multi-modal approach to transit is in line with LTD's stated values and the proximity of bike lanes and routes in the area. The three study area stations are in close proximity to regional bike routes along the Willamette River, through Island Park, and to the Dorris Ranch open space. By including wayfinding signage and improving bike infrastructure on buses and at stations, more riders may consider linking transit with alternative transportation in a more connected area.

- Improve pedestrian safety and appeal. While the EmX stations in the study area are of high quality and maintain significant amenities, the pedestrian experience within the service areas is variable. LTD can specifically improve the pedestrian experience in two locations: 1) the crossing between Springfield Station and the downtown district along South A Street, and 2) crosswalks and sidewalks near E and F Street Stations that require more continuity and ADA accessibility. By targeting these two areas, residents may feel more confident walking and using wheelchairs to and from the transit stops.

Centennial and Q Street Stations

This section presents the findings for Centennial and Q Street Stations. It is organized by unit of analysis and individual station, when appropriate.

FIG. 37
Centennial and Q Street Station Locations



STATIONS

This subsection outlines key findings for the station audits conducted at Centennial and Q Street Stations. Overall, students found Centennial and Q Street stations to be very well-designed, comfortable, and accessible. However, the station is located in the middle of Pioneer Parkway, a noisy street with heavy traffic and poor pedestrian and bike connectivity outside of the infrastructure provided by the station itself. The amenities listed in Figure 38 below are present at both Centennial and Q Street Station.

Amenities Present
Shelter (16 ft. height)
Trash receptacles
Artwork element
Lighting fixture
Free-standing benches
Bike racks
Trees and landscaping
ADA waiting area/ramps
Route map
Schedules information,
Ticket vending machine

FIG. 38
Station Amenities Present at Centennial and Q Street Stations

FIG. 39
Centennial Station
Looking North

FIG. 40
Q Street Station
Looking North

STATION WALKSHEDS

A summary of both stations' walkshed land use characteristics is provided below in Figure 41.

Land Use Characteristics	Centennial	Q Street
Land use mix entropy	0.64	0.58
Commercial	20 parcels	2 parcels
Residential	16 parcels	23 parcels
Industrial	5 parcels	4 parcels
Total acreage	37 acres	10 acres

FIG. 41
Centennial Station Looking North

CENTENNIAL STATION

Facilities at Centennial Station include a shopping center and a health care facility. It has 10,524 feet of bike facilities, mostly in the Rosa Parks Path that goes down the center of Pioneer Parkway and as bike lanes on Centennial Boulevard. However, the pedestrian catchment ratio is 0.04, indicating that this walkshed almost is very poorly connected. There is one LTD bus stop on Centennial Boulevard to the west of this station, but it is on the edge of the quarter-mile walkshed. The percent of households with no vehicle range from 4 percent to 17 percent in the census block groups that intersect this walkshed. A significant amount of people do not have access to a car, and the poor connectivity of this area indicates that they are not being adequately served.

On Pioneer Parkway, a path going down the middle of the road provides north-south access to pedestrians and bikes traveling along the road, but there are no sidewalks along the side of the street or crosswalks for more than a quarter mile. This means that users of the EmX Gateway must walk well over a quarter mile if they are to reach any destination from this station.

Q STREET STATION

Facilities include shopping areas along Q Street. There are 6,803 feet of bike facilities, all of which are along the Rosa Parks Path. There is no connectivity by bike to areas along Pioneer Parkway because there are no bike lanes on the road and no bike lanes at the nearest intersection in the walkshed. The PCR is 0.01, which is even lower than the Centennial Station walkshed. There are no connecting bus stops, and the no-vehicle households range from 10 percent to 14 percent.

Street Segments

The segment of street between the two walksheds of Centennial Station and Q Street Station is defined by an exit ramp and entrance ramp onto Highway 126. It has a very heavy concentration of vehicle traffic and goes under an overpass. There is a bike path on the

FIG. 42
Intersection between Centennial and Q Street Station

west side, the By-Gully Bike Path, which ends abruptly at Pioneer Parkway. This street segment is one of the least desirable places to be a pedestrian, with nowhere to go in the immediate vicinity but north to the Q Street Station Walkshed or south to the Centennial Station Walkshed.

Recommendations

Both stations' walksheds have very poor connectivity. There is a path giving pedestrians and bicyclists a way to go north and south indefinitely but no connections to adjacent neighborhoods or facilities along the street. Sidewalks are absent and there is often no way to get to a neighborhood without going more than a quarter mile north or south to the nearest large intersection. These areas are designed for cars, not people.

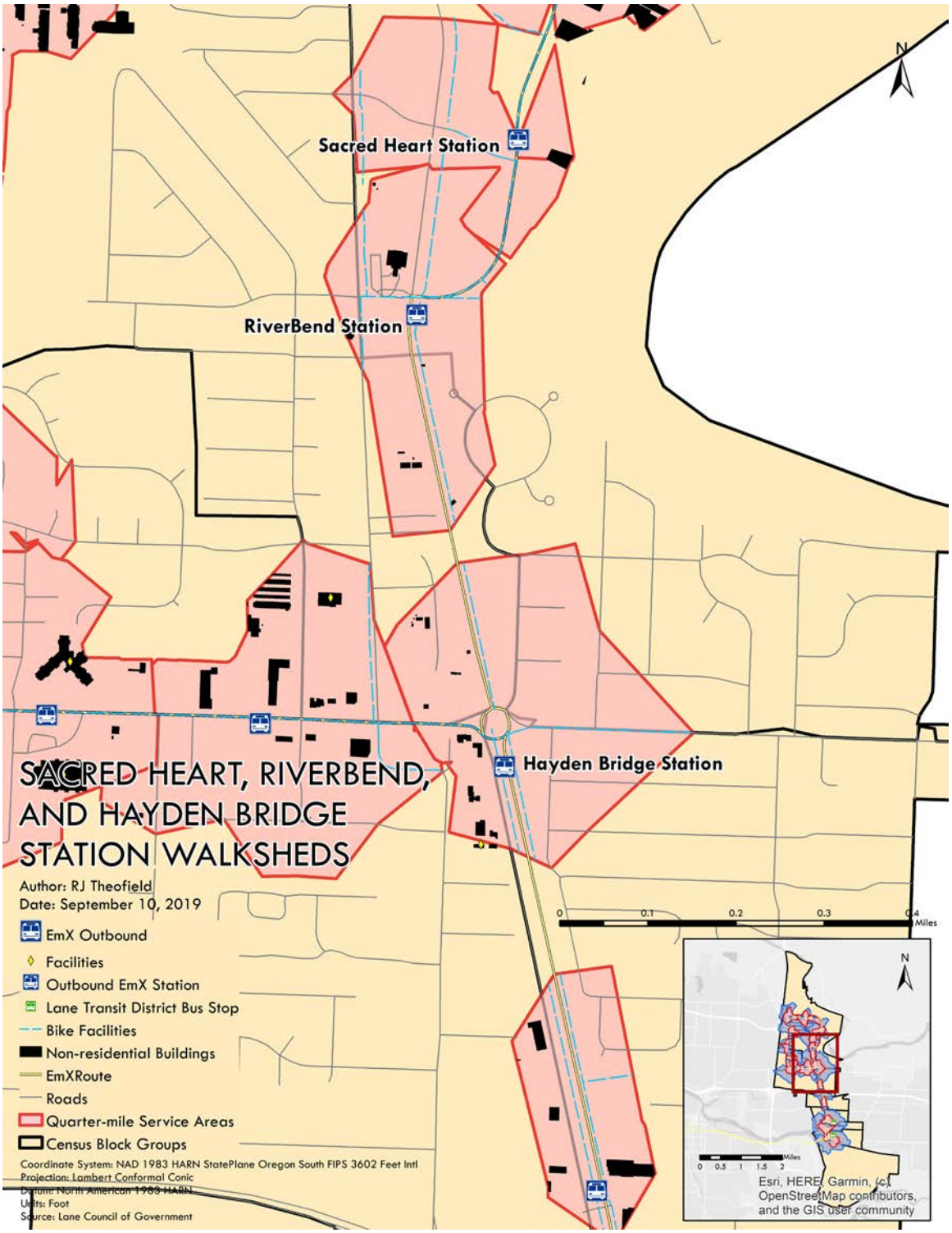
To improve the walksheds, adding sidewalks to Pioneer Parkway would give pedestrians access to locations along the street, and more frequent crosswalks along the Rosa Parks Path would give users of the path access to adjacent neighborhoods.

In the street segment, the By-Gully Bike Path could be extended to the other side of Pioneer Parkway to continue along Highway 126, giving pedestrians and bicyclists a separate route east from this area. This area could also benefit from improvements to the crosswalk at Pioneer Parkway and the Highway 126 entry/exit routes. Potential conflict zones with bikes and cars could be painted green to improve visibility where bikes cross from the By-Gully Path and from the Rosa Parks Path. In addition, introducing traffic calming features could lower speeds and increase the safety of users of the EmX line.

Hayden Bridge, Riverbend, and Sacred Heart Stations

FIG. 43
Hayden Bridge, Riverbend, and Sacred Heart Stations

This section presents the findings for Hayden Bridge, Riverbend, and Sacred Heart Stations. It is organized by unit of analysis and individual station, when appropriate.



STATIONS

This subsection outlines key findings for the station audits conducted at Hayden Bridge, Riverbend, and Sacred Heart Stations.

Hayden Bridge Station

Hayden Bridge Station is similar to other other EmX Gateway Corridor stations and is in generally good condition. The station features several important amenities. The station's protected seating is appropriate for the weather and climate of Oregon. Its electronic display is beneficial to riders because it allows them to know when to expect their bus. Further, ADA accessible sidewalks provide ways for people with disabilities to easily travel to, onto, and from the bus.

Nevertheless, station improvements could enhance the rider experience. For example, seating comfort could be improved. There are only two benches at the station, which allows four people to sit. It might make sense to add back rests for these benches so that the station is a more comfortable place to wait and sit. Additionally, bicycle facilities are rudimentary and do not offer sufficient protection. As previously mentioned, the station is on a main road, Pioneer Parkway, which greatly impacts the comfort of the station. Cars travel at high speeds that result in high traffic noise and pollution. A consideration might be to have part of the station indoors. This would provide protection from the sound as well as from the weather on inclement days.

Riverbend and Sacred Heart Stations

Both the clockwise and counterclockwise Riverbend stations are located at the intersection of Martin Luther King, Jr. Parkway and Riverbend Drive. Sacred Heart Station is located within the median along Riverbend Drive. Stations were clean and possessed the amenities shown in Figure 44 below.

Amenities Present
Shelter (16 ft. height)
Trash receptacles
Artwork element
Lighting fixture
Free-standing benches
Bike racks
Trees and landscaping
ADA waiting area/ramps
Route map
Schedules information,
Ticket vending machine

FIG. 44
Station Amenities Present at Riverbend and Sacred Heart Stations

STATION WALKSHEDS

This subsection outlines key findings for the analysis of station walksheds at Hayden Bridge, Riverbend, and Sacred Heart Stations.

Hayden Bridge Station

The Hayden Bridge Station is the fifth station for riders departing the downtown Springfield Station. It is easily identifiable by the bright red sculpture that is adjacent to it. The walkshed for the station has an entropy of 0.60 and has 455 residential parcels and 112 acres of residential land. This means that the walkshed is not very diverse, even when compared to the other homogenous walksheds along the corridor. Both of the residential statistics for the Hayden Bridge walkshed are the highest among all of the Gateway Corridor walksheds. The station serves two parks, one of which is near the northern part of the

FIG. 45

Hayden Bridge Station, half-mile Pedestrian Catchment Area

walkshed and the other is to the south. There is also an assisted living center on the western edge of the walkshed.

The station falls on Pioneer Parkway, which is a major road in Springfield. A roundabout with crosswalks helps to combat high travel speeds. When riders depart these stations, they must use the roundabout crosswalks to get to their final destinations. To the east of the station, the service area is split by Hayden Bridge Way with notably different neighborhoods on each side.

Spatial analysis revealed that the pedestrian catchment ratio (PCR) is 0.12 in quarter mile and 0.10 in the half mile. Considering that PCR ratios above 0.5 are considered to be desirable, the PCRs in the Hayden Bridge walkshed are cause for concern. The PCRs indicate that there is very low connectivity in the area, especially towards the western side of the station. However, when comparing the half-mile PCR to the other walksheds along the corridor, the station is the second highest out of 17. The highest is the Springfield Station walkshed, which has a PCR of 0.12. This means that an ideal PCR of 0.5 or even 0.6 is an unfair comparison.

As identified in the PCR, the walkshed is one of the largest along the Gateway Corridor. This is due to the connectivity in the "North" and "South" neighborhoods split by Hayden Bridge Way. The "North" neighborhood has limited sidewalks but aesthetically pleasing landscaping. The "South" neighborhood has sidewalks on both sides of the street throughout the neighborhood but has a less appealing look. Both neighborhoods are clearly auto-centric, and the GIS class observed only two pedestrians during the walkshed review.

Safety in the walkshed could be improved by adding more pedestrian infrastructure like street lighting. For accessibility purposes, it would be a challenge for an individual to move around with a wheelchair because of the inconvenient curb cuts. The connectivity of the western part of the walkshed was lower in comparison to the east, and there could also be improved connections from Pioneer Parkway itself.

Note: The two parks in the walkshed were not observed during the analysis.

Riverbend Station

The quarter-mile pedestrian catchment area (PCA) is made up primarily of residential lots. There are no facilities within the quarter-mile service area for the Riverbend station. A health clinic is the only commercial destination. The PCR of the quarter-mile service area is 0.09, which is significantly lower than the 0.5 to 0.6 that is described as the minimum for a walkable area. The quarter-mile service area may not accurately reflect pedestrian and cyclist accessibility due to streets within the service area being closed to foot access.

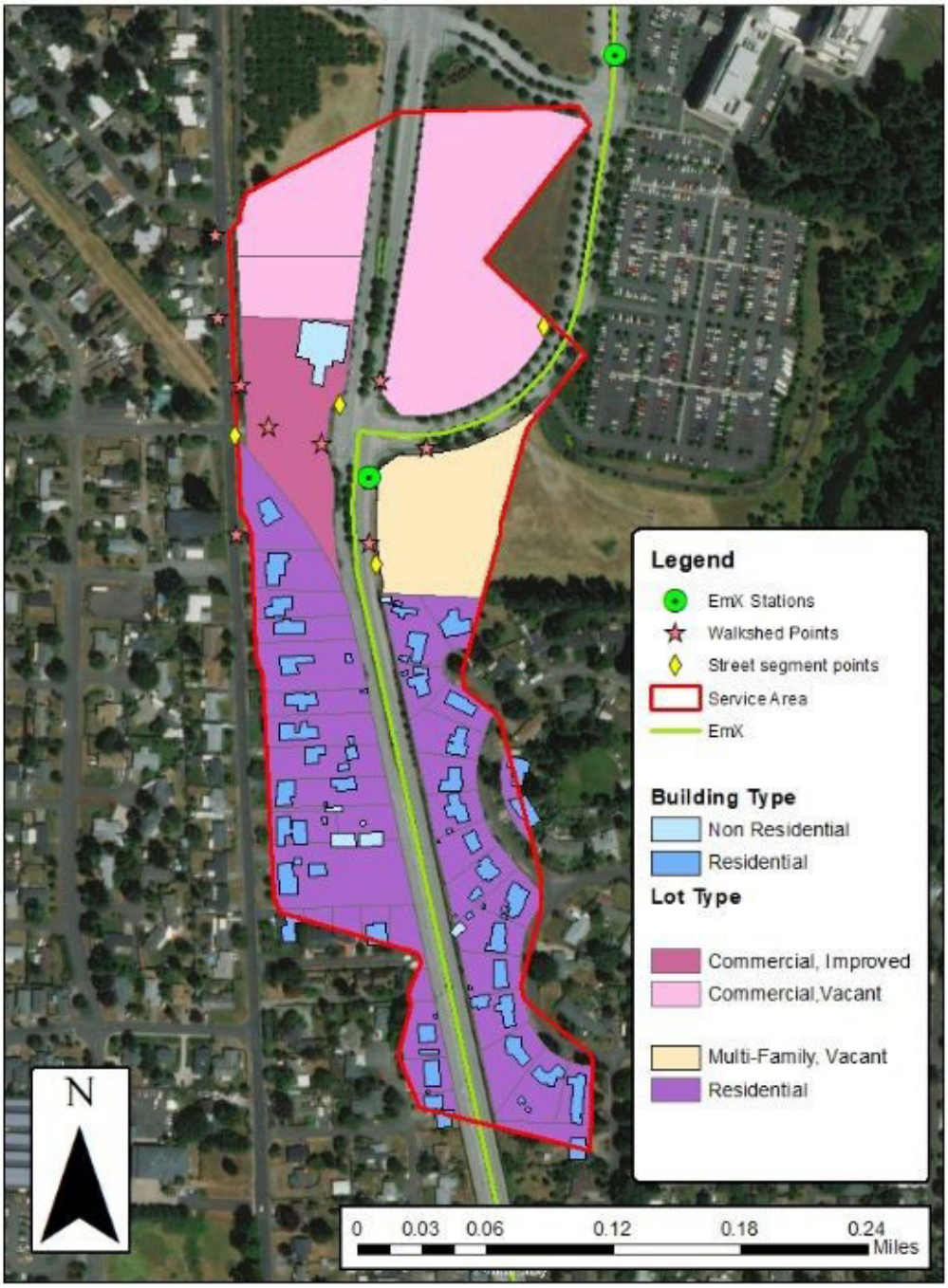
The half-mile PCA is almost the same as the quarter-mile. Due to an increase in total area but little increase in catchment area, the PCR goes down to 0.02. The half-mile land use mix is similar to the quarter-mile catchment area. There are 42 residential parcels, but the two commercial lots in the area make up over half of the total land. There are 20 acres of residential land and 24 acres of commercial land. The land mix entropy for this service area is 0.84, which suggests a fair mix of land uses. Note that entropy calculates land distribution by area. Because the acreage is similar, the entropy is high,

but the number of parcels steeply differs.

From the observations and collection of data points, we found that a large portion of the land accessing the station is undeveloped. There is also only one commercial destination in the service area and the rest is residential.

In the service area, there were a few safe walking and biking paths. These paths were completely separated from traffic with trees and other greenery in the landscaping strip. The paths had lighting, and the landscaping strip provided a significant distance from the street. To the east, there was also a sidewalk with a landscaping strip with

FIG. 46
Riverbend Station, half-mile Pedestrian Catchment Area



trees, lighting, and a bike lane that was part of the right-of-way. Everywhere else there was no sidewalk, bike lane, or any path along the roadway. All of the roads in the service area have a higher speed limit (35 to 45 miles per hour) that created an unsafe place for pedestrians and cyclists. The EmX stations were close enough to these streets that waiting at the station feels unsafe due to the speed of cars.

The protected paths for pedestrians and cyclists provide the only safe space for people near the station, yet they are disconnected from destinations. The streets that do connect to destinations such as houses are not suitable for non-car travel.

Another concern is connectivity to neighborhoods. There is no crosswalk or safe way of accessing the neighborhood at Game Farm Road and Mallard Avenue. The neighborhood to the south surrounding Robin Park is separated by a large wall, which prevents access entirely.

The intersection of Riverbend Drive and Martin Luther King, Jr. Parkway prioritizes throughput and had significant wait times for bike and pedestrian access.

Sacred Heart Station

The PeaceHealth Sacred Heart Riverbend Hospital is located 0.2 miles from the counterclockwise station and is the only facility within the PCA. Large lots of land lie between Game Farm Road and Martin Luther King, Jr. Parkway. The area has the second lowest calculated PCR at 0.07, meaning the area is not well connected, accessible, or walkable, and therefore not suitable for pedestrians.

Similar to the quarter-mile PCA, the half-mile PCA does not include the nearby PeaceHealth Sacred Heart Riverbend Hospital. The area does have a higher PCR for the half-mile PCA at 0.05, though this still qualifies the area as not well connected, accessible, or walkable.

The half-mile PCA was used to analyze land use mix and entropy. The area boasts a 0.51 land use mix entropy, giving the area about an average land use mix. The land use mix entropy analysis yielded 142 residential parcels and nearly 30 acres of residential parcels. An additional 10 parcels were deemed vacant (32 acres) and other (30 acres), four were deemed commercial (28 acres) taking into account the fact that sections of the PCA are adjacent to or intersect the hospital, and zero were deemed industrial. A church is also located within the area.

The quarter-mile PCA is largely vacant. The area consists of open fields between Game Farm Road and Riverbend Drive and sections for the north and south hospital parking lots. A power plant is also within the area. Pavilion Station on the north end of Riverbend Drive is also very close and nearly within the northern section of the quarter-mile PCA. As noted above, no facilities lie within the area.

The area along Riverbend Drive is quiet and calm, with ADA accessibility to the station as well as along sidewalks on both sides of the street. The intersections are smaller, allowing pedestrians to have enough time to safely cross the stop-sign-modulated intersection at Riverbend Drive and Cardinal Way, and speeds are slower at 25 miles per hour, and traffic noise does not create an issue here. Greenery around the station and overall area was welcoming. The only destination in the area, the hospital, is well-connected with sidewalks and bike lanes on both sides of the road. The area also feels safe and walkable given lower speeds and smaller intersections.

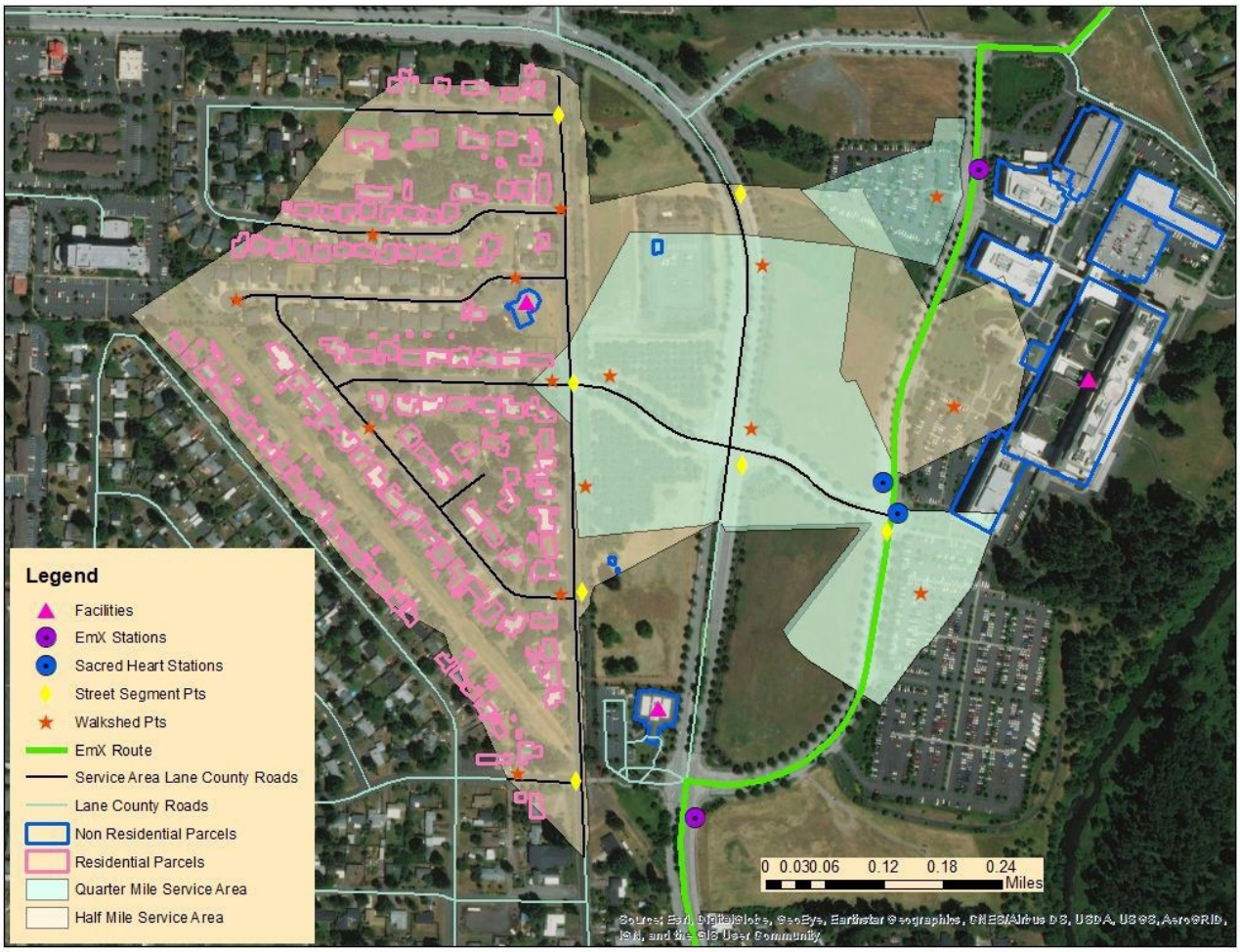


FIG. 47
Sacred Heart Station, quarter- and half-mile Pedestrian Catchment Areas

Further down Martin Luther King, Jr. Parkway and Cardinal Way (also within the half-mile PCA, but this is the only major intersection within the quarter-mile PCA) speeds are faster at 45 miles per hour, and the area is highly unwalkable. Bike lanes are disconnected on both sides of the road leading into the intersection, and a sidewalk is only available on one side of Martin Luther King, Jr. Parkway (though it is buffered). The major intersection modulated by a stop light did not have audible cues. The area felt generally unsafe, disconnected, and not very walkable.

The above descriptions of the Riverbend Drive and Martin Luther King, Jr. Parkway and Cardinal Way intersections apply within the half-mile PCA as well. The residential neighborhood, which takes up most of this PCA, was also found to be highly unwalkable due to the lack of sidewalks in the area. A trail along Game Farm Road is only accessible on one side of the road, though this sidewalk is well-buffered from the road by greenery. Many crossings are either unmodulated or modulated by stop signs. Speeds are 35 miles per hour in the area with no designated bike lanes.

SUMMARY & DISCUSSION

Land Use Mix and Destinations

The area has an average mix of land uses, but the area lacks destinations for EmX riders. With EmX ridership low, it is important to identify ways to make the service useful and attractive for present and potential commuters.

Sacred Heart Station Parcels, Facilities, and PCR					
Station	Residential	Facilities	¼ PCR	½ PCR	Entropy
Sacred Heart	142	1	0.065	0.046	0.5115

STREET SEGMENTS

Overall, the street segments could benefit from improvements that encourage walkability and bicycle access. The main street segments that are near the station are Pioneer Parkway, Hayden Bridge Way, and Harlow Road. These arterial streets combine at a busy roundabout. Despite the traffic at the roundabout, there are many visual cues for pedestrians to safely cross. Even though motorists travel at a high speed towards the roundabout, flashing lights make for a sufficient warning system that tells motorists to be alert to the presence of pedestrians. However, an existing crosswalk was removed from Hayden Bridge Way, limiting connectivity and safety for pedestrians.

Opportunities exists for more robust bike infrastructure along the street sections. The bike lanes on the main roads are unprotected, and no cyclists were present during the GIS class's visit to the station. This area may have low demand for cycling due to the low density.

The area lacks signage indicating that a bus station is nearby. The visible signage is at the station itself. An increase in wayfinding signage within the neighborhoods may increase awareness of the bus station and therefore increase ridership.

FIG. 48

RECOMMENDATIONS

The recommendations for the stations reviewed in this subsection are organized by station.

Hayden Bridge Station

The following recommendations are made for the Hayden Bridge Station:

- Remove or eliminate bicycle parking at the station: There are currently three spots to park a bicycle at the Hayden Bridge Station. If a rider chooses to park their bicycle there, they have to leave it unattended (presumably locked) while going on their journey. In the analysis, visual surveillance features were not identified, which means that there is poor security for the bike racks. Adding a security guard would not be a better solution because that could discourage ridership by vulnerable populations. The bike racks take up valuable real estate within the station, and the area could be put to better use. An alternative solution is to expand the number of bicycles

that can be transported on the EmX coaches from the current maximum of three.

- Improve connectivity to the "South" walkshed area: The "South" neighborhood has connected sidewalks throughout its entirety. The density of homes is higher than the neighborhood north of Hayden Bridge Way and makes for a better target for the BRT. There could be better access points along Pioneer Parkway in order to reach this neighborhood. In the current state, residents can only reach the station by crossing at the roundabout.

- Improve connectivity to the assisted living center: Similar to the issues in the "South" neighborhood, the assisted living center could have better access to the EmX. Currently, the walking route is significantly longer than the actual distance between the station and the center. A possible improvement may be to add a sidewalk that runs along the east side of Pioneer Parkway, similar to the sidewalk on the west side.

- Encourage the City of Springfield to continue to improve pedestrian elements such as street lighting, additional seating, increased density, added signage, etc.: It is important to acknowledge that many of the observations are within LTD's jurisdiction. However, LTD can work with the City by being a part of the conversation when making policy decisions regarding the pedestrian experience. Some of the pedestrian changes, such as improving signange and adding seats along sidewalks, are lighter, quicker, and cheaper than other changes such as increasing building density and adding destinations.

Riverbend

The EmX stations at Riverbend are comfortable and have all of the necessary amenities for a comfortable wait. The surrounding area, however, has fast moving cars that are likely to exceed the stress tolerance of many riders. For the neighborhoods within the service area, poor connectivity makes accessing the station unsafe at best, and at worst, completely impossible.

Data collected on the Riverbend Station show that it is a primarily residential area with very poor pedestrian connectivity and few destinations. The acreage of different land uses is fairly even, generating entropy despite the stark difference in the number of parcels.

Riverbend Station could benefit from consideration of the following recommendations:

- Put in crosswalks at Game Farm Road and Mallard Avenue

- Look into options for implementing sidewalks in the neighborhoods

- Prioritize lights at Martin Luther King, Jr. Parkway and Riverbend Drive for pedestrians and cyclists

- Create paths so neighborhoods to the south can access the station

- Implement traffic calming measures on Martin Luther King, Jr. Parkway for increased pedestrian and cyclist comfort

- Develop vacant lots near the station to bring activity into the area

Sacred Heart Station

The greatest areas for improvement in the PCA of Sacred Heart Station are connectivity and, in turn, safety. The next priorities are accessibility and increasing destinations in the area.

LTD could encourage the following from the City of Springfield:

- Improve connectivity of sidewalks along Martin Luther King, Jr. Parkway and Game Farm Road
- Improve connectivity of bike lanes along Martin Luther King, Jr. Parkway and Game Farm Road
- Revitalize lots identified in the quarter-mile PCA findings to potentially create a sense of place in the area

The implementation of more connected sidewalks and bike lanes can create a sense of safety for pedestrians and cyclists from knowing they will not have to potentially cross an unsafe intersection or have to use a side of the road without a sidewalk or bike lane to get to a destination.

To create a greater sense of place and more destinations in the PCA of Sacred Heart, revitalizing the lots between Game Farm Road and Riverbend Drive could increase ridership to the area. The lots are currently zoned mixed-use commercial.[1]

Connecting more sidewalks and bike lanes to current and potential destinations could increase safety, connectivity, accessibility, and walkability of the walkshed and street segments within it.

Pavilion and International Way East Stations

This section presents the findings for Pavilion and International Way East stations. It is organized by unit of analysis and individual station, when appropriate.

STATIONS

This subsection outlines key findings for the station audits conducted at Pavilion and International Way East Stations.

Pavilion Station

The Pavilion Station is relatively well-connected to the surrounding area, and the prevalence of bike infrastructure makes it accessible by bike. However, the neighborhoods to the west of the station are home to older and sometimes disabled residents. This makes the half-mile journey to the EmX station too much of a burden for many. The large loop in the middle of the area also creates a long walking distance from housing to transit that could be shorter. This walk also involves crossing a 45-mph road that does not have audio or visual cues for motorists or pedestrians. These are the biggest factors that are currently contributing to low ridership at Pavilion Station.

FIG. 49
Major Findings for Pavilion Station

	Pros	Cons
Safety	Motion activated audio/visual cues at crosswalk	Road design encourages fast driving
	Different materials and colors communicate beginning/end of platform	Few signs indicating road speed
	Generous signage	
	Well lit	
	Clearly marked crosswalk	
Amenities	Benches, trash cans, maps, tickets, rain cover, lights, etc.	Lack of art and place making features

International Way East Station

The international Way East Station is attractive, featuring a contemporary design. The station is erected in the middle of a large street, providing station access to buses traveling in either direction simultaneously. There are several places for sitting and leaning, ADA access is high and unencumbered by obstructions. A touch of landscaping and splash of artistic details are incorporated in the design of the station.

Perhaps the most eye-catching item is the motion-activated crossing system. When a pedestrian crosses between the two white devices located on both sides of the street and at the station, several automated processes are triggered: lights on the pedestrian crossing signs are activated to alert drivers to the crossing, and audio and visual cues begin that accommodate those with certain disabilities.

STATION WALKSHEDS

Even though these two service areas are adjacent to one another, they have very different distributions of land use. With no residential parcels and the same number of vacant parcels as industrial, International Way East has no real destinations for users to ride to except work. Residents who do not live next to an EmX line are likely to drive to work. This is a major factor contributing to the low ridership here. Pavilion Station has a much higher entropy level (0.77) compared to International Station (0.29). While there are not any destinations as defined by LCOG, the higher entropy level gives Pavilion Station a higher likelihood of attracting riders.

Pavilion Walkshed

The following are key findings for the Pavilion Station walkshed:

- All streets have sidewalks, bike lanes, or bike paths
- Lacking benches, trash cans, pleasing aesthetics
- Low connectivity of street pattern reduces accessibility
  - Residential parcels are in sandwiched between commercial/ industrial
  - A loop must be made to access housing from Pavilion Station
- Intersections at Martin Luther King, Jr. Parkway/Beltline Road are large and lack safety features found at EmX
- Connections to other stations are adequate, but not to other destinations
- No facilities or destinations within walkshed

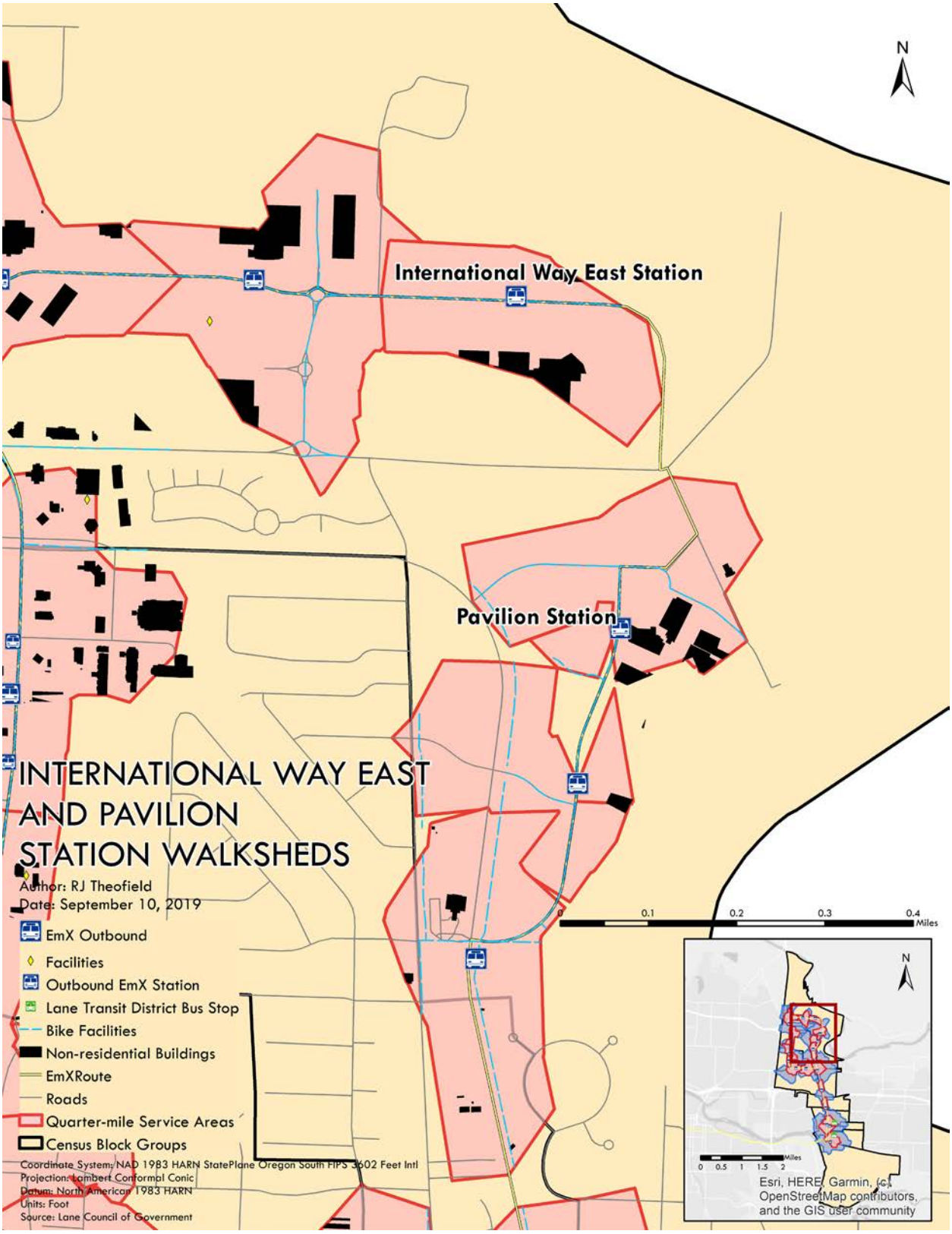


FIG. 50
Pavilion Station Walkshed

International Way East Station Walkshed

FIG. 51
International Way East Station

Safety	Walkshed	
	Sidewalks: Walkability	Sidewalks: Accessibility
The median station is modern and attractive	Long	Low PCR 0.015
Audio and visual street crossing cues	Well maintained	Little land use variation
Feels safe and comfortable, but isolated	Attractive landscaping	Few destinations

FIG. 52
Findings for International Way East Station

RECOMMENDATIONS

These stations, like all EmX stations, are attractively built and possess all the amenities that one would expect or need in a transit station. Buses are generally on time and can get riders anywhere on the line in under 30 minutes. The major issue at these stations is the surrounding land use in the Gateway area. Analysis of the two stations reveals that there are no places for people to ride to for shopping, recreation, food, or uses other than employment. The surplus of surface parking lots further encourages people to drive to work rather than utilizing the EmX. Because LTD cannot influence private development, it is a waiting game until the rest of the vacant land gets filled in, ideally with mixed-use development to foster an area that supports both housing and jobs.

There are a few features within the half-mile study area that make the area walkable and bikeable, but fundamental elements of land use, urban design, and isolation limit ridership at these stations to those employed in the area. Furthermore, vacant fields and large parking lots contribute to pedestrian networks with few route options and longer distances for pedestrians to have to travel. This service area has the lowest PCR of all the service areas, reflecting the fact only one road intersects the study area. However, the area is a very inviting place to walk, run and even to bike thanks to long bike lanes on several nearby streets. International Way, which does not have a bike lane, may still be attractive to some cyclists.

Though this study area is isolated from many destinations, there are still opportunities to increase ridership. Social programs and events can promote the area and the EmX system to new riders who might not have otherwise known about it. For instance, the area is ideal for fitness fairs, runs and walks, and many other community events that take place on weekends, providing opportunity for outreach. This will bring the most ridership to the EmX Gateway line.

Recommendations for consideration are as follows:

Pavilion Station:

- Bring surrounding intersections to the same level of safety as the station
- Add additional stop near residential housing or swap Pavilion/Sacred Heart Station for a station serving the residential area
- Add station art or features that let the rider know they have “arrived”
- With more development and destinations, more riders will come

International Way East Station:

- Hold family-oriented events on weekends
- Fitness and activity related events
- 5k run
- Food carts during lunch time/work week
- Restaurants and shops at Gateway
- Community events near EmX Gateway line

INTERNATIONAL WAY CENTER AND INTERNATIONAL WAY WEST STATIONS

This section presents the findings for International Way Center and International Way West stations. It is organized by unit of analysis and individual station, when appropriate.

STATIONS

Both International Way Center and International Way WestsStations are well-designed and provide a comfortable environment. The station has a park and ride facility. One

obstacle observed is that a pedestrian crossing sign was blocked, which is a safety issue.

RECOMMENDATIONS

To enhance safety, accessibility, and comfort at both stops, we recommend:

- Relocating crosswalk signs to ensure better visibility and awareness for drivers.
- Additional speed limit sign
- Repainting of crosswalk paint
- Addition of designated lanes for micro-mobility uses
- Traffic calming measures to combat speeding
- Additional lightning and safety measures
- Addition of designated lanes for micro-mobility
- Re-painting of pedestrian crossings
- Re-location of pedestrian crossing signage
- Park and ride awareness

Kruse Way and Postal Way Stations

This section presents the findings for Kruse Way and Postal Way stations. It is organized by unit of analysis and individual station, when appropriate.

STATIONS

This subsection outlines key findings for the station audits conducted Kruse Way and Postal Wayv stations.

Kruse Way Station

Kruse Way Station was clean, well-lit, and, overall, featured well-maintained facilities. However, some aspects present obstacles for users. While it does feature a digital schedule signage, the arrival and departure times were inaccurate. The main challenge is its heavily-trafficked location. Additionally, getting to the station by bike is challenging with disconnected bike lanes and intersections. The oncoming buses were difficult to see because of obstructed visibility.

Postal Way Station

Postal Way Station was overall well-maintained and well-lit. As opposed to Kruse Way Station, Postal Way Station has good visibility of oncoming buses. However, this station suffers from poor ADA accessibility. It also displayed inaccurate information on the digital schedule.

RECOMMENDATIONS:

The following are recommendations for Kruse Way and Postal Way stations:

- Install traffic calming features such as speed bumps or narrowing the street to limit noise pollution.
- Connect bike lanes to bus stations using ramps
- Bump station out into the street so that pedestrians can see approaching buses without stepping into the road.
- Ensure that scheduling projections are accurate and updated.
- Improve crosswalk safety by including pedestrian islands, erecting signage, and providing flashing lights to prompt drivers to stop when a pedestrian is crossing the street.
- Narrow and limit breaks in the sidewalks for driveways and parking lot entrances.
- Ensure that all sidewalks and stations are 100 percent accessible by wheelchairs.
- Broaden side street sidewalks.

Gateway Station

This section presents the findings for Gateway Station. It is organized by unit of analysis.

ANALYSIS (DEMOGRAPHICS)

Population Density

The population density, measured in individuals per acre, varies across the study area. At the high end (blocks three, four, and five) the density measures between seven and 11 individuals per acre. At the low end, blocks one and 12 measure between .6 and 1.1. The two largest blocks in the study area, which cap the north and south ends, have the lowest densities, while the interior census blocks, which are smaller in area, are more densely populated.

Percent of Population below the poverty Level-Households with incomes <$25,100

The distribution of population living below the poverty level varies by about 35 percent throughout the study area. Block 12 has the lowest percentage of households living below the poverty level at 9.6 percent. Block eight has the highest percentage of households living below the poverty level at 44.5 percent. The pattern seen in these data reflects the distribution in household income: the census blocks with the highest proportions of households living below the poverty level are the same blocks with the highest percentages of households earning below $49,999.

Number of Vehicles Owned by Households-Owner occupied

Most of the households in the study area own a car. Blocks two, five, six, 11, and 12 have a 100 percent ownership rate. Block two, which represents the low end, has about a 96 percent ownership rate. More generally, ten of the twelve census blocks have an average of two cars per household. The remaining census blocks have an average of one car per household.

ANALYSIS (*SERVICE AREA)*

Station

The physical condition of the station itself was appealing in its design and maintenance. There were no perceived traffic conflicts between vehicles, buses, pedestrians, and cyclists. One possible improvement to the overall quality of the station would be to add art as a way to improve views.

Unlike the station, the street segments and the encompassing walkshed presented a less satisfactory pedestrian experience. Sixty percent of the data points for the street intersections had no pedestrian amenities. This makes it difficult to move to and from the station and poses a barrier, especially given the proximity to a shopping center where people may be travelling with bags or food. Forty percent of the data points for sidewalks did not connect to destinations. In fact, the most prominent destination, Gateway Shoppes, has minimal connections/access to the bus station along the main road. Most of the businesses do not front the street in this area.

Forty-four percent of the data points taken in the walkshed indicate that the area is uninviting due to noise, traffic, and the overall atmosphere. In terms of safety, 89 percent of the data points indicate that there is either no buffer or that parking space is a buffer between pedestrians and the road. That means that throughout nearly the entire walkshed, pedestrians have no relief from the sense of being adjacent to automobiles. Lastly, 89 percent of the data points indicate a lack of universal design elements (curb cuts, tactile paving, auditory crosswalk cues, etc).

Findings

The following demographic, connectivity, land use, and physical conditions are important to consider when analyzing the quality and effectiveness of this station in serving riders along this portion of the EmX route.

- The service area tends to be lower income
- Median household income is $36,303
- 29.01 percent of population is below poverty level
- Population densities are lower than what would typically support transit
- Population densities range from 1-11 persons per acre
- Most households own 2 cars on average
- 12 percent of households do not own a car
- The service area is not walkable
- The quarter-mile PCR is .06
- The half-mile PCR is .11
- The service area has limited access to facilities
- The half-mile service area only accesses two facilities
- The service area has an equitable distribution of land use
- Gateway Station, Bay A has an above-average entropy of .77
- Gateway Station, Bay A is in good condition
- Overall appealing design and comfort
- No observed traffic conflicts
- The pedestrian experience within the service area is uninviting
- 40 percent of intersection data points indicate that sidewalks do not connect to destinations
- 60 percent of intersection data points indicate that there are no pedestrian amenities
- 44 percent of walkshed data points indicate that the area is uninviting due to noise, traffic, atmosphere, or view

Walkshed

Quarter-Mile Service Area

As seen in Table 1, there are a total of 25 facilities located within all of the stations' quarter-mile service areas. Gateway Station, Bay A only has access to one transportation facility. In comparison, Springfield Station, Bay B has access to a majority of the facilities with a total of 14 covering 12 different types. Table 1 also shows that most stations, with the exception of Springfield Station, Bay B, only have access to one or in some cases zero facilities. This means that most stations, not just Gateway Station, are very limited in their offerings. Individuals would have to make multiple trips in order to reach multiple types of facilities.

As shown in Table 2, the PCR is very low across all of the stations with the highest PCR being .14 at the Springfield Station, Bay B and the Guy Field Station. Comparatively, Gateway Station, Bay A has a PCR of .06. The low PCR values show that within a quarter-mile service area, none of the stations exist in a very walkable area. In fact, the average PCR

for the entire study area is .08. In order to be considered a walkable area while using PCR as an indicator, a value of .5 would have to be reached.

Half-Mile Service Area

As seen in Table 3, when the service area is stretched to a half-mile, the total number of facilities accessible in the overall study area jumps to 42. It is important to note that the increase in service area does not result in a directly proportional increase in facility accessibility: even though this is the case for Gateway Station, Bay A, which services two facilities within a half-mile radius compared to one facility in the quarter-mile service area, Springfield Station, Bay B accesses 19 facilities within a half-mile and 14 within a quarter-mile. In the half-mile service area as well as the quarter-mile service area, most stations are limited in the number of facilities reached, meaning multiple trips have to be taken in order to get to multiple types of facilities.

Additionally, as the service area increases so does the PCR. However, even with the increase in service area, none of the stations' PCR indicate a walkable environment. Gateway Station, Bay A has a PCR of .11, which is below the average PCR for the half mile service area of .13 for the study area. Again, the increase in service area does not result in a directly proportional increase in PCR.

ANALYSIS (*LAND USE MIX ENTROPY*)

As seen in Table 5, Gateway Station, Bay A has a land-use mix entropy of .77, which is higher than the average entropy of .64 for the total study area. It has a fairly even mix of residential (40.4 acres), commercial (32.6 acres), and other (47.7 acres) area. This service area is mostly developed, but the development is generally low-density. The balanced mix of residential, commercial, and other land-uses means that this station is as likely to serve as a destination as much as a starting point for riders.

ANALYSIS (PHYSICAL CONDITION OF STATION)

Street Segments

Summary and Discussion

Gateway Station is located in a service area that comprises a fairly even land use distribution but has a very low pedestrian catchment ratio. This is due to the low street connectivity, and it results in reduced walkability and accessibility to key destinations. Gateway Station is well-maintained with high-quality design and condition but lacks overall comfort and aesthetics within the surrounding area. This includes unsafe street intersections, walksheds with discontinuous sidewalks, and a lack of crosswalks, street buffers, and pedestrian street amenities. There is low sidewalk, street, and bike path connectivity throughout the walkshed, which inhibits utilization of the station. The overall atmosphere, traffic, noise, and view creates an unpleasant environment within the walkshed. The area surrounding the station is dominated by large parking lots and lacks sidewalk connectivity to adjacent destinations.

RECOMMENDATIONS

Gateway Station could be improved by enhancing pedestrian amenities within the intersections and walkshed area. This can include providing seating and trashcans, incorporating universal ADA design elements, and

providing vegetated buffers between sidewalk and traffic. The station could also benefit from improving sidewalk and crosswalk connections to key destinations. Incorporating public art can improve the user experience and provide a sense of place along the corridor. These suggested improvements to the surrounding intersections and walkshed could help transform the EmX into an accessible means of transportation, increase ridership, and enhance the overall rider experience.

Guy Lee and Pheasant Stations

Guy Lee and Pheasant stations are located on the southern end of the Gateway Loop on Harlow Road in Springfield. The PCA for Guy Lee Station is 115 acres while Pheasant Station's is 26 acres.

Facilities located in the catchment area include a park, a school, commercial shopping centers, and a senior care facility. The PCR for Guy Lee Station was 0.32 while Pheasant Station's was 0.29. The land use mix is a combination of residential and commercial uses.

STATION

Overall Guy Lee and Pheasant stations are well-equipped with amenities. However, they are located on a busy road that may pose accessibility and comfort issues for riders. Key amenities include being located within 50 feet of an intersection with auditory signals, shelter cover that provides shade and protection from the elements, benches, and an ADA-accessible ramp. However, the proximity of the bus stop to fast-moving traffic creates air and noise pollution, which might make some riders feel uncomfortable or unsafe when waiting for the EmX. During the field study, it was difficult to maintain an average-volume conversation with others at the stop due to traffic noise.

WALKSHED

Most areas in the catchment area are safe, but proximity to busy streets may cause discomfort for transit riders. Drivers tend to speed along the main corridor. The main street is not very appealing to wait on, even though stations provide primary amenities. This could be problematic especially for the population served by Guy Lee Elementary School, which is within the station's quarter-mile walkshed. Families with young children may walk in the area and use the bus while there. While good ADA access exists along the main street, including crosswalks located near the station, gaps occur in the walkshed area.

The southern side of the Guy Lee walkshed lacks consistent sidewalks, which often results in residents having to walk in the middle of the road. This part of the walkshed is heavily residential, with many families who have children that attend the elementary school nearby. This creates an uncomfortable experience for students to walk as they go to and from school. However, the pedestrian experience is also impacted by the large amount of tree cover, which makes the experience positive for walking without vehicles. Pedestrians can easily see vehicles along the street, but the proximity of pedestrians to cars within the street causes discomfort and can discourage pedestrian use of the area.

The northern side of the Pheasant Station walkshed presents similar issues including a lack of consistent sidewalks once one diverts from Pheasant Boulevard. This includes roads with sidewalks on one side of the road and roads with no sidewalks at all, which is also evident north of Oakdale Avenue.

STREET SEGMENTS

The street connecting these two stations has large sidewalks and bike lanes on both sides, although high-

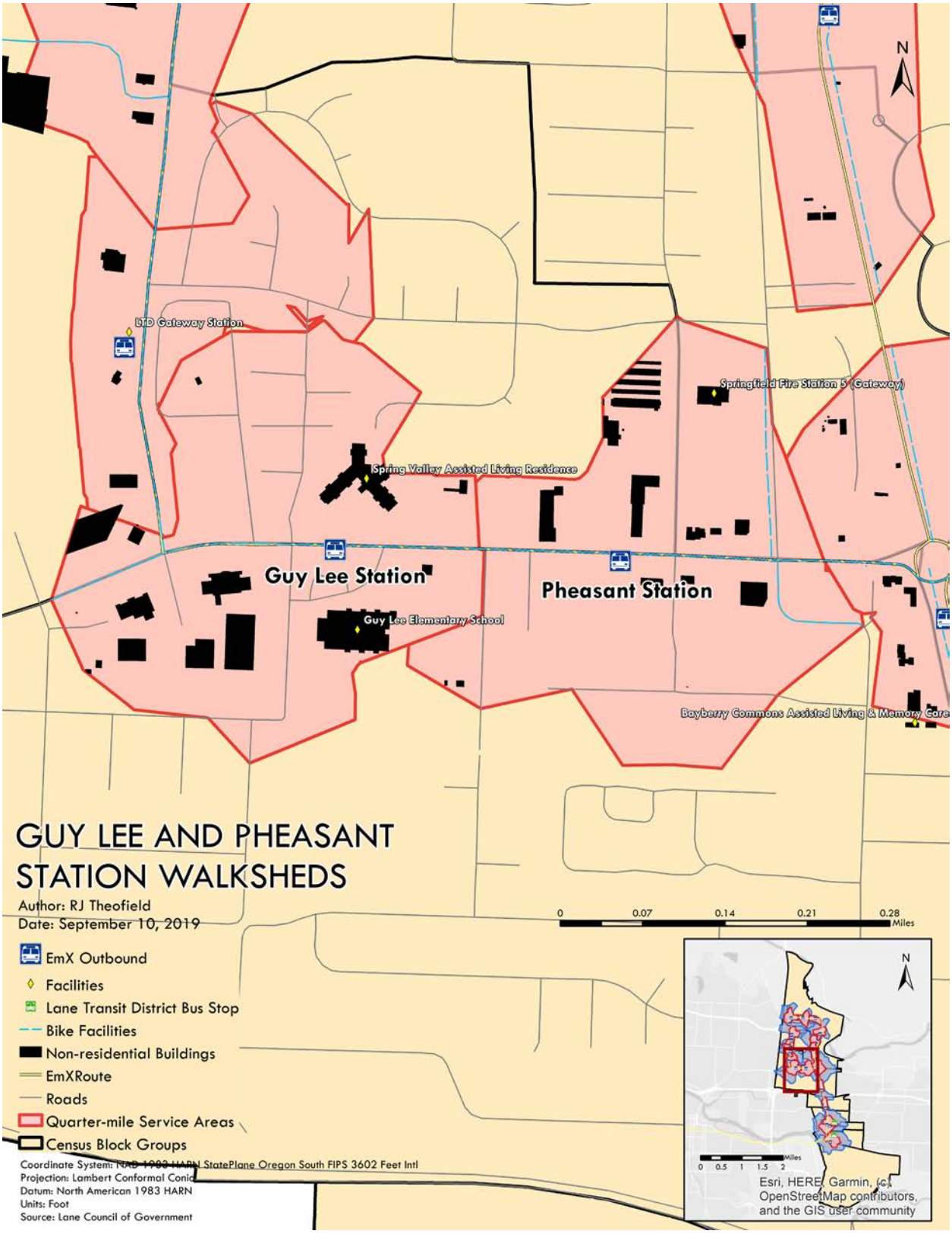


FIG. 53
Study Area and Catchment Zones

speed vehicle users along the four-lane highway negatively impacts pedestrian and bicycle comfort.

RECOMMENDATIONS

In summary, the Guy Lee and Pheasant stations are well-equipped for transit riders, but surrounding areas could be more rider-friendly. Our recommendations include considering improving sidewalk connectivity, increasing landscaping on major corridors to provide buffers from traffic, and improving pedestrian comfort on major corridors and in walksheds. Some of the suggestions are pertinent to the work that Lane Transit District implements, and some suggestions are more applicable to the City of Springfield. In general, the stations themselves were in good condition visually, practically, and were close to places that the population of the area might utilize. However, the surrounding walkshed around each station was unsafe for pedestrians, which could negatively impact the efforts of the EmX and its ridership. The residents and the ridership of the EmX of these areas could benefit from increased pedestrian network connectivity.

Summary of Analyses and Recommendations

This section provides a summary of findings and discussion of implications for the EmX Gateway Corridor.

KEY FINDINGS

This subsection summarizes the key findings from the analysis conducted for the EmX Gateway Corridor Study Area as a whole. The findings for the stations, walksheds, and street segments are located in their respective subsections.

Discussion

There are two main elements LTD and its partners can continue to improve upon: connectivity and surrounding land uses. The first element to improve upon, connectivity, will complete the physical gaps and remove barriers that prevent potential transit riders already in the area from riding. Active transportation connectivity along the EmX Gateway Corridor is limited. While the more central stations within the study area include more connectivity and infrastructure than the rest of the corridor, they still have relatively low PCR. Both community and alternative transportation facilities are concentrated within the downtown Springfield district. There are several key areas where connectivity can be improved such as along the Rosa Parks Path. When traveling along the Rosa Parks Path, there are no connections to adjacent uses except for existing intersections. This issue makes traveling to and from stations longer for pedestrians and bicyclists and forces them to either risk running across the street or to travel through noisy, auto-centric intersections.

The second area for continued improvement, surrounding land uses, could expand the demand and accessibility of the existing stations. The Gateway Corridor EmX line serves a variety of neighborhoods within each station service area, which vary greatly in land use mix. While many stations serve mostly residential areas, a limited number serve districts with significant land use mixes. The Springfield Station pedestrian catchment area has the highest entropy value and mix of residential and commercial parcels, while the E and F Street Stations areas are mostly residential. Aside from the stations in and near downtown Springfield, the surrounding land uses are either too dispersed or do not generate ridership. The area surrounding stations could be up-zoned, and mixed-use development could be allowed to increase activity and the proximity of riders. Through these new developments, connectivity and accessibility improvements could be made or financed as well. However, it is important to note LTD does not have the capacity to achieve these improvements alone—partnership is required. LTD and partners like the City of Springfield will need to coordinate their efforts to see the full potential of the EmX Gateway Corridor route.

NEIGHBORHOOD CHARACTERISTICS	The EmX Gateway Neighborhood is denser than the city of Springfield as a whole. In 2017, the study area's population density of 7.0 people per acre was slightly higher than the city of Springfield, which had 6.6 people per acre. The study area's housing density of 3.2 houses per acre was slightly higher than the city of Springfield average of 2.6 people per acre.
	The EmX Gateway Neighborhood has higher rates of people living below the poverty line than the city of Springfield as a whole. In 2017, 25 percent of the study area's population were below the poverty line, while the poverty rate for the city of Springfield overall was 21.3 percent.
	The EmX Gateway Neighborhood has a low percentage of female residents. In 2017, 43 percent of the population in the study area was female.
	Vehicle ownership rates are high in the EmX Gateway Neighborhood. In 2017, 88 percent of households in the study area owned at least one vehicle. The largest percentage of households, 39 percent, owned one vehicle, while only 12 percent of households did not own a vehicle.
ACCESSIBILITY & CONNECTIVITY	Springfield Station Bay B has the most facilities and highest PCR for both the quarter-mile and half-mile service areas. This station is by far the most connected and accessible station given these attributes. This finding makes sense since the station is located directly adjacent to downtown Springfield, the most urbanized area of the city.
	All station service areas have very low PCRs for both quarter-mile and half-mile service areas. No station service area in the EmX Gateway Corridor had a PCR higher than 0.50, which would indicate good pedestrian conditions. In fact, no station service area has a PCR higher than 0.14. This indicates the station service areas have very poor street connectivity.
	Most station service areas have very few facilities. Aside from Springfield Station Bay B, all station service areas had three facilities or less within both the quarter-mile and half-mile service areas. With no nearby facilities, people may have little reason to ride to these stations.
LAND USE MIX	Springfield Station Bay B has one of the highest land use mix entropies, highest number of commercial and industrial parcels, and most acreage of commercial and industrial land in the Gateway Corridor. Springfield Station Bay B's service area has one of the overall most diverse land mixes.
	Hayden Bridge Station has the most residential parcels and acreage. With 460 parcels and nearly 111 acres, the Hayden Bridge Station Service Area provides the largest access to residential riders.

FIG. 54
Summary of Key Findings

RECOMMENDATIONS

This section provides recommendations informed by neighborhood characteristics for LTD to consider as they re-evaluate the EmX Gateway route and stops. The recommendations are organized into three categories: Neighborhood Characteristics, Accessibility & Connectivity, and Land Use Mix.

NEIGHBORHOOD CHARACTERISTICS	Coordinate with the City of Springfield to encourage further infill development in the EmX Gateway Neighborhood to increase population and housing densities to support ridership.
	Consider reducing financial barriers (e.g. fare waiver) for households below the poverty line to encourage ridership and reduce household transportation costs.
	Evaluate bus stops in areas where there are high female populations (i.e. Census Block Groups 2, 10, and 12) to ensure adequate amenities are in place to facilitate female ridership.
	Coordinate with the City of Springfield to ensure the areas in the EmX Gateway Corridor meet the housing needs of people aged 25 to 54 to match the EmX Gateway line's capacity for likely riders.
ACCESSIBILITY & CONNECTIVITY	Coordinate with the City of Springfield to prioritize the siting of bike facilities around EmX Gateway Corridor stations to improve accessibility and street connectivity.
	Re-evaluate the viability of very poorly connected and accessible EmX Gateway line stations, such as Postal Way Station and Kruse Way Station, where no facilities exist, the PCR is 0.00, and no bus stops are within a one-quarter mile or one-half mile.
	Further evaluate the travel behavior of users to identify frequented destinations to prioritize station and station service area improvements.
	Build upon the success at Springfield Station Bay B to increase ridership by focusing resources to further enhance the pedestrian experience/increase PCR to make the surrounding facilities more accessible.
LAND USE MIX	Coordinate with the City of Springfield to increase the intensity of uses and mix of uses in station service areas.
	Focus on up-zoning areas where current information shows ridership potential based on existing land use mix and accessibility and connectivity attributes.

FIG. 55
Recommendations

Conclusion

In this report, we analyzed each of Lane Transit District's EmX Gateway Corridor's 17 stations, their walksheds (one-quarter- and one-half-mile service areas), street segments, and surrounding neighborhoods.

At each of these units of analysis, the characteristics of walkability, safety, accessibility, and public use and public life were assessed. Our findings suggest, overall, LTD's EmX Gateway Corridor suffers not from issues of inadequate facilities or amenities, but from incompatible land uses nearby and the absence of a well-connected transportation system.

As noted throughout this report, the station audit found nearly all stations featured the amenities expected to create a safe, comfortable, and accessible transit station. Unfortunately, more often than not, these stations were well-designed islands in poorly connected, noisy, and destination-less places. In its current state, the EmX Gateway Corridor represents a superb transit system that needs to be more integrated with its context if it is going to increase its ridership. However, if improvements to connectivity and surrounding land uses are made, the EmX Gateway Corridor line stands ready to facilitate the transformative impacts it was originally installed to create for the Eugene-Springfield community. With the information provided in this report, LTD can now move forward by implementing data-driven recommendations to enhance the corridor for its riders, neighbors, and the greater LTD community.

Appendix A

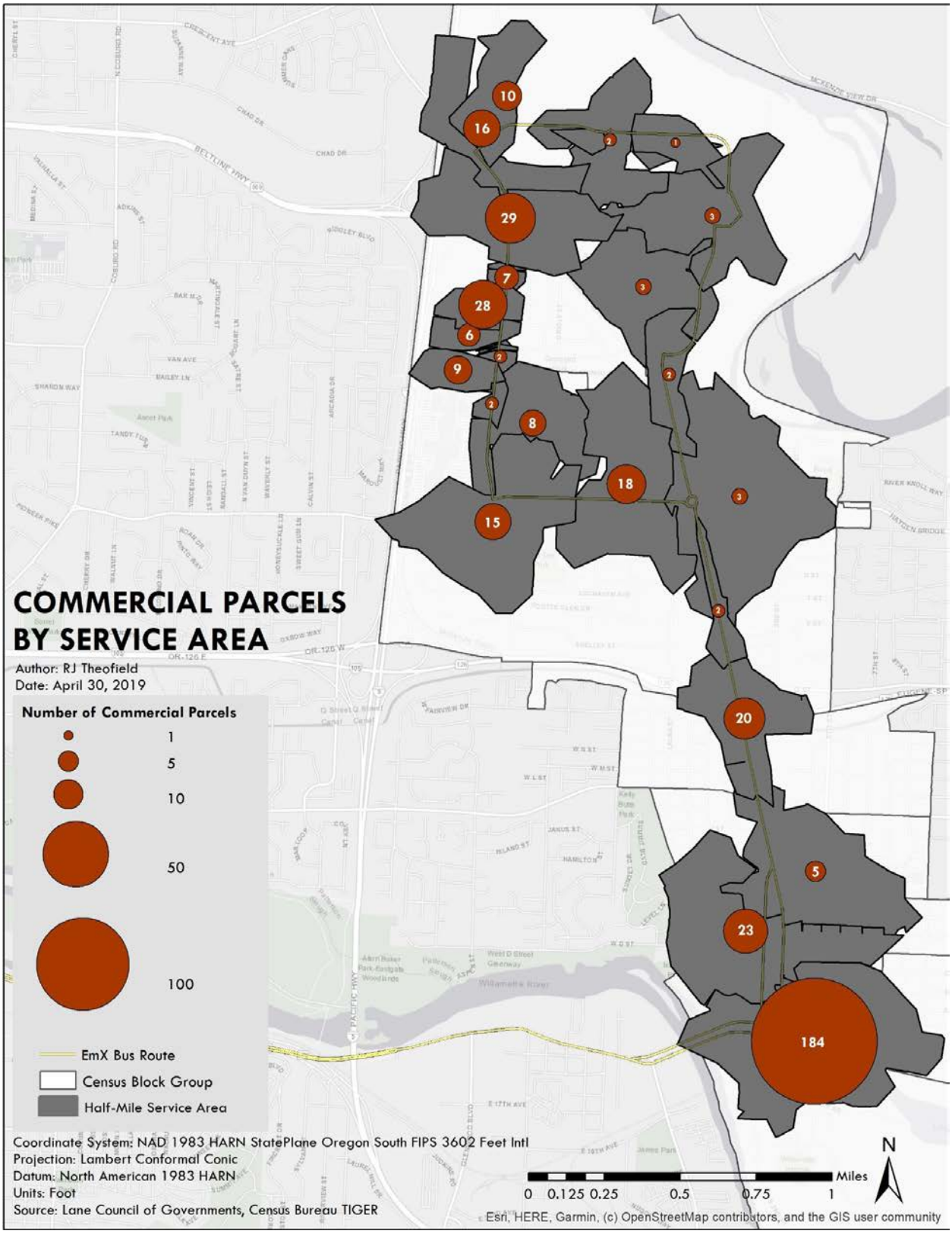


FIG. 56
Number of Commercial Parcels by Half-Mile Service Area

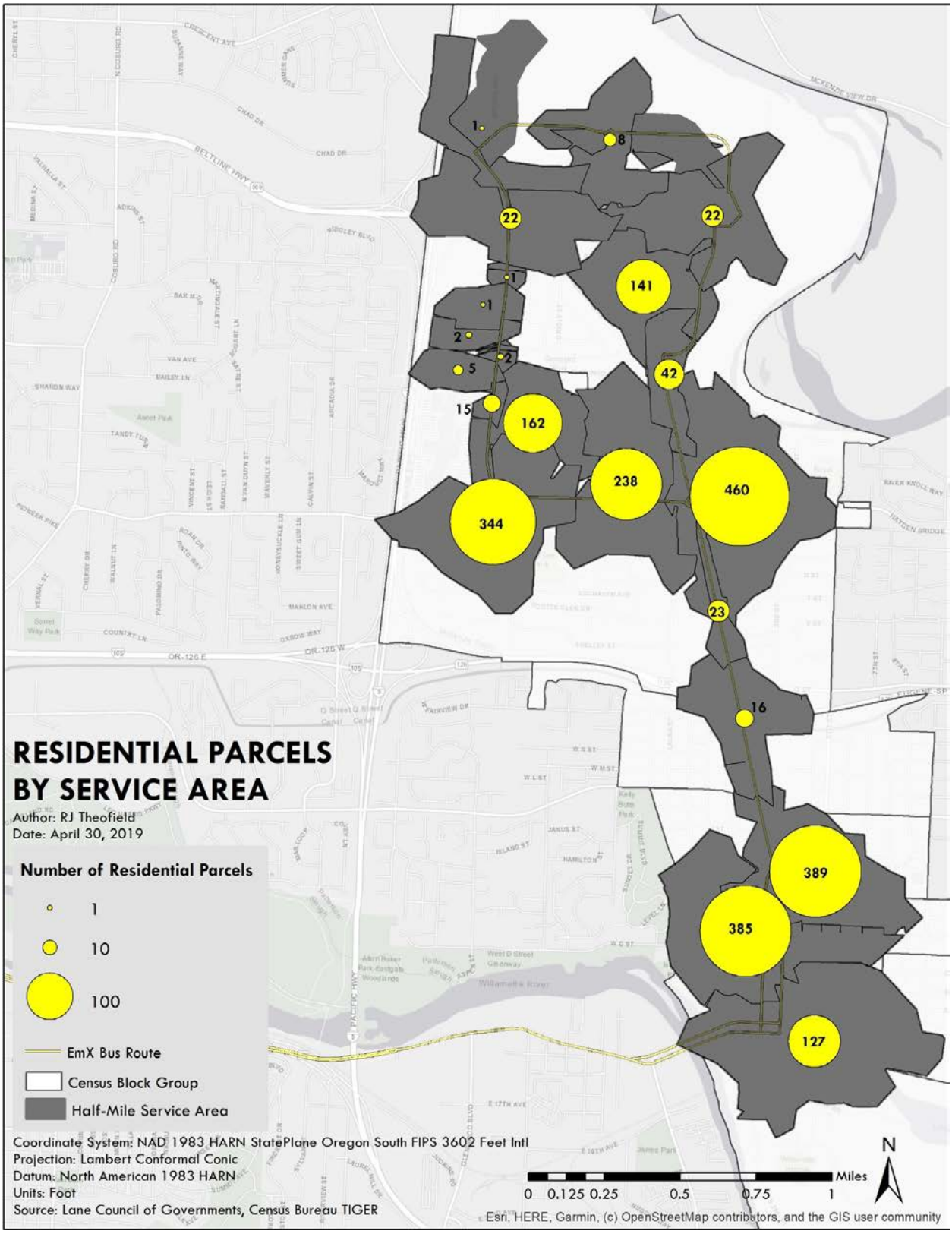


FIG. 57
Number of Residential Parcels by Half-Mile Service Area

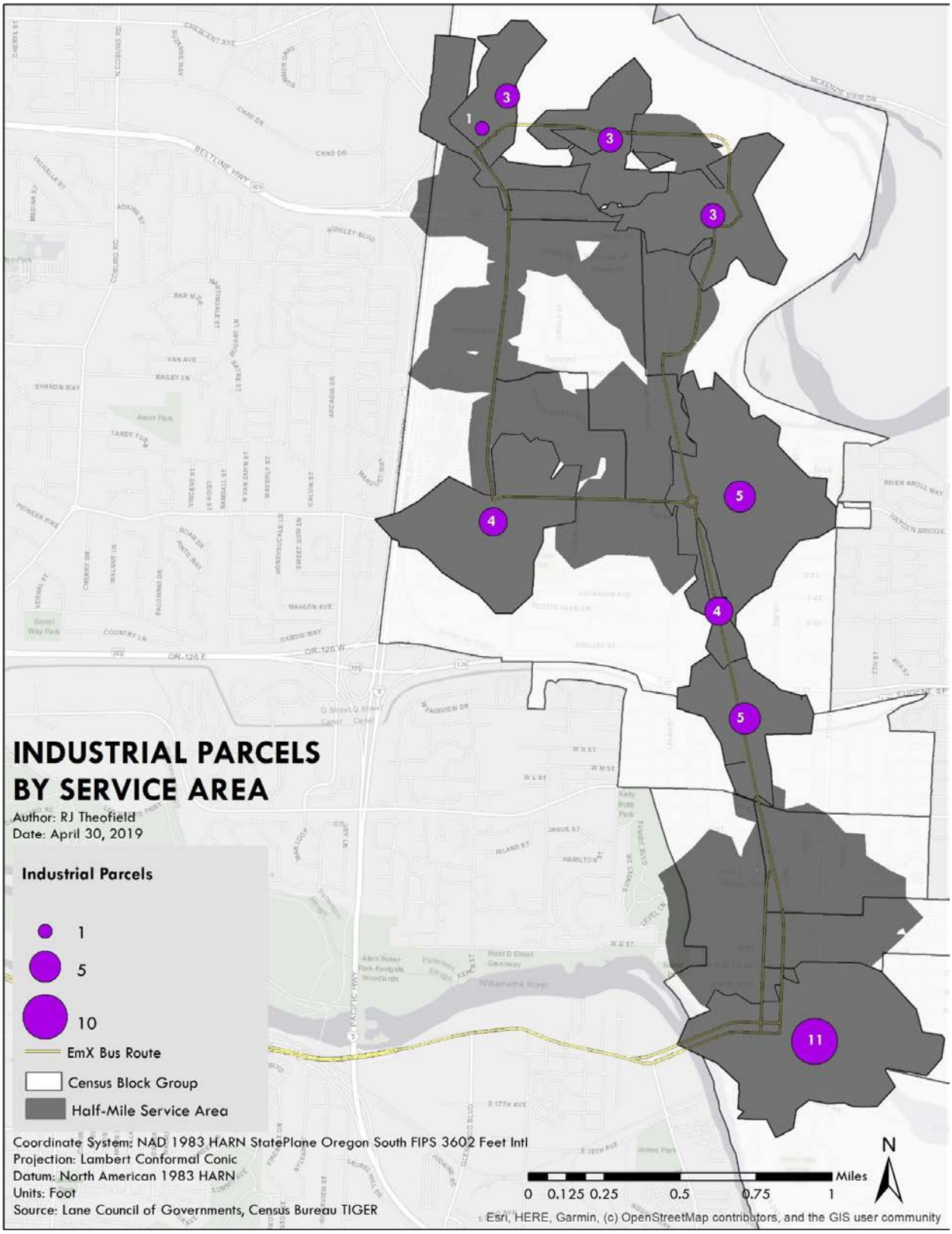


FIG. 58
Number of Industrial Parcels by Half-Mile Service Area

Appendix B

Table 1: Quarter-Mile Service Area Facilities, Bike Facilities, PCR, and LTD Bus Stations by Station, 2019

OUTBOUND STATION SERVICE AREA	FACILITIES	BIKE FACILITIES (FEET)	PCR	LTD BUS STATIONS
Centennial Station Outbound (10)	0	3,899	0.05	0
E Street Station (7)	1	3,174	0.09	1
Park	1			
E/S of Gateway S of North Access (16)	0	6,111	0.04	0
F Street Station (23)	1	9,456	0.10	0
School District Office	1			
Gateway Sta.-Bay A (to Spfd) (2)	1	4,930	0.06	0
LTD Transit Station	1			
Guy Lee Station (11)	2	8,235	0.14	0
Care Facility	1			
Elementary School	1			
Hayden Bridge Station Outbound (12)	1	7,999	0.12	0
Care Facility	1			
International Center Station Outbound (1)	1	6,065	0.11	0
LTD Park & Ride	1			
International Way East Station Outbound (17)	0	1,706	0.07	0
International Way Station West Outbound (6)	1	3,545	0.10	0
University	1			
Kruse Way Station (15)	0	4,930	0.00	0
Pavilion Station Outbound (20)	0	5,882	0.09	0
Pheasant Station (8)	1	5,200	0.13	0
Fire Station	1			
Postal Way Station (9)	0	4,930	0.01	0
Q Street Station Outbound (13)	0	5,030	0.05	0
River Bend Station (21)	0	9,104	0.09	0
Sacred Heart Station (18)	0	6,694	0.07	0
Springfield Station, Bay B (4)	14	8,521	0.14	2
Alternative School	1			
City Hall	1			
Jail	1			
Library	1			
LTD Park & Ride	2			
LTD Transit Sta	1			
Museum	1			
Park	1			
Police Station	1			
Pub Charter School	1			
The Arts	2			
Water Pump Station	1			
W/S Gateway Street S of Postal (14)	1	4,930	0.03	0
Shopping Center	1			
W/S of Gateway N of Game Farm Rd E (3)	0	4,704	0.08	0
W/S of Gateway N of Gateway Lp (19)	0	4,930	0.06	0
W/S of Gateway S of Beltline (22)	1	6,276	0.10	0
Clinic	1			
W/S of Gateway S of North Access (5)	0	4,930	0.02	0
TOTAL	**25**	**131,180**	**0.09**	**3**

Table 2: Half-Mile Service Area Facilities, Bike Facilities, PCR, and LTD Bus Stations by Station, 2019

OUTBOUND STATION SERVICE AREA	FACILITIES	BIKE FACILITIES (FEET)	PCR	LTD BUS STOPS
Centennial Station Outbound (10)	3	10,524	0.04	0
Care Facility	1			
Shopping Center	2			
E Street Station (7)	2	10,648	0.07	9
Park	1			
High School	1			
E/S of Gateway S of North Access (16)	0	6,528	0.01	0
F Street Station (23)	3	19,893	0.08	1
Community Center	1			
School District Office	1			
Park	1			
Gateway Sta.-Bay A (to Spfd) (2)	2	5,253	0.04	0
LTD Transit Station	1			
Care Facility	1			
Guy Lee Station (11)	3	10,126	0.08	2
Care Facility	2			
Elementary School	1			
Hayden Bridge Station Outbound (12)	3	11,467	0.10	0
Care Facility	1			
Park	2			
International Center Station Outbound (1)	1	10,750	0.04	0
LTD Park & Ride	1			
International Way East Station Outbound (17)	0	2,185	0.02	0
International Way Station West Outbound (6)	1	3,261	0.03	0
University	1			
Kruse Way Station (15)	0	4,937	0.00	0
Pavilion Station Outbound (20)	0	15,492	0.06	0
Pheasant Station (8)	1	7,331	0.07	0
Fire Station	1			
Postal Way Station (9)	0	4,937	0.00	0
Q Street Station Outbound (13)	0	6,803	0.01	0
River Bend Station (21)	0	8,080	0.02	0
Sacred Heart Station (18)	0	11,118	0.04	0

OUTBOUND STATION SERVICE AREA	FACILITIES	BIKE FACILITIES (FEET)	PCR	LTD BUS STOPS
Springfield Station, Bay B (4)	19	21,779	0.12	6
Alternative School	1			
Boat Ramp	1			
City Hall	1			
Jail	1			
Library	1			
LTD Park & Ride	2			
LTD Transit Station	1			
Museum	1			
Park	3			
Police Station	1			
Pub Charter School	1			
Post Office	1			
Public Utility	1			
The Arts	2			
Water Pump Station	1			
W/S Gateway Street S of Postal (14)	2	4,937	0.01	0
Post Office	1			
Shopping Center	1			
W/S of Gateway N of Game Farm Rd E (3)	1	5,946	0.03	0
Treatment	1			
W/S of Gateway N of Gateway Lp (19)	0	4,937	0.01	0
W/S of Gateway S of Beltline (22)	2	7,809	0.06	0
Senior Mfd Park	1			
Clinic	1			
W/S of Gateway S of North Access (5)	0	4,937	0.00	0
TOTAL	**43**	**199,678**	**0.07**	**18**

Table 3: Summary of Land Use Mix by Half-Mile Station Service, 2019

STATION SERVICE AREA NAME	LAND USE MIX ENTROPY	COMMERCIAL PARCELS		RESIDENTIAL PARCELS		INDUSTRIAL PARCELS	
		Total Number	Total Acreage	Total Number	Total Acreage	Total Number	Total Acreage
Sacred Heart Station	0.86	3	27.85	141	29.32	0	0.00
River Bend Station	0.84	2	26.09	42	20.53	0	0.00
Springfield Station, Bay B	0.83	184	49.03	127	25.43	11	36.97
Pavilion Station Outbound	0.78	3	25.46	22	18.44	3	3.23
Gateway Station Bay A	0.76	8	24.90	162	40.76	0	0.00
Guy Lee Station	0.74	15	26.05	344	71.98	4	1.52
Pheasant Station	0.72	18	20.42	238	79.98	0	0.00
F Street Station	0.67	23	20.03	385	75.41	0	0.00
W/S of Gateway S of Beltline	0.67	29	38.47	22	9.85	0	0.00
International Way Station West Outbound	0.66	10	28.89	0	0.00	3	7.10
International Center Station Outbound	0.65	2	8.15	8	7.78	3	11.46
Centennial Station Outbound	0.64	20	24.67	16	8.37	5	3.80
E Street Station	0.61	5	17.17	389	66.67	0	0.00
W/S of Gateway N of Gateway Lp	0.60	28	20.10	1	5.43	0	0.00
Hayden Bridge Station Outbound	0.59	3	3.04	460	111.86	5	1.38
W/S Gateway Street S of Postal	0.58	6	16.22	2	5.78	0	0.00
Q Street Station outbound	0.58	2	3.25	23	5.70	4	1.45
W/S of Gateway N of Game Farm Rd E	0.58	16	39.58	1	0.05	1	3.33
W/S of Gateway S of North Access	0.54	2	14.35	15	2.69	0	0.00
E/S of Gateway S of North Access	0.54	9	32.13	5	5.51	0	0.00
Kruse Way Station	0.50	7	5.83	1	5.43	0	0.00
Postal Way Station	0.46	2	11.47	2	4.72	0	0.00
International Way East Station Outbound	0.29	1	1.61	0	0.00	0	0.00

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