



GREENbike

SLC'S NON-PROFIT BIKE SHARE

Strategic Implementation Plan

Salt Lake City Core 2014-2020

Produced by:
National Park Service
Rivers, Trails, & Conservation Assistance



GREENbike Strategic Implementation Plan

Salt Lake City Core: 2014-2020

Executive Summary

This Strategic Implementation Plan was created to guide the immediate growth of Salt Lake City's non-profit bike share program, GREENbike, in the downtown Salt Lake City area through 2020. The approximate service area for this plan is 600 North to 1000 South, 1100 East to 900 West. This service area was selected because it already represents the highest level of employment density in the state and will be a major center of the explosive population growth expected to occur along the Wasatch Front during the next 25 years. In 2013, GREENbike was the most successful small bike share program in the country with only 65 bikes available at 11 stations. Each one of those bikes averaged 390 trips during a 255 day inaugural season. This plan illustrates the necessity of expanding the GREENbike network to compound this early success while capitalizing on the benefits from scalable economies. This expanded system will additionally serve as a tool to enhance the region's existing public transportation infrastructure, improve community health, air quality, and spur economic development in Utah's capital city through tourism and downtown living.

Bike sharing is an innovative urban transportation solution that allows members to access bicycles designed for the city environment from a network of automated bike share stations for short-distance trips. This document explains the benefits of bike sharing along with the dramatic rise of bike share systems in the United States as a low cost, public transportation solution that does not impact dense business and traffic centers with long construction cycles.

This strategic plan details the many metrics used to evaluate future success and the network's site selection process. There are four implementation phases with corresponding anticipated installation dates in this plan. 30 bike share stations with 260 active bikes by 2016, 50 stations with 450 bikes by 2018, 75 stations with 700 bikes by 2019 and 100 stations with 1,000 bikes by 2020. Goals have been set at each of the four implementation phases for the number of 24-hour passes and Annual GREENbike Memberships sold, the associated usage fees generated from those sales, the anticipated amount of annual sponsorships received and many other business metrics illustrating due diligence and the benefits from economies of scale.

The phased implementation and financials portion of this document illustrate that as the system expands, and if that expansion is focused on downtown office workers, residents and tourists, it can recover between 60-70% of its annual operating expenses through ridership. This is an extremely high "fare-box recovery rate." The Utah Transit Authority represents a public transportation industry average with roughly 20% of operating expenses recovered via fares. An expanded and dense GREENbike network would also create enough value from available sponsorship assets that all remaining operational expenses can not only be sustained, but exceeded on a reoccurring annual basis.

This document is in conformance with myriad of existing or in-progress master plans and serves as a reference for partners hoping to improve the future of the Wasatch Front. It provides a tool for collaborative planning and supports the goals of plans and studies that are defining the future of Salt Lake City and the region as a whole.

However, this Strategic Implementation Plan is only for Salt Lake City's downtown core. A more comprehensive needs assessments and feasibility studies are necessary to consider "satellite areas" such as Sugarhouse or other communities along the Wasatch Front.

The intended audience of this document is a variety of local, state and federal government bodies along with civic and business leaders throughout the region.

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1. Introduction

Bike sharing is an innovative urban transportation solution that allows members to access bicycles from a network of automated bike share stations for short distance trips. Bike share programs work best in dense urban grids with access to high density residential development, transit stops, employment centers, and popular destinations for food, drink, and entertainment. Bike sharing is ideal for short-term, short-distance trips and provides a first mile/last mile solution for riders connecting to public transportation. The program is designed to for short trips because the majority of all car trips are actually short trips. More than half of all annual automobile trips are less than three miles and most of those are less than two.



There has been a dramatic rise in bike share programs over the last three years, with programs in cities such as Denver, Minneapolis, Washington D.C., Boston, and San Antonio, with many more set to begin operations within the next year. In fact, over 600 cities worldwide have instituted bike sharing as a relatively inexpensive and quick-to-implement option to improve mobility for residents and visitors. These cities cite many benefits of bike sharing, including improved health, increased access to transit systems, and better mobility options for both residents and visitors. Plus – it’s fun!

GREENbike, Salt Lake City's bike share program, is a non-profit organization, the result of a public/private partnership between Salt Lake City, the Salt Lake Chamber of Commerce, Salt Lake City Downtown Alliance, Visit Salt Lake, Utah Transit Authority, Utah Department of Transportation, Wasatch Front Regional Council, SelectHealth, TWIO Brand and City Creek Center. The current boundaries of the GREENbike system are formed by a rectangle extending north and south between South Temple and 400 South, and east and west between 200 East and 600 West. This core area of downtown Salt Lake includes the business district, the Intermodal Transit Hub, the Salt Palace Convention Center, two shopping centers, and numerous restaurants and hotels. This area represents the highest employment density and the widest variety of trip generators in the city and was therefore the optimal area to launch the bike share program.

Salt Lake City launched its GREENbike program in April 2013 with 10 stations and 55 bikes. Several months later, the program added two additional stations, expanded the capacity of five existing stations, and added 20 more bikes. By November 2013, 6,100 users took nearly 25,361 trips, the equivalent of 390 trips per bike – the highest per bike usage of any city in the country with less than 50 bike share stations. The program has proved to be immensely popular and has received support from local government, businesses, and the media as well as from the general public.

Now that the program has been established and has attracted an enthusiastic response from the public, there is a need to expand the system to accommodate demand. This involves increasing system density within the central business district by providing more bikes and stations that are placed closer together, and expanding the network outside the core area to reach other businesses, housing, and points of interest. This expansion will increase the availability of bikes and extend the reach of the system, making the program more convenient and reliable for users.

The *GREENbike Strategic Plan for Downtown Salt Lake City 2014* was developed as a collaborative planning effort through the National Park Service Rivers, Trails, and Conservation Assistance (RTCA) Program. Through RTCA, the National Park Service supports community-led projects with technical assistance. RTCA assisted the GREENbike program by facilitating partnership meetings, researching grants, and in the development of the plan.

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2. Purpose of the Plan

This plan demonstrates the importance of GREENbike as an enhancement to existing public transportation, and the necessity to expand the program. The plan also serves as a blueprint to guide further expansion and identifies downtown Salt Lake City's approximate service area for bike share. This includes the phasing of future expansion within the city's core that will best meet GREENbike users' needs while addressing the program's financial sustainability. Finally, this plan is intended to serve as a reference for partners invested in seeing GREENbike succeed, and provides a tool for collaborative planning.

This is a short range plan to guide immediate growth in downtown Salt Lake City through 2020. The plan is intended only for downtown Salt Lake City; more comprehensive needs assessments and feasibility studies are necessary to consider "satellite areas" such as Sugarhouse or other places along the Wasatch Front.



Showing support for GREENbike left to right: UTA General Manager Mike Allegra, Overstock.com CEO Jonathon Johnson, Salt Lake City Mayor Ralph Becker, Salt Lake County Mayor Ben McAdams, and Governor Gary Herbert. Photo: GREENbike

3. What is Bike Share?

3.1 Bike Share Overview

A bike share program is a network of public bike share stations where, for a nominal access fee, people can use and return any bike, from any station, as many times as they need a bike. Instead of renting one specific bike (bike rental), a bike share pass gives the user access to every bike at all bike share stations. Bike share is intended for short-term, one-way trips that are only 30-60 minutes in length compared to bike rentals where bikes are rented for days or weeks at a time. The pricing structure of bike share incentivizes these short trips, encourages a high turnover rate, and helps to maximize the number of trips per bicycle per day. The bikes are comfortable, commuter-style bicycles with specially designed parts and sizes that discourage theft and resale. Bike share stations have fully automated locking systems that allow users to check bicycles in or out easily, thus eliminating the need for an attendant to be present on site.

Bike share programs like GREENbike use innovative technology and strategies to ensure the program's success. Each bike features a radio-frequency identification device, a wireless tracking system that makes it possible to identify the user and to locate where a bicycle is picked up and returned. Wireless communication technology, such as general packet radio services, allows real-time monitoring of station occupancy rates. This real-time information is available to users not only at on-site terminals, but through other platforms such as the web and cell phones, allowing both program operators and customers to be up-to-date on station capacity and bike availability. Users can check bikes in and out with a credit card or smart phone, and the docks lock and unlock automatically.

In the last few years, the number of bike share programs has risen dramatically as cities recognize the many benefits of bike-sharing, such as increasing active transportation, extending the reach of public transportation, reducing traffic congestion, improving air quality, and promoting healthy lifestyles.

3.2 GREENbike, Salt Lake City's Bike Share Brand

GREENbike was founded in 2011 through a partnership between Salt Lake City Municipal Corporation, the Salt Lake City Downtown Alliance, and the Salt Lake Chamber of Commerce. GREENbike is a 501(c)3 not-for-profit, public/private partnership that works collaboratively to improve the community's physical health and air quality by providing an active transportation alternative to single occupant automobile trips. The program was developed to reflect the city's efforts to encourage walkable, bike-friendly communities that offer convenient access to various public transportation choices.

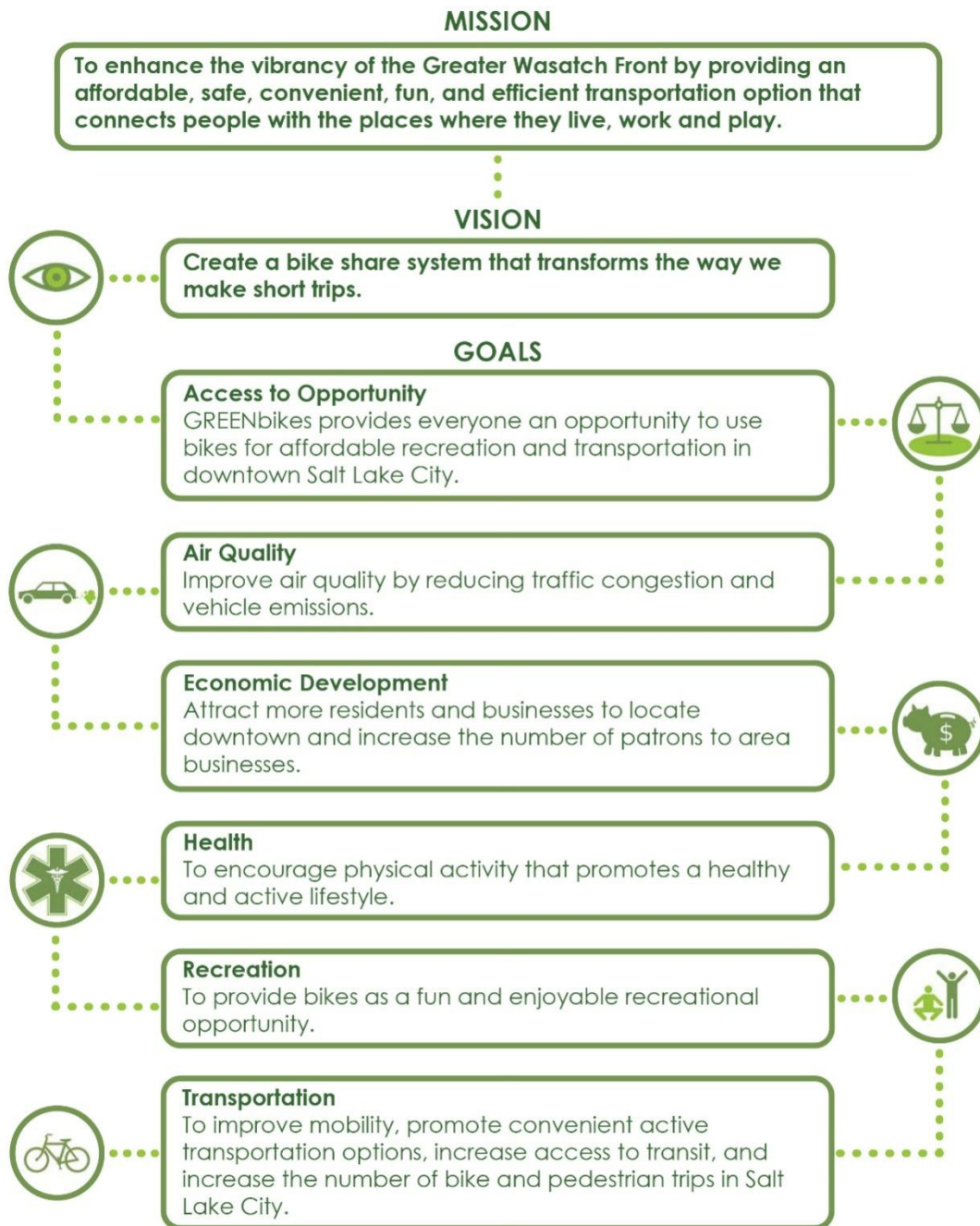
GREENbike's network of 10 fully-automated bike share stations and 55 bicycles was launched in April of 2013. Immediately, the system garnered widespread usage necessitating an expansion in July, 2013, which included the addition of two new stations, the expansion of five existing stations, and the addition of 20 more bikes. The program's first season proved to be a big success, and its popularity was spurred by interest from the public, government officials, the business community, and the media. At the end of its first year of operations in December, 2013, the GREENbike system had the highest per bike usage rate of any bike share system in the United States with less than 50 active stations.

SMALL U.S. BIKE SHARE SYSTEMS USAGE COMPARISON

SYSTEM/CITY	OPERATING YEAR	STATIONS	ACTIVE BIKES	USERS	TRIPS PER SEASON	SEASON LENGTH (DAYS)	SEASONAL TRIPS PER BIKE	DAILY TRIPS PER BIKE
San Antonio	2012	42	354	16429	65560	365	185.20	0.51
Fort Worth	2013	35	300	14345	30113	365	100.38	0.28
Madison	2012	30	280	11794	63325	258	226.16	0.88
Boulder	2013	22	150	6483	30314	365	202.09	0.55
Charlotte	2012	22	190	8500	26000	365	136.84	0.37
Kansas City	2012	12	90	2000	5300	165	58.89	0.36
Salt Lake City	2013	11	65	6131	25361	255	390.17	1.53

In 2014, the program will add an additional eight stations, expand the capacity at seven stations, and nearly double the number of available bikes. As the program moves forward, GREENbike needs to continue to expand and to create a dense network of stations in the downtown area in order to meet the needs of its users and to help Salt Lake City strengthen its image as an innovative, sustainable city.

4. Mission, Vision, and Goals



Note: the goals are listed in alphabetic order and are not rated by the order they appear.

5. Conformance with Other Plans

This strategic plan seeks to further the vision of GREENbike in Salt Lake City while supporting the goals of various plans and studies that are defining the future of transportation to and within the community.

Salt Lake City Plans and Studies include:

- Salt Lake City Transportation Master Plan – April 16, 1996
- PLAN Salt Lake City – Salt Lake City’s Comprehensive Plan (in process)
- Salt Lake City Bicycle and Pedestrian Master Plan (update in process)
- Salt Lake City Transit Master Plan (in process)
- The Mayoral Agenda – Livability in Salt Lake City – February 1, 2012
- Council Philosophy Statement on Transportation and Mobility – August 14, 2012
- Downtown In Motion – Salt Lake City’s Downtown Transportation Master Plan - November 28, 2008
- Sugar House Master Plan – December 13, 2005
- Sugar House Circulation Plan – November 12, 2013

Green Bike also supports regional efforts for coordinated transportation improvements. The following plans are prepared by the Wasatch Front Regional Council:

- Wasatch Choice for 2040 – May 2011
- The Regional Transportation Plan (RTP) – May 2007
- The Unified Transportation Plan – April 2012

Ultimately, the success of bike share in Salt Lake City is intertwined with a region wide understanding of the GREENbike vision and an appreciation of how it serves numerous community goals.

6. The Case for GREENbike

GREENbike has already proven to be a great asset for Salt Lake City and has the potential to improve and transform the city. Expansion of the program will result in a number of positive outcomes that will help Salt Lake City achieve its goal of becoming an innovative, livable, and sustainable city. This section describes the ways in which a more robust bike share system will benefit the city and work in harmony with other efforts to improve the livability of Salt Lake.

6.1 Transportation

The GREENbike program grew out of a desire to create an active transportation alternative to single occupant automobile trips, to enhance public transport, and increase transit options. Salt Lake City recognized the need for a sustainable transportation system that provides residents with safe, affordable, and efficient options to get around, and GREENbike has become a key component of that system. In particular, placing GREENbike stations at or near transit stations can help promote healthy commuting behaviors, reduce parking demands, and positively impact air quality.

Providing transportation alternatives is crucial as the Wasatch Front continues to grow. Salt Lake County, which has the highest number of vehicle miles traveled (VMT) of any county in the state, has seen a dramatic increase from 4.9 billion VMT in 1988⁽¹⁾ to 8.7 billion VMT in 2012⁽²⁾. The current system is dependent on the automobile, which leads to traffic congestion, wasteful energy consumption, and an increase in air pollution. It's expensive too – average vehicle driving costs are close to \$10,000 a year for maintenance, insurance, and fuel, according to AAA's 2013 *Your Driving Costs* report⁽³⁾. That makes transportation the second largest expense for most households.

6.1.1. Utah Transit Authority

Bike share allows users to leave the car behind for short trips around town – or to leave it behind altogether by making it easier to connect to public transportation. The Utah Transit Authority (UTA) serves Salt Lake City and the Wasatch Front with an extensive system of commuter rail lines (FrontRunner), light rail lines (TRAX) and buses. GREENbike works as a complement to UTA's public transit system, extending the reach of the system by providing a critical first-mile/last-mile connection between the transit stop and the user's destination. It is often the first- or last-mile connection that can be the most difficult to overcome, and removing those obstacles by co-locating GREENbike stations at transit stops makes using transit more attractive and convenient. Compared to other transportation projects, bike share is

Table 1: Number of boardings at TRAX stations in the bike share service area (August 2013-January 2014). Source: UTA

Station:	Average Boardings / Weekday
Courthouse	7,140
City Center	4,010
Arena	2,826
Gallivan Plaza	2,294
Library	1,659
Salt Lake Central	1,411
North Temple Bridge/Guadalupe	1,374
Temple Square	1,330
900 East	1,299
Trolley	1,200
900 South	1,141
Planetarium	1,087
Old GreekTown	723
Jackson/Euclid	573

Table 2: Comparison of costs. Source: UTA, GREENbike

UTA Transportation Costs per Mile	
Capital Costs	
Commuter Rail	\$17.7 million/mile
Light Rail	\$52.8 million/mile
Streetcar	\$37.94 million/mile
BRT Exclusive Lane/BRT III	\$16.4 million/mile
Enhanced Bus/BRT I	\$3.4 million/mile
Operating Costs	
Commuter Rail	\$9.92/mile
Light Rail	\$7.07/mile
Motor bus	\$6.65/mile
GREENbike Costs	
Capital Cost per Station	\$65,000
Operating Cost per Station	\$25,000/year

considerably less expensive, easier to install or modify, and the timeline for implementation is short (see Table 2 on the previous page for costs).

As one of GREENbike's Strategic Partners, UTA recognizes the benefits of integrating bike share with the existing public transit system. UTA has identified improved active transportation accessibility to FrontRunner and TRAX stations as a low-cost way to increase ridership, and includes increased bike share stations as one method to achieve that ⁽⁴⁾.

A survey conducted by the Transportation Sustainability Research Center in 2013 found that GREENbike users strongly agree that the bike share program is an enhancement to Salt Lake City's public transportation system:

- 96% agree or strongly agree that GREENbike is an enhancement to existing public transportation.
- 52% said they drive their personal vehicle less frequently.
- 30% use public transportation more often and only 4% use it less often.

GREENbike conducted its own survey of annual members and found that 62% are more likely to use other forms of public transit. This results in additional transit ridership.



GREENbike works as an extension of UTA.
Photo: GREENbike

6.1.2. Utah Department of Transportation

The above survey also indicated that bike share allows users to drive less, which dovetails with the efforts of the Utah Department of Transportation's (UDOT) TravelWise program to encourage Utahns to use alternatives to driving alone ⁽⁵⁾. TravelWise lists bike sharing as an opportunity to improve air quality, optimize mobility, and support economic growth. TravelWise also promotes active transportation not only as a way for people to integrate physical activity into their daily routine, but as a way to save money on fuel and spend less time in traffic congestion.

In addition to being consistent with the goals of both UTA and UDOT, the GREENbike program helps Salt Lake City meet several of its goals and strategies for transportation listed in the *Sustainable Salt Lake – Plan 2015* ⁽⁶⁾ including:

- Deliver transportation services that result in a zero carbon footprint and make the environment better.
- Develop a sustainable, high-performance transportation system that supports a robust economy.
- Enhance quality of life by integrating transportation with the built environment.
- Increase, improve, and promote pedestrian and bicycle facilities within the city, with a focus on safety.
- Foster alternative transportation use, reduce vehicle miles traveled, and promote fuel-efficient vehicles.

In 2013, users that took GREENbikes instead of driving saved a total of 54,000 miles traveled by vehicle. It is estimated that further expansion will yield significant reductions in vehicle miles traveled (see Table 3 below.)

Table 3: Estimated impact of GREENbike on vehicle use; includes transit capture. Source: Wasatch Front Regional Council

Stations	Trips / Year	Miles / Day	Total VMT Reduced / Year	Cold Starts Reduced / Year
25	66,000	688	135,300	31,350
50	168,000	1,750	344,400	79,800
75	288,000	3,000	590,400	136,800
100	408,000	4,250	836,400	193,800

That reduction in the vehicle miles traveled will reduce traffic congestion, improve air quality, and promote active and healthy lifestyles.

6.2 Transportation Linking to Affordable Housing

Transportation and housing costs are the biggest budget items for most families. Reducing the amount of income spent on transportation costs can help people meet their housing needs in an affordable way. Future expansion of the GREENbike system could be leveraged to add new mobility options for low income populations.

In 2010, there were 29,085 persons living in Salt Lake City dramatically below the median income ⁽⁷⁾, roughly 12.6% of the city's total population. While this population is dispersed throughout the city, new housing developments are needed to meet the growing demand for affordable units. By working with affordable housing developers and tapping into affordable housing funds, GREENbike stations could be provided at new affordable housing developments to expand mobility for vulnerable populations. These developments offer an opportunity to expand the GREENbike system while providing a much needed service to provide access and transportation options for low income populations.

6.3 Environmental Health - Air Quality

One of the main objectives of the GREENbike program is to improve the air quality of the Salt Lake Valley by reducing the number of car trips and the resulting greenhouse gas emissions. Air pollution has a significant effect on health and quality of life, and Salt Lake County has unique challenges to its air quality due to meteorological and topographical conditions. The mountains surrounding Salt Lake trap ozone, particulate matter (PM_{2.5}, PM₁₀), carbon monoxide, nitrogen dioxide, and sulfur dioxide in the valley, which can cause air pollution to rise to unhealthy levels. Poor air quality has been linked to a variety of health issues: aggravation of respiratory problems such as asthma and chronic obstructive pulmonary disease, decreased lung function, increased risk of respiratory infections, increase in blood pressure, and increased risk of heart attacks or strokes.

According to the Utah Department of Environmental Quality, vehicles account for 57% of PM_{2.5} pollution and are the primary source of the NO_x and VOCs that form ozone. Reducing the number of vehicle miles traveled in the valley is one of the most important approaches to improving Salt Lake's air. Several strategies in the *Sustainable Salt Lake – Plan 2015* address these issues:

- Reduce single-occupant vehicle use
 - Reduce vehicle miles traveled in the city by 6.5%, to 1.26 billion miles annually
- Reduce community greenhouse gas emissions.
 - Reduce greenhouse gas emissions from community by 10%, to 4.7 million tons annually, through transportation and energy strategies.

Bike sharing provides an excellent tool to cut down on air pollution in the city. GREENbike's goal is to eliminate unnecessary short-distance car trips in the downtown area by encouraging people to take a bike instead. By replacing short trips that would otherwise be made by car, GREENbike users help decrease the amount of vehicle miles traveled and reduce the amount of pollutants and greenhouse gases released into the atmosphere.

In 2013 GREENbike users removed 58,322 miles from the road that directly led to an estimated 66,000 pounds of carbon dioxide kept out of the air. According to the Salt Lake County Health Department Air Quality program, GREENbike trips saved 4,600 gallons of gasoline by replacing short trips taken by vehicles with an average of 15mpg⁽⁸⁾. By expanding to 25 stations GREENbike can eliminate 180,000 pounds of carbon dioxide per year and with 50 stations 457,800 pounds of carbon dioxide from entering the atmosphere. These numbers do not account for the additional transit ridership resulting from GREENbike trips which saves extra gasoline and prevents even more emissions from polluting the air.

In addition, GREENbike members claim to experience a crossover effect in their transportation behaviors. When GREENbike annual members were surveyed, 79% said that using GREENbike inspired them to take fewer trips in their personal vehicle in addition to their GREENbike trips.

6.4 Physical Activity

GREENbike provides Salt Lake residents with an excellent strategy to combat obesity and chronic diseases by integrating physical activity into their daily routine. According the Utah Health Department, 59.1% of Utahns were overweight or obese^a in 2012⁽⁹⁾. Being overweight or obese can significantly increase the risk of a number of chronic diseases, including heart disease, hypertension, stroke, Type 2 diabetes, and some types of cancer. Regular physical activity is essential to controlling weight, reducing the risk for chronic diseases, and improving both physical and mental health. The U.S. Department of Health and Human Services recommends that adults get at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity activity every week.

Bike share is an active transportation option that allows users to incorporate physical activity into daily life activities such as commuting or running errands. Recent research has observed a strong connection between active transportation and physical health – the more people walk or bike to their destinations, the more physical activity they get, thus reducing rates of obesity and chronic diseases^{(10) (11)}. In fact, some hospitals are now prescribing bike share memberships as a way to help patients integrate physical activity into their daily lives⁽¹²⁾.

Healthy People 2020⁽¹³⁾ is a nationwide effort by the U.S. Department of Health and Human Services to improve the health of all Americans, in part by increasing physical activity and active transportation. The GREENbike program can help Salt Lake City achieve a number of these objectives including:

- Increase the proportion of adults who engage in aerobic physical activity of at least moderate intensity for at least 150 minutes/week, or 75 minutes/week of vigorous intensity, or an equivalent combination.
- Increase the proportion of trips of 5 miles or less made by bicycling by adults aged 18 years and older.
- Increase community-scale policies for the built environment that enhance access to and availability of physical activity opportunities.

^a Overweight or obese is defined as a body mass index (BMI) of 25 or more. BMI is calculated by dividing weight in kilograms by the square of height in meters.

- Increase street-scale policies for the built environment that enhance access to and availability of physical activity opportunities.
- Increase transportation and travel policies for the built environment that enhance access to and availability of physical activity opportunities.

In its first year alone, GREENbike users burned nearly 2.8 million calories. With an average GREENbike trip of around 2.5 miles, it is estimated that an additional 38 stations (50 stations total) might increase that number to 18 million calories burned, depending on station locations and nearby network density. This will have a real and measurable impact on the health of users

6.5 Economic Development

Bike share programs have a direct and positive economic impact on the communities they serve. This economic gain occurs because bike share:

Provides easy access to local businesses

Bike share stations located in close proximity to grocery stores, restaurants, bars, shopping, and entertainment venues boost sales by making it quick and convenient to access those businesses. Bike share makes it easy to run an errand during work, grab lunch, or to do some shopping on the way home. Research shows that people on bikes are likely to shop more frequently and to spend more money locally⁽¹⁴⁾ ⁽¹⁵⁾ than they would if driving a car. Plus, people who bike instead of drive save money on gas and other transportation costs, and they tend to spend their disposable income closer to home⁽¹⁶⁾. In fact, one recent study estimated that bike share users brought in an extra \$150,000 to restaurants and other businesses near Nice Ride Minnesota bike share stations in the Twin Cities⁽¹⁷⁾.

Results from an early GREENbike survey highlight the economic impact of the program:

- 56% of people surveyed said they shop more at locations near stations than they did before GREENbike started.
- 38% are spending more money at local establishments.
- 79% said that stations “enhance the attractiveness of nearby shopping locations.” Only 3% said they reduce attractiveness.

Attracts young professionals

The bike share program and being perceived as bike-friendly makes the city more attractive to a youthful,

Culture Shift

The proliferation of bike share programs in the last three or four years is in part a reflection of a larger culture shift in the US away from driving and car-centric suburbs and toward denser urban neighborhoods where cars are not necessary. A 2012 report, *Transportation and the New Generation*, found that vehicle miles driven by Americans reached its peak in 2005 and has been dropping ever since. That trend is most evident in younger generations: between 2001 and 2009, the average annual number of vehicle-miles driven by 16- to 34-year-olds dropped 23%. Instead, by 2009 16- to 34-year-olds were taking 24% more bike trips, walking 16% more frequently, and increasing the number of passenger-miles traveled on public transit by 40% per capita. And according to Federal Highway Administration, 26% of young people between 14 and 34 did not have a driver’s license in 2010, up from 21% in 2000⁽²³⁾.

There are a number of factors at work in this shift away from driving. After 60 years of migration towards car dependent suburbs, the movement has reversed⁽²⁴⁾. Retiring Boomers and Millennials are returning to urban areas with mixed use developments that are walkable and have more transportation options. Revitalized urban areas and transit-oriented developments are attracting two generations of Americans: baby boomers and millennials. Many baby boomers are now on the verge of retirement and have a desire to downsize to housing with less upkeep and amenities within walking distance. Meanwhile, millennials are just setting off on their own and entering the workforce, and their interest in urban areas is fueled by distaste for long commutes, an awareness of their environmental impact, and a desire to be near friends and an active urban environment with concerts, bars, and activities⁽²³⁾ ⁽²⁵⁾.

educated, tech-savvy workforce and the businesses that want to employ them. Increasingly, younger generations are more interested in doing without a car and living in urban areas with easy access to public transportation and amenities (see sidebar). Greg Ballard, the Mayor of Indianapolis, has championed massive improvements to the city's bike infrastructure, pointing out that "it's about talent attraction and business attraction, and you need to know the trends that are coming forward now. So when you look at what young people are looking for, when you look at businesses who want to hire those people, you have to create that kind of city, and that's really what we're trying to do."⁽¹⁸⁾

Encourages infill development downtown

Bike share makes urban living more attractive and convenient, which in turn attracts development of higher density, mixed-use buildings with a range of housing options and businesses. The success of City Creek and other projects have demonstrated the demand for a revitalized downtown Salt Lake with vibrant neighborhoods and commercial areas. Furthermore, infill development returns the favor to bike share: an increase in high density, mixed-use buildings promotes a denser and more successful bike share program.

The majority of 2013 GREENbike Annual Member Survey respondents reported shopping at businesses near a bike station, and 45% said they were more likely to move downtown if more stations are installed. Additionally, 74% said that if they moved downtown, they would choose a condo/apartment with a station nearby. For many annual members, GREENbike is an important amenity that contributes to home's value.

6.6 Tourism

GREENbike offers an excellent service to visitors to Salt Lake City. It provides a convenient and fun way for visitors to explore downtown and to travel between their hotel and tourist attractions. With the opening of the Green Line extension to the airport, visitors can now take TRAX into town and use GREENbikes to get around, eliminating the need for a car. Conference organizers and conventions like the Outdoor Retailer show that are committed to sustainable and environmentally friendly practices will be attracted to the city because of the options that GREENbike provides.

Visit Salt Lake, one of GREENbike's Strategic Partners, is the tourism entity in charge of promoting Salt Lake City as a convention and travel destination, and provides support for conventions and visitors. Its Annual Report shows that in 2013:

- Approximately 200,000 meeting/convention delegates came through the convention center, and overall attendance in the building for all Salt Palace Convention Center events (day events, consumer shows, etc) was over 500,000 people.
- The Salt Palace Visitors Center tracked 361,391 visitors in 2013.

GREENbike belongs to the B-cycle family of bike share programs, and annual memberships may be used in multiple cities, which gives bike share members from other cities an incentive to visit Salt Lake. In addition,



Photo: Paul Duane, slugmag.com

tourists who do not have memberships elsewhere can purchase 24-hour passes, which can generate a significant amount of revenue.

6.7 Bicycle Safety / Increased Use

The branding of GREENbikes makes them highly visible and easily recognizable, which increases the awareness of cyclists in the eyes of drivers. Though helmets are not required, GREENbike offers its annual members free helmets – green, to match the bikes.

Bike share also has the benefit of attracting new cyclists, and with more cyclists on the road, drivers become more

aware and cautious. One study found that a doubling of the number of cyclists appeared to result in a one third drop in crashes with a vehicle ⁽¹⁹⁾, indicating that there's a "safety in numbers" phenomenon in effect. GREENbike reported no fatalities or injuries in its first season of operation.

Bike sharing's convenience, safety, and comfort are appealing to new cyclists, particularly women ⁽²⁰⁾. In 2009, 24% of bike trips were taken by women ⁽²¹⁾; however, a 2012 study found that in North America, 43% of bike share members were female ⁽²²⁾. With roughly 40% of all GREENbike riders being female, the program is on par with trends of increased female ridership among U.S. bike share programs.

7. GREENbike System Evaluation

This section features key system data from GREENbike's first year of operation—April 8th through December 15th, 2013. Evaluation of GREENbike's first season provides baseline information to help inform future program decisions.

Before the program opened it was unclear exactly how popular the system would be, how the program would be used, and the factors that would influence program use. GREENbike exceeded expectations in its first year with over 25,000 trips, which established valuable GREENbike usage information. For instance, the majority of trips, roughly two thirds, are taken by 24-hour users. This accounts for same station returns (a bike checked out and returned to the same station) being the most popular trips taken at each station, with exception the Intermodal Hub Station. Annual members tend to be more "destination oriented" taking short trips from one station to another, often using the program to commute and access transit stops, eat at restaurants, shop, etc. Having a detailed understanding of the trips users take and how they incorporate bike share into their travel behaviors is critical for future station planning. In addition, a notable observation is how weather impacts the program. As colder fall temperatures and precipitation arrived in late 2013, program usage was stifled, and operations were put on hold until the following spring.

Through analysis of the GREENbike program and other bike share programs around the country, personal vehicle replacement, additional transit ridership, and health and air quality improvements associated with using GREENbike have been estimated. These projections help forecast the added benefits of increased program usage as GREENbike expands the number of stations and bicycles in downtown Salt Lake City.

Table 4: User type summary

User Type	Checkouts	Pass/Member Type
24-Hour Kiosk	16,226	9,524
7-Day Membership	316	76
Annual Membership	8,819	308
Total	25,361	9,908

Table 5 shows the total checkouts per station for the 2013 GREENbike season. Stations are ranked by most checkouts.

Table 5: The number of total bikes checked out per station for the 2013 GREENbike season. *Note: The Radisson and 300 South 160 East stations were not added to the program until mid-2013 season.*

Rank	Checkout Station	Total Checkouts
1	Key Bank Station (Main St. S. Temple)	3,694
2	Rocky Mountain Station (250S Main St.)	3,432
3	Squatters Station (150W 300S)	2,665
4	Exchange Place Station (350S Main St.)	2,540
5	Harmons Station (110E 100S)	2,521
6	Tour of Utah Station (350S 200E)	2,504
7	Fidelity Station (400W S. Temple)	2,320
8	348 West 200 South Station	1,807
9	Intermodal Hub Station (310S 600W)	1,493
10	Backcountry.com Station (30S W. Temple)	1,138
11	300 South 160 East Station	524
12	Radisson Station (215W S. Temple)	420

Table 6 lists trips ranked by returns to the same station from which the trip began. The top five trips are outlined and total returns are highlighted in red.

Table 6: Trips ranked by same station returns

Rank	Station	Total Checkouts	Returns	SSRR
1	Key Bank Station (Main St. S. Temple)	3,694	1,194	32%
2	Rocky Mountain Station (250S Main St.)	3,432	870	25%
3	Squatters Station (150W 300S)	2,665	755	28%
4	Exchange Place Station (350S Main St.)	2,540	726	29%
5	Tour of Utah Station (350S 200E)	2,504	667	27%
6	Fidelity Station (400W S. Temple)	2,320	660	28%
7	Harmons Station (110E 100S)	2,521	503	20%
8	348 West 200 South Station	1,807	384	21%
9	Backcountry.com Station (30S W. Temple)	1,138	331	29%
10	Intermodal Hub Station (310S 600W)	1,493	200	13%
11	Radisson Station (215W S. Temple)	420	125	30%
12	300 South 160 East Station	524	109	21%

Table 7 shows stations ranked by the percentage of a station's trips that originate and terminate at the same station. The average SSRR for all stations is 25%. The top five trips are outlined and total returns are highlighted in red.

Table 7: Trips ranked by same station return rate (SSRR)

Rank by SSRR	Checkout Station	Total Checkouts	Returns	SSRR
1	Key Bank Station (Main St. S. Temple)	3,694	1,194	32%
2	Radisson Station (215W S. Temple)	420	125	30%
3	Backcountry.com Station (30S W. Temple)	1,138	331	29%
3	Exchange Place Station (350S Main St.)	2,540	726	29%
5	Fidelity Station (400W S. Temple)	2,320	660	28%
5	Squatters Station (150W 300S)	2,665	755	28%
7	Tour of Utah Station (350S 200E)	2,504	667	27%
8	Rocky Mountain Station (250S Main St.)	3,432	870	25%
9	348 West 200 South Station	1,807	384	21%
9	300 South 160 East Station	524	109	21%
11	Harmons Station (110E 100S)	2,521	503	20%
12	Intermodal Hub Station (310S 600W)	1,493	200	13%

Table 8 provides the most frequent trip for *each station*, not including trips that begin and end at the same station. This is *not the same* as the most frequent trips overall. However, many of the most frequent trips program-wide do coincide with this table.

Table 8: Most frequent trip of each station (different station return)

Checkout Station		Return Station	Returns
Rocky Mountain Station (250S Main St.)	to	Intermodal Hub (310S 600W)	581
Key Bank Station (S. Temple Main St.)	to	Fidelity Station (400W S. Temple)	557
Intermodal Hub Station (310S 600W)	to	Rocky Mountain Station	496
Fidelity Station (400S W. Temple)	to	Key Bank Station	492
Tour of Utah Station (350S 200E)	to	Harmons Station	396
Harmons Station (110E 100S)	to	Tour of Utah Station (350S 200E)	395
Squatters Station @ The Rose	to	Exchange Place Station	393
Exchange Place Station (350S Main St.)	to	Squatters Station @ The Rose	338
348 West 200 South Station	to	Key Bank Station	218
Backcountry.com Station @ Visit Salt Lake	to	Fidelity Station (400W S. Temple)	150
300 South 160 East Station	to	Rocky Mountain Power Station	99
Radisson Station (215W S. Temple)	to	Key Bank Station	64

Table 9 shows total checkouts and trips ranked by the total number of trips that begin and end at a different station. For example, a bike was checked out from the Fidelity Station and then returned to the Key Bank Station 492 times -- the fourth most frequent trip overall (not including trips starting and ending at the same station). The top five trips are outlined and total returns are highlighted in red.

Table 9: Trips ranked by different station return

Rank by Returns	Checkout Station	Total Checkouts	Return Station	Returns	% of checkouts
1	Rocky Mountain Station	3,432	Intermodal Hub	581	17%
2	Key Bank Station	3,694	Fidelity Station	557	15%
3	Intermodal Hub	1,493	Rocky Mountain Station	496	33%
4	Fidelity Station	2,320	Key Bank Station	492	21%
5	Tour of Utah Station	2,504	Harmons Station	396	16%
6	Harmons Station	2,521	Tour of Utah Station	395	16%
7	Squatters Station	2,665	Exchange Place	393	15%
8	Key Bank Station	3,694	Rocky Mountain Station	345	9%
9	Exchange Place Station	2,540	Squatters Station	338	13%
10	Rocky Mountain Station	3,432	Tour of Utah Station	318	9%
11	Rocky Mountain Station	3,432	Key Bank Station	317	9%
12	Rocky Mountain Station	3,432	Harmons Station	313	9%
13	Squatters Station	2,665	Rocky Mountain Station	288	11%
14	Key Bank Station	3,694	348 West 200 South Station	286	8%
15	Key Bank Station	3,694	Exchange Place Station	269	7%

In Table 10, trips are ranked by the percentage of total checkouts of the station from which the trip began (not including trips that begin and end at the same station). For example, one third (33%) of all trips that began at Intermodal Hub ended at the Rocky Mountain Power Station. The top five trips are outlined and total percent of trips are highlighted in red.

Table 10: Trips ranked by percent of checkouts (different station return)

Rank by %	Checkout Station	Total Checkouts	Return Station	Returns	% of checkouts
1	Intermodal Hub	1,493	Rocky Mountain Station	496	33%
2	Fidelity Station	2,320	Key Bank Station	492	21%
3	300 South 160 East Station	524	Rocky Mountain Station	99	19%
4	Rocky Mountain Station	3,432	Intermodal Hub Station	581	17%
5	Tour of Utah Station	2,504	Harmons Station	396	16%
5	Harmons Station	2,521	Tour of Utah Station	395	16%
6	300 South 160 East Station	524	Harmons Station	81	15%
6	Radisson Station	420	Key Bank Station	64	15%
6	Key Bank Station	3,694	Fidelity Station	557	15%
6	Radisson Station	420	Fidelity Station	62	15%
6	Squatters Station	2,665	Exchange Place Station	393	15%
7	Intermodal Hub	1,493	Tour of Utah Station	204	14%
8	Exchange Place	2,540	Squatters Station	338	13%
8	Backcountry.com Station	1,138	Fidelity Station	150	13%
9	348 West 200 South Station	1,807	Key Bank Station	218	12%

Figure 1 shows the number of bicycles checked out each week during the 2013 operating season. As shown in the chart, inclement weather has a substantial impact on bike share ridership. In 2013, ridership spiked during warm dry weeks, and then dropped sharply when cooler temperatures and more precipitation occurred in the fall.

Figure 1: Weekly trips 4/8/13 - 12/8/13

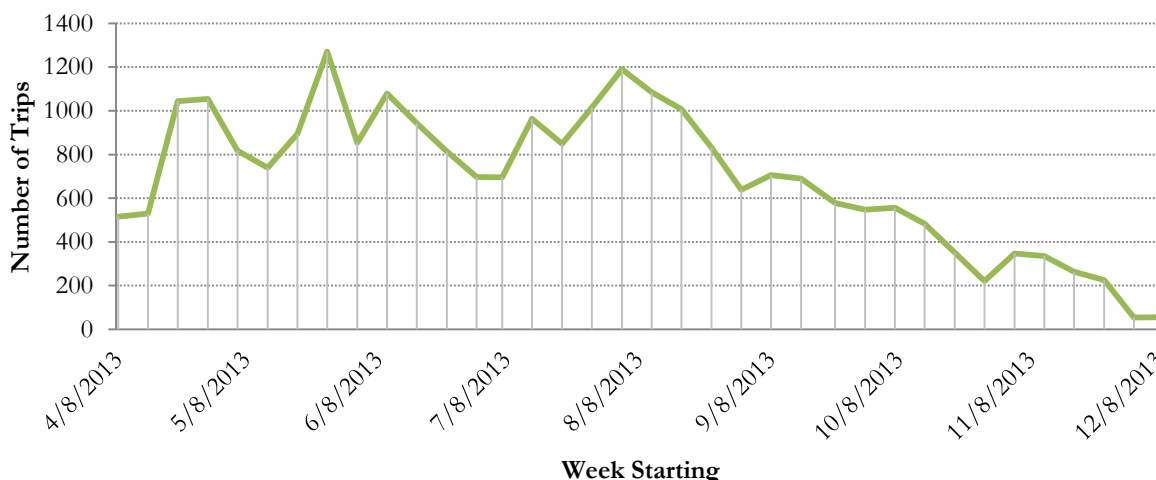


Table 11 shows GREENbike trips replacing car trips. With help from the Wasatch Front Regional Council, the following vehicle and transit information was determined based on the assumptions given in the table. VMT is vehicle miles traveled.

Table 11: GREENbike trips replacing car trips.

GREENbike trips in 2013	25,361
Daily trips with 65 bikes available	99.45
GREENbike miles per day	275
Direct auto VMT replaced per day	110
New transit capture VMT replaced per day	116
Total VMT reduced per day	229
Total VMT reduced per year	58,322
Cold starts reduced per day	57
Cold starts reduced per year	14,580
Assumptions	
Trips per station per day	9.0
Miles per trip	2.5
Trips directly replacing auto trips	50%
New commuter trip by transit, 1/2 of which still drive to transit	15%
Miles each way average commuter trip to SLC	7
Days of operation per year	255

8. Site Selection and Network Strategy

This section describes the criteria for selecting service area boundaries, conditions for station site selection, and the phasing of future expansion.

8.1 Criteria for bike share service area

Successful bike share systems are located in areas with elements such as high population and employment densities, access to public transportation systems, and where there is a wide variety of trip generators that will attract users throughout the day and week. When GREENbike was initially launched, the network was focused on the heart of downtown as an area with a high concentration of these elements and the highest potential for demand, and therefore the greatest potential for success.

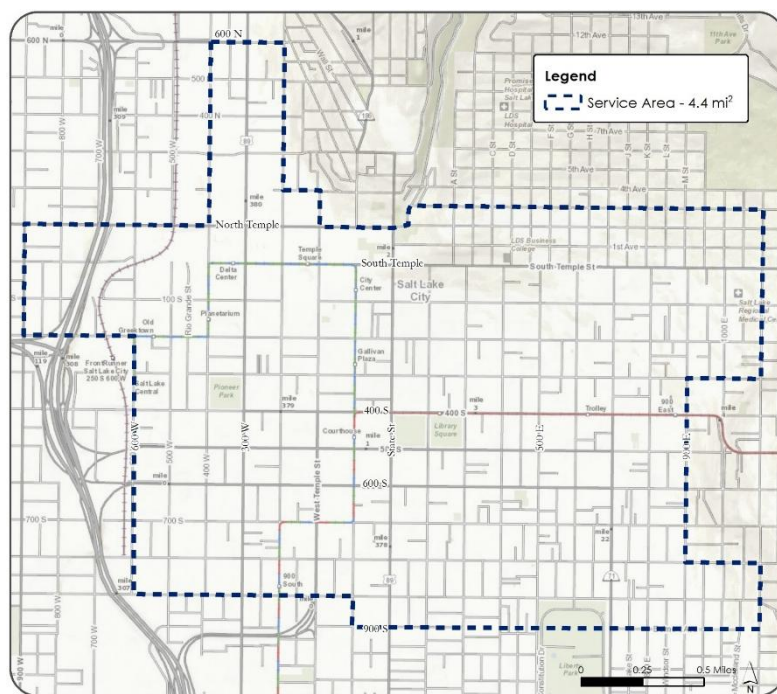
As the GREENbike program expands, the focus will be on building out from the present system to create a dense, convenient, and accessible network that connects a wide range of origins and destinations. The network will spread out from the core depending on the success of current stations, user demand, and the availability of funds or sponsorships. The existing system must be established as successful before expanding to areas with lower demand or fewer trip generators, or to areas that are less well connected to the network.

There are a number of factors that were considered in determining the bike share service area with the highest potential for success, including:

- Population density, housing density, and locations of affordable housing
- Employment density
- Trip generators: retail, restaurants, bars, hotels, tourist attractions, and public services
- Access to public transportation
- Bike infrastructure
- Limiting factors: topography, physical barriers

These factors and the role they play in establishing the GREENbike service area will be discussed in further detail in the following sections.

The map on this page shows the approximate boundary of the service area, which encompasses 4.4 square miles of downtown Salt Lake City. Expansion outside this service area will depend on demand and availability of sufficient funds to launch and sustain operations. Future expansion may involve satellite areas where there may be high demand but that are discontinuous from the downtown core area, such as the Sugarhouse neighborhood. Other areas may be desired from a social equity standpoint or as an extension of transit. The need for such expansion must be demonstrated and a plan must be in place for financial support.



8.1.1 Population and Employment Density

The number of people who live and work in downtown Salt Lake is one of the most important factors in determining GREENbike's service area and ensuring its success. Salt Lake City's population at the time of the 2010 Census was 186,440, which is small compared to most cities with a bike share system. However, downtown Salt Lake City serves as an employment hub that attracts workers from all over the Wasatch Front (see Table 12 for population totals). According to an early survey, a third of GREENbike users were from Salt Lake County, a third spread throughout the Wasatch Front, and the final third came from out of state.

The population of the GREENbike service area is 28,896, or approximately 6,567 people per square mile^d. The population tends to be denser in the neighborhoods to the east of the downtown core due to the high number of apartment buildings located between downtown and the University of Utah (see population density map below).

The employment density of the service area is 21,165 people per square mile, or a total of 93,124. The highest density of employment is in the core of downtown, which has a total employment number of 41,951. These numbers demonstrate the large influx of people into the downtown area who could potentially use GREENbike to get around during the work day (see employment density map on the following page).

Table 12: Salt Lake City population totals for 2010 and 2040		
	2010 ^b	2040 ^c
Salt Lake City	186,440	229,985

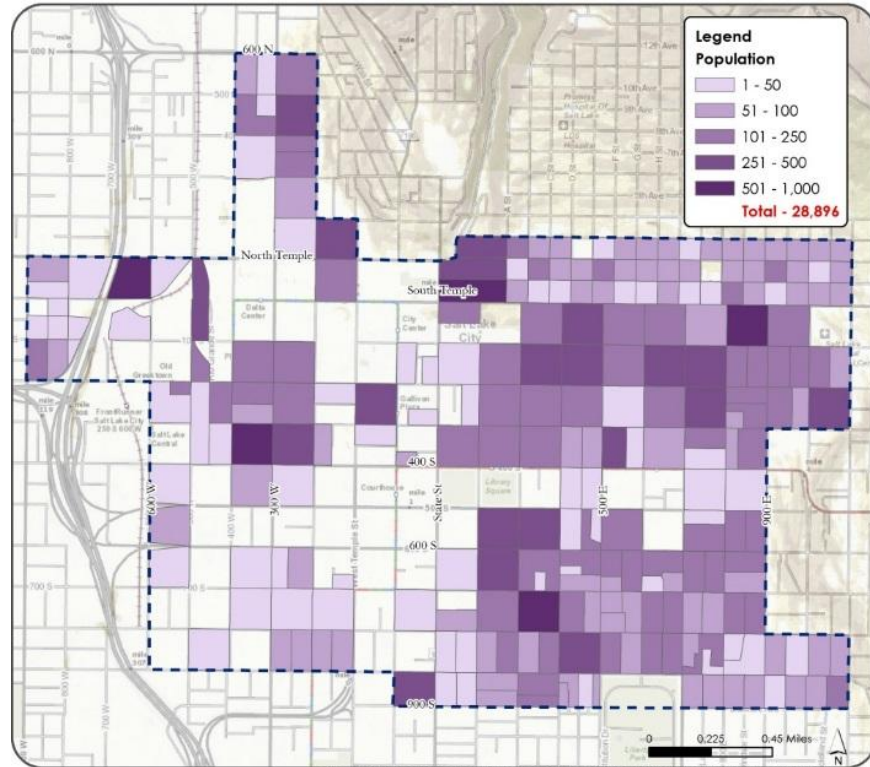
Greater Wasatch Front Area population totals for 2010 and 2040		
County	2010	2040
Davis	306,479	426,392
SLCO	1,029,655	1,507,997
Summit	36,324	71,433
Tooele	58,218	128,348
Utah	516,564	1,019,828
Weber	231,236	349,009
Total	2,178,476	3,503,007

^b Source: U.S. Census Bureau, Population Division. (2013, May). State and County QuickFacts. Retrieved from: <http://quickfacts.census.gov/qfd/states/49000.html>

^c Utah Governor's Office of Planning & Budget. (2012). 2012 Baseline Projections: Subcounty Population Projections. Retrieved from: <http://governor.utah.gov/DEA/projections.html>

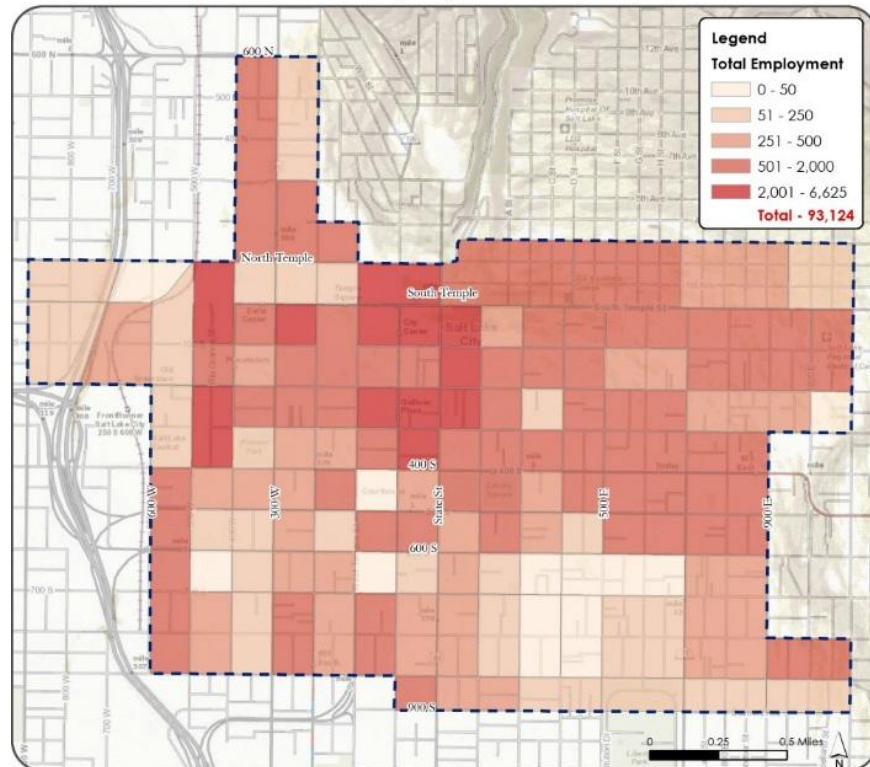
^d Wasatch Front Regional Council and Mountainland Association of Governments. (2011). WRF-C-MAG Regional Travel Model.

GREENbike Service Area Population



Source: Utah Automated Geographic Reference Center dataset derived from 2010 US Census Bureau Data (2011, June). Retrieved from <http://gis.utah.gov/data/demographic/2010-census-data/>

GREENbike Service Area Employment



Source: Wasatch Front Regional Council /Mountainland Assoc. of Governments Regional Travel Model, Version 7.0 (2011, February 1). The WFR-CMAG travel model was used in this study, but the results and conclusions have not been warranted by either WFR-C or MAG.

8.1.2 Trip Generators

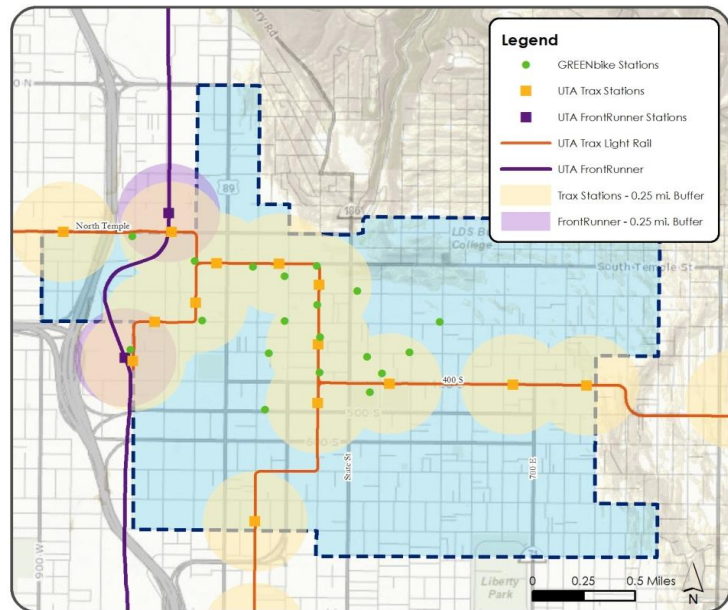
The success of bike share systems depends in part on having stations located in close proximity to a variety of trip generators. A range of destinations near stations will generate activity at different times of the day and week, contributing to a higher number of trips taken per bike. Stations should be placed in locations with access to:

- Housing
- Office buildings
- Retail
- Restaurants and bars
- Hotels
- Tourist attractions
- Civic buildings

Salt Lake City’s Central Business District has the highest concentration of destinations along the Wasatch Front. The neighborhoods adjacent to the downtown core also have a large number of destinations which will play a part in determining where stations will be located in the future.

8.1.3 Access to Public transportation

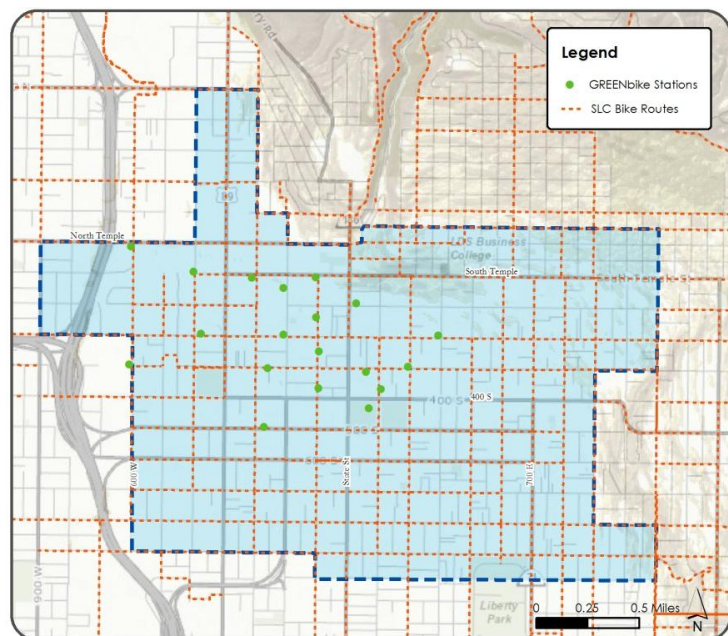
GREENbike works well as an extension of UTA’s public transportation system. Where possible, bike share stations should be located adjacent to or within easy walking distance (quarter mile) of TRAX stations or bus stops within the service area to allow users to connect with transit.



Areas within a quarter-mile walking distance from a TRAX or FrontRunner station.

8.1.4 Bike Infrastructure

Where possible, bike share stations should be located on or near streets with good bike infrastructure such as bike lanes, cycle tracks, and shared lanes. Some streets with a large number of trip generators may not be suitable for cycling such as 400 South and State Street. The 400 South corridor is home to a number of businesses, shops, and restaurants as well as the Red TRAX line to the University, but is not a safe cycling route due to heavy traffic and a lack of bike infrastructure. Bike share stations should be placed within short walking distance to these streets, but where users could be directed to use other, safer cycling routes.



Bike infrastructure in the GREENbike service area.

8.1.5 Limiting Factors

Salt Lake City's topography is a limiting factor in terms of where the bike share network can be located. Generally it can be assumed that people will be less willing to ride the bikes uphill, resulting in more bikes at downhill stations which would require constant re-balancing. This limits the potential for expansion into the Avenues neighborhood northeast of downtown, and to the University of Utah. Expansion to the University was eliminated from consideration due to the length and steepness of the slope east of 1000 or 1100 East.

Expansion to the west of downtown is constrained by the twin barriers of I-15 and the railroad tracks that run parallel to it. There are fewer streets that connect across this wide industrial corridor, limiting the options to travel safely between the east and west sides. However, North Temple has a bridge with bike lanes over the train tracks and provides access to a number of businesses as well as the Green TRAX line to the airport. This corridor has potential for future expansion.

8.2 Station Density

Bike share programs in other cities typically have stations spaced within between 984 feet and 1,300 feet, which represents a station density of 16-28 stations per square mile. Stations should ideally be located a quarter-mile or 5 minute walking distance apart. Salt Lake City's blocks are large – just two blocks equals about 0.3 miles – and people may be less likely to walk more than a block and a half to access a GREENbike. A dense network with stations placed close together provides people with the option to ride to another station nearby if the one nearest their destination is full. Stations cannot be isolated from the network, but must be within easy riding distance from other stations.

8.3 Site Selection

Within the service area, the exact placement of bike share stations is flexible and depends on factors such as available space on the sidewalk or in the street, location to trip generators, safety, and access to power.

GREENbike prefers to locate stations:

- On minor arterials and lesser streets, where vehicle speeds are lower and less threatening to bike share users.
- On streets with safe cycling infrastructure to encourage smart and legal bicycling by users.
- In close proximity to a variety of trip generators that will attract users at different times of the day.
- Within the public right-of-way on sidewalks, parking strips, or within parking stalls to improve visibility of stations, provide easy access for members, and to avoid the time and expense of acquiring access to private property.
- Within quarter-mile walking distance of TRAX, FrontRunner, or bus stations/stops, to stay within the distance most people are willing to walk to access transit.

Based on physical requirements of the station equipment, station locations must:

- Receive sunlight each day from approximately 9am-3pm to recharge solar batteries, or have access to a 110V AC power source.
- Be situated in a configuration that preserves adequate sight distances for pedestrians, cyclists, or motorists.
- Be in an area that is well-lit at night.
- Have a minimum 4 feet of sidewalk clearance behind a parked bike for pedestrians.
- Not block access to fire hydrants, standpipes, storm drains, or underground utilities.
- Have space for a 56' 10" x 7' footprint with an additional 4' of backup zone if single-sided.
- Have space for a 31' x 8' 6" footprint with an additional 4' on either side for a backup zone if double-sided. (Note: double-sided is more cost effective and therefore preferred.)

8.4 Phasing for Service Area

Phasing for GREENbike expansion will involve increasing station density within the service area. Each phase will add to the existing (as of 2014) network of 20 stations, building up density in the downtown core while expanding outward to establish stations in neighborhoods such as Trolley Square and 9th & 9th. These phases depend on securing the necessary funds and completing more in-depth site analysis to determine final station locations.

Phasing of GREENbike stations 2014 – 2020:

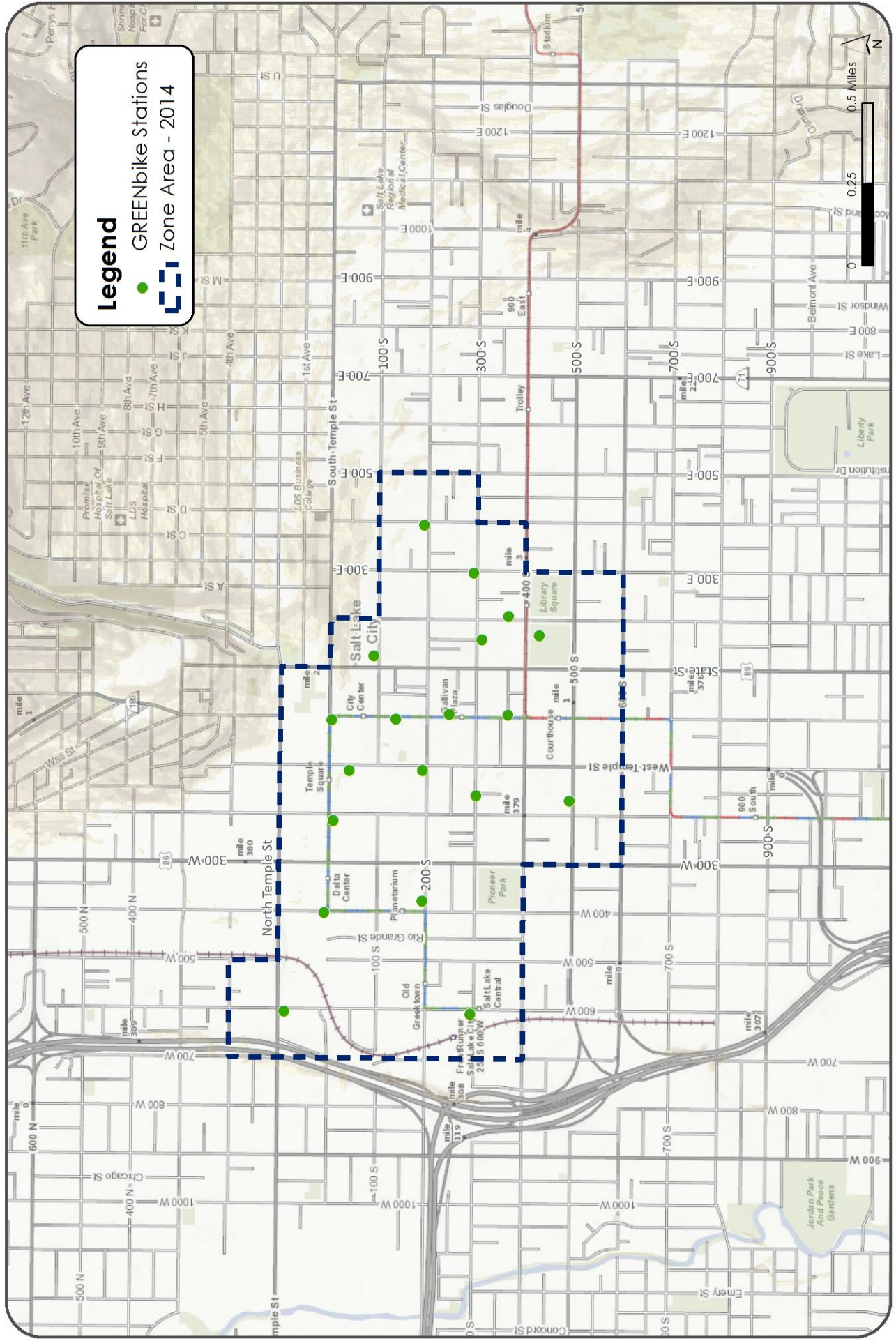
- **Completed as of 2014:** 20 stations
- Phase 1 2016: 30 stations
- Phase 2 2018: 50 stations
- Phase 3 2019: 75 stations
- Phase 4 2020: 100 stations

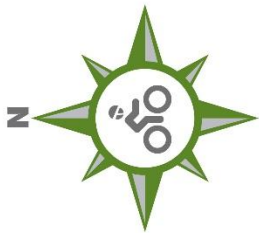
The maps on the following pages show the proposed expansion associated with these phases. For each phase, there is a *phase map* showing phase area and station locations, as well as a *station map* showing trip generators such as housing, restaurants and bars, shopping centers, and entertainment centers. The locations of stations shown on these maps are approximate and may change depending on factors such as sponsorships, infrastructure, available space, and user demand.

A summary of projected revenues and operational expenses follows the maps for each phase.

GREENbike 2014 - 20 Stations

Map of the 2014 locations of GREENbike stations. Zone boundary is drawn to include areas within approximately 1 block of GREENbike stations.





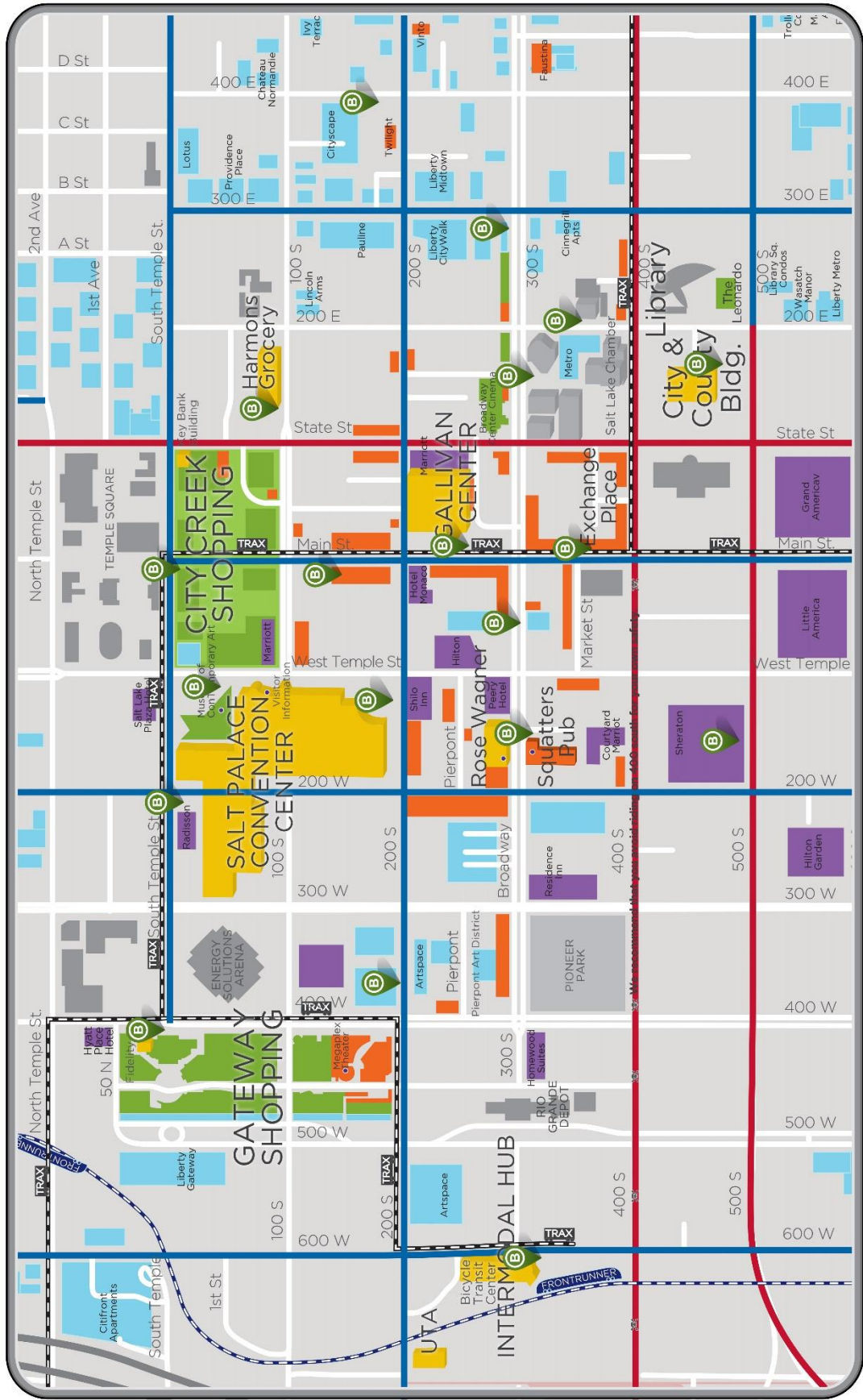
GREENbike

SLC BIKE SHARE

20 Stations / 160 Bikes: 2014

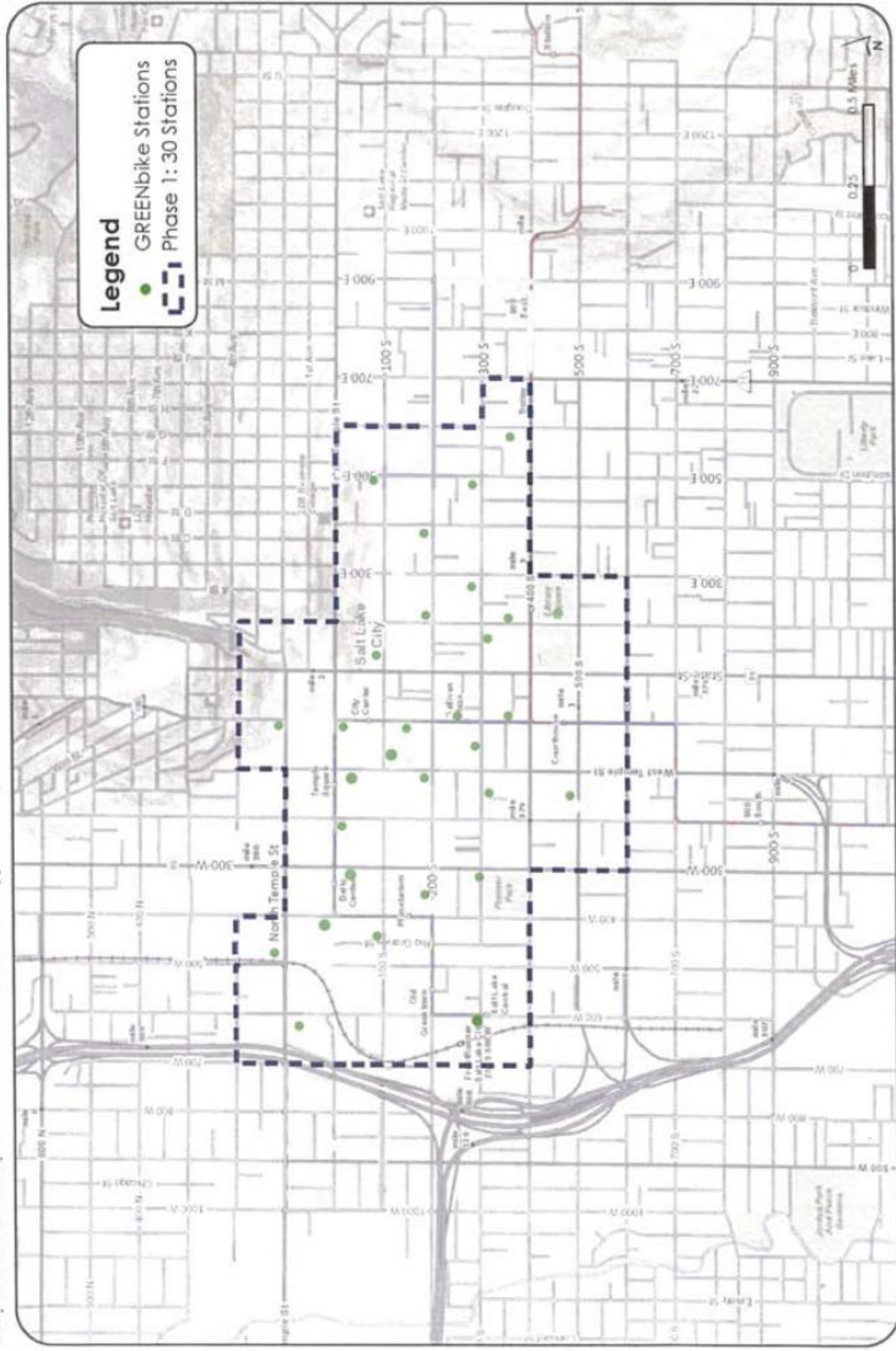
LEGEND

	FOOD/DRINK		HOTEL
	SHOPPING & ENTERTAINMENT		RESIDENTIAL



GREENbike Expansion Phase 1 - 30 Stations

Map showing approximate locations of GREENbike stations in Phase 1 expansion. Exact site selection will take place once funding is in place and after in-depth site analysis. Zone boundary is drawn to include areas within approximately 1 block of GREENbike stations.





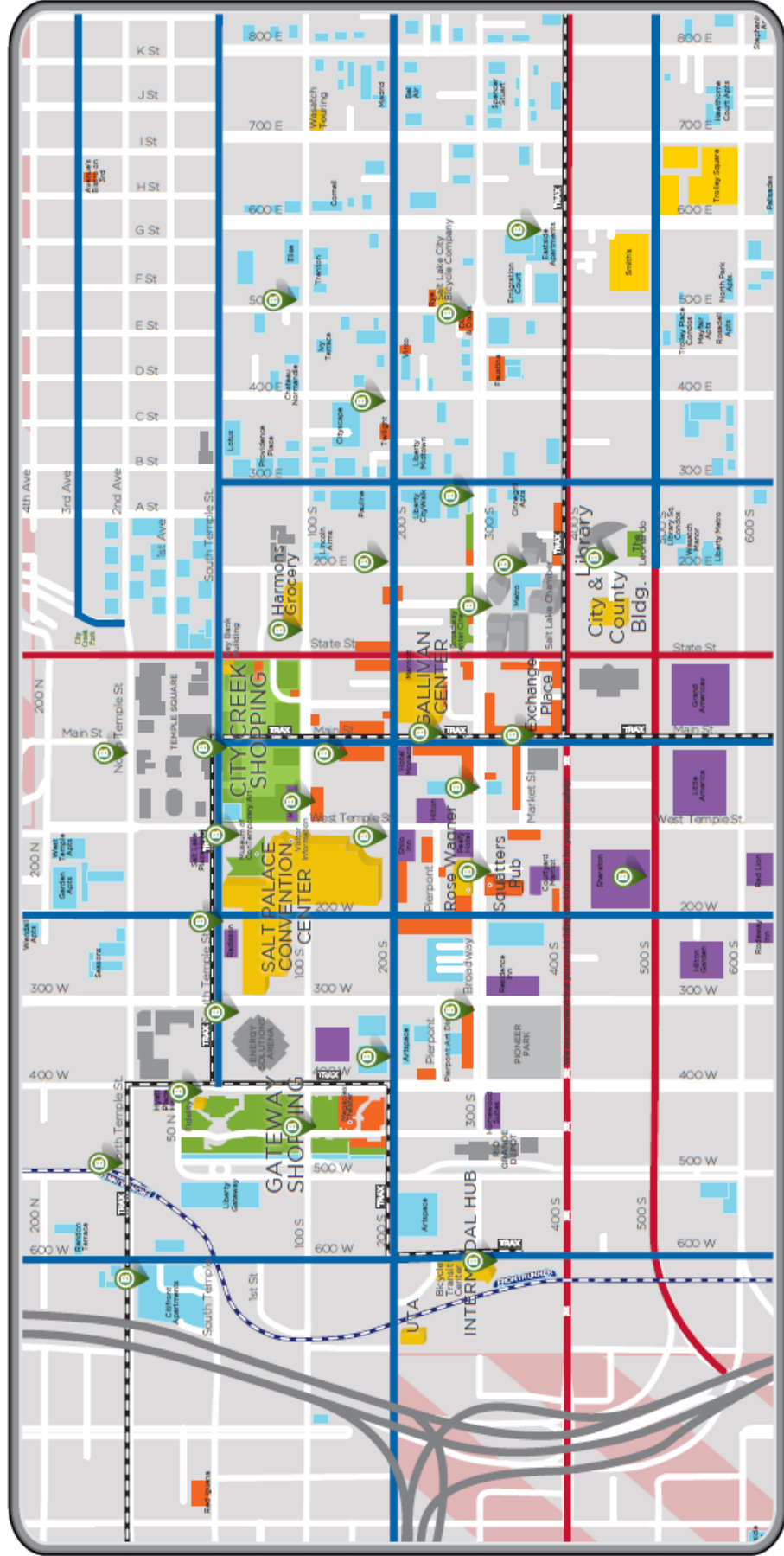
GREENbike

SLC'S NON-PROFIT BIKE SHARE

30 Stations / 260 Bikes: 2016

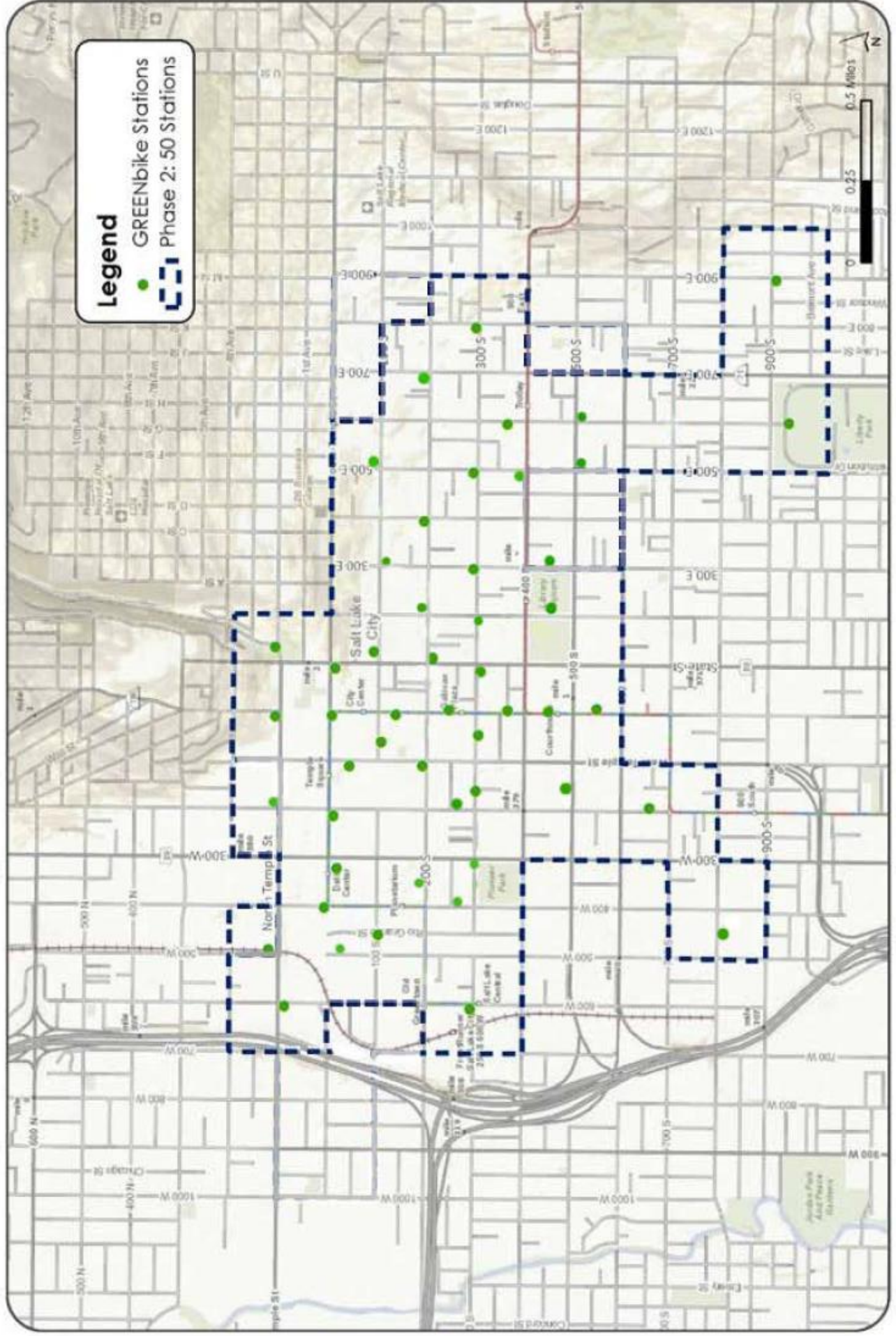
LEGEND

	FOOD/DRINK		HOTEL
	SHOPPING & ENTERTAINMENT		RESIDENTIAL



GREENbike Expansion Phase 2 - 50 Stations

Map showing approximate locations of GREENbike stations in Phase 2 expansion. Exact site selection will take place once funding is in place and after in-depth site analysis. Zone boundary is drawn to include areas within approximately 1 block of GREENbike stations.





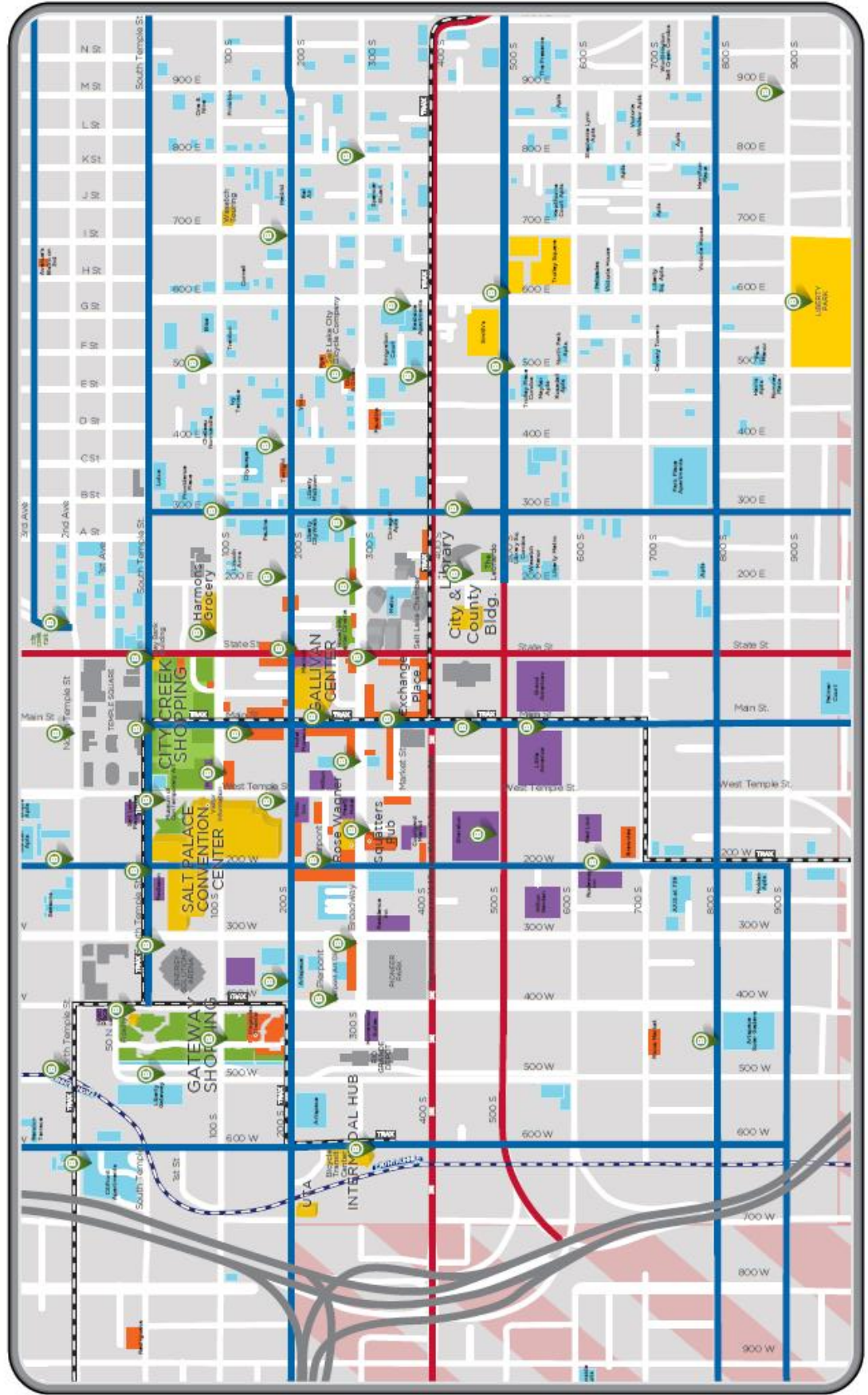
GREENbike

SLC'S NON-PROFIT BIKE SHARE

50 Stations / 450 Bikes: 2018

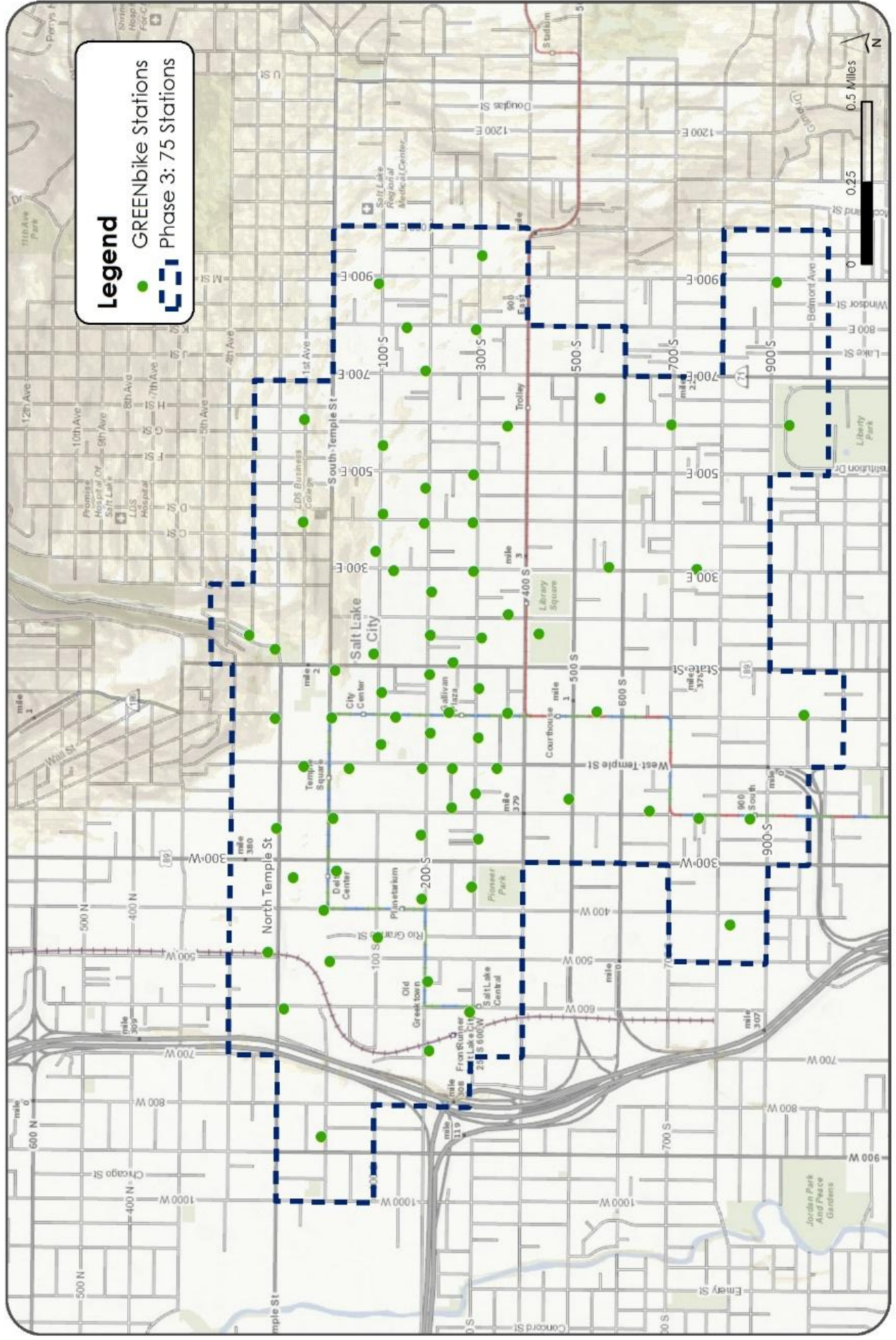
LEGEND

- FOOD/DRINK
- SHOPPING & ENTERTAINMENT
- HOTEL
- RESIDENTIAL



GREENbike Expansion Phase 3 - 75 Stations

Map showing approximate locations of GREENbike stations in Phase 3 expansion. Exact site selection will take place once funding is in place and after in-depth site analysis. Zone boundary is drawn to include areas within approximately 1 block of GREENbike stations.





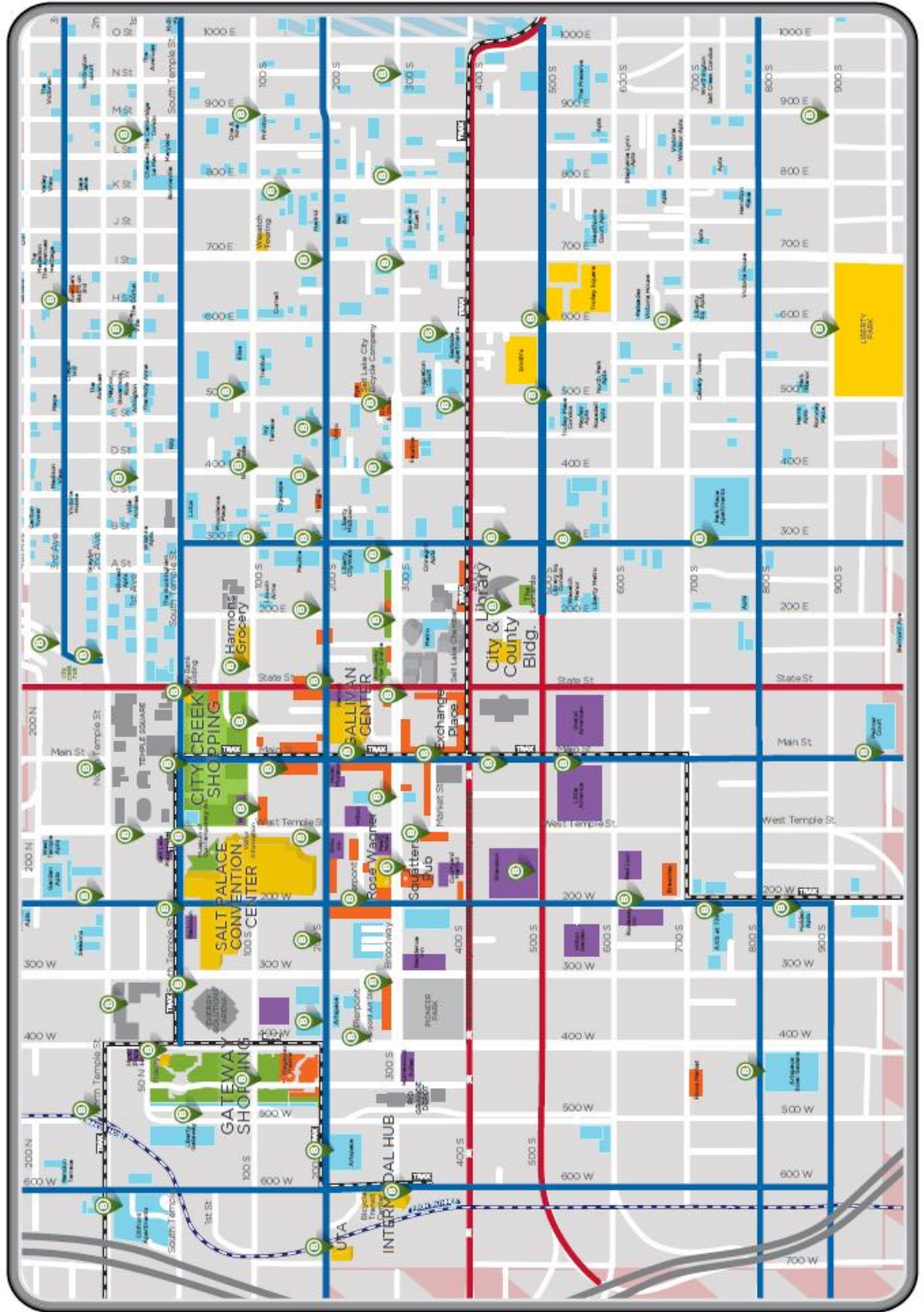
GREENbike

SLC'S NON-PROFIT BIKE SHARE

75 Stations / 700 Bikes: 2019

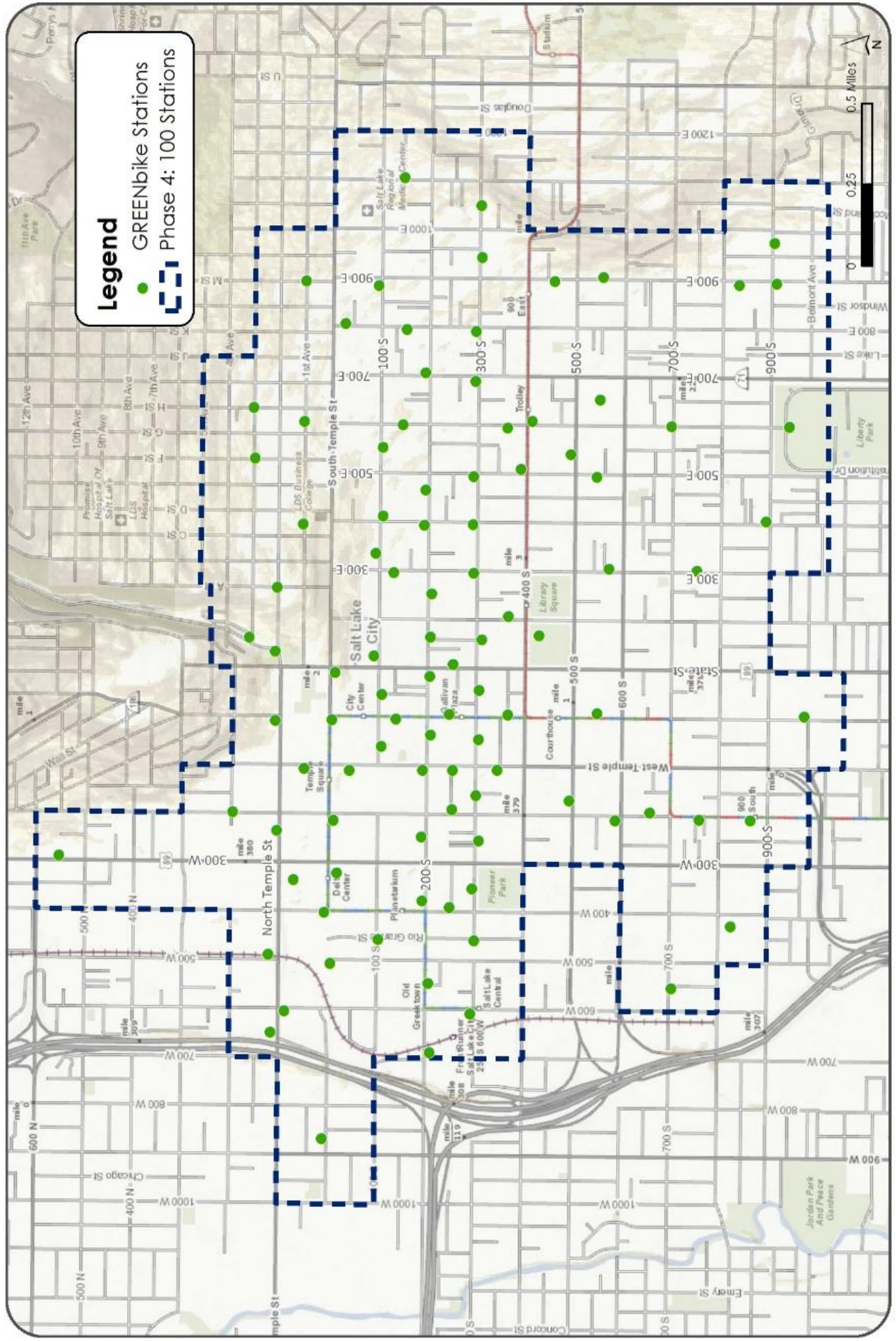
LEGEND

- FOOD/DRINK
- SHOPPING & ENTERTAINMENT
- HOTEL
- RESIDENTIAL



GREENbike Expansion Phase 4 - 100 Stations

Map showing approximate locations of GREENbike stations in Phase 4 expansion. Exact site selection will take place once funding is in place and after in-depth site analysis. Zone boundary is drawn to include areas within approximately 1 block of GREENbike stations.





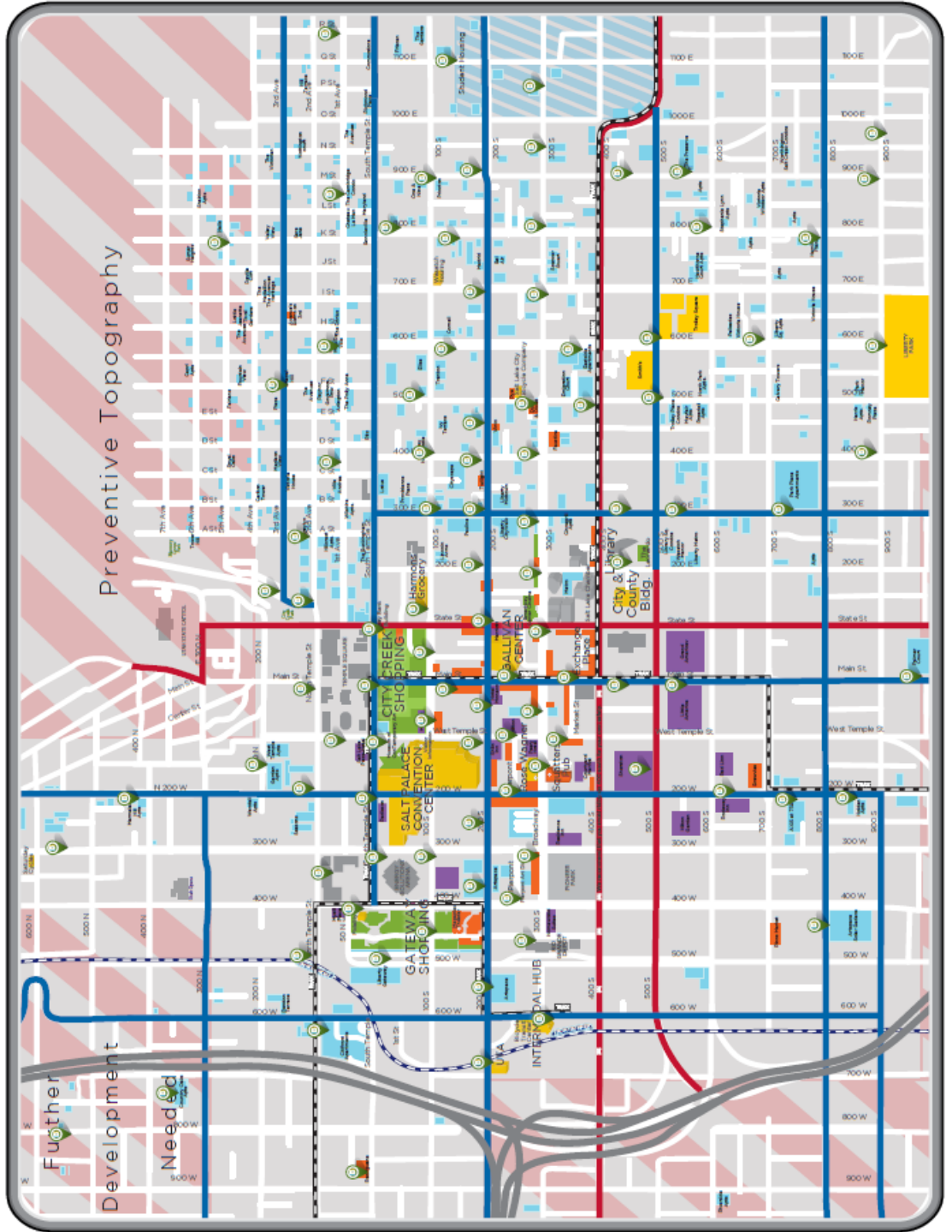
GREENbike

SLC'S NON-PROFIT BIKE SHARE

100 Stations / 1,000 Bikes: 2020

LEGEND

- FOOD/DRINK
- SHOPPING & ENTERTAINMENT
- HOTEL
- RESIDENTIAL



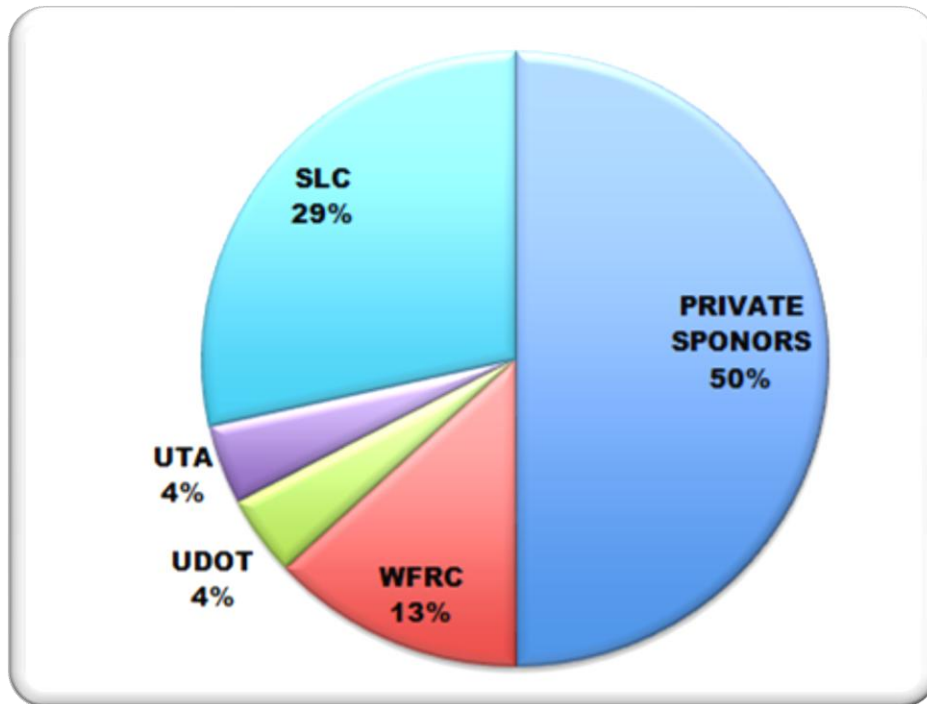
9. Expansion to Satellite Areas Beyond Downtown

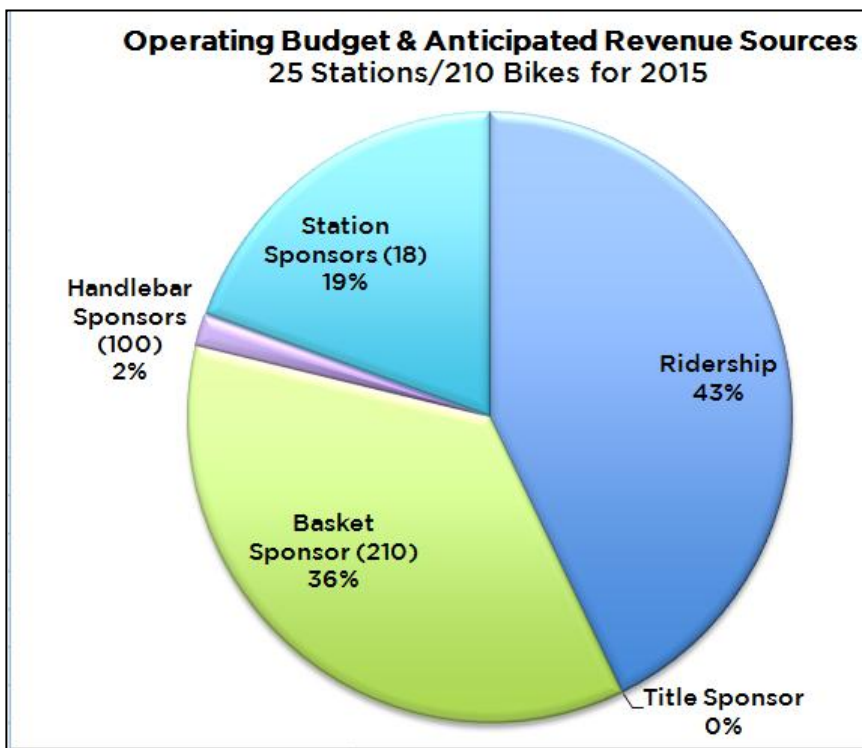
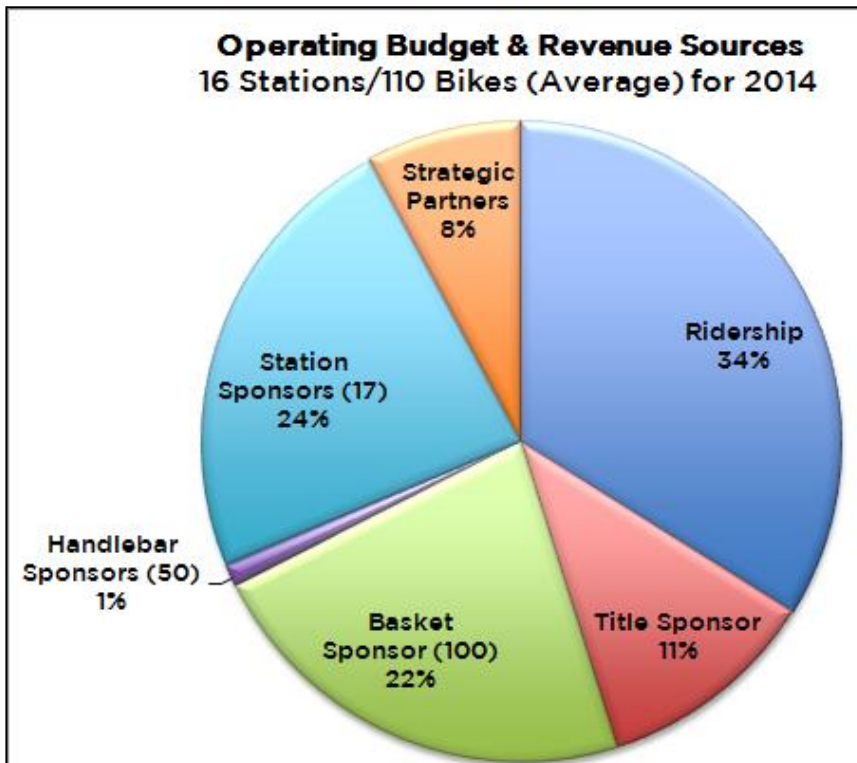
Expanding GREENbike away from downtown will extend the benefits of bike share to other areas of the City, and perhaps enhance the downtown coverage area. However, a careful assessment must first be completed to determine priority expansion areas. Additionally, financial commitments (capital and operational funding) must be obtained and an operational strategy designed before proceeding. Assessment of this type of expansion will require a consultant and/or other assistance.

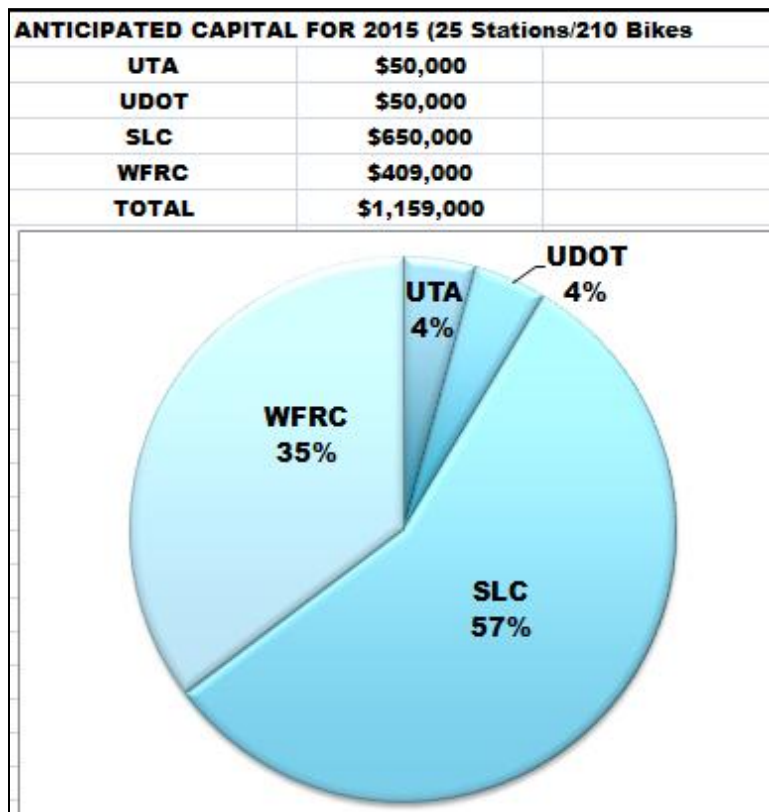
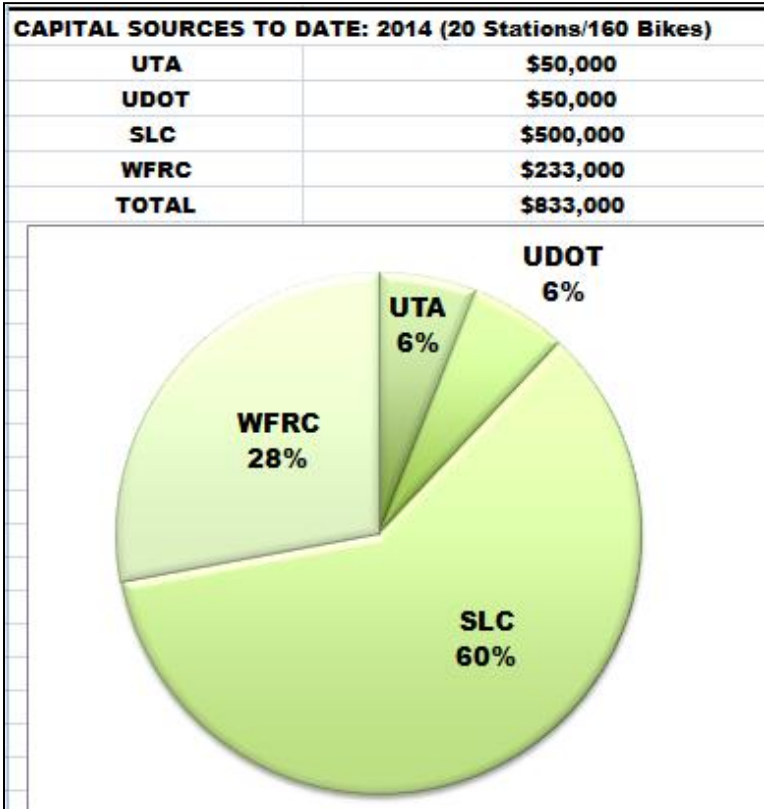
10. GREENbike Financial Summary

10.1 GREENbike Funding

Information below represents all monies received or committed as of 3.22.14
(does not include ridership based revenue)







10.2 Station Ridership Revenue & Operational Expenses

Expansion Forecast

Current and Projected Station Ridership Revenue & Operational Expenses based on sample pro Formas for 10, 30, 50, 75, and 100 Bike Share Stations Systems.

Soft Launch/Pilot: 2013

10 Bike Share Stations

55 Active Bikes

	Annual	Per Month
Expense Per Station	\$31,174.00	\$3,801.71
Revenue Per Station	\$8,170.00	\$996.34
	-\$23,004.00	-\$2,805.37

Phase 1: 2016

30 Bike Share Stations

255 Active Bikes

	Annual	Per Month
Expense Per Station	\$22,936	\$2,797
Revenue Per Station	\$12,135	\$1,480
Balance	-\$10,801	-\$1,317

Phase 2: 2018

50 Bike Share Stations

450 Active Bikes

	Annual	Per Month
Expense Per Station	\$21,831	\$2,662
Revenue Per Station	\$14,128	\$1,723
Balance	-\$7,703	-\$939

Phase 3: 2019

75 Bike Share Stations

700 Active Bikes

	Annual	Per Month
Expense Per Station	\$20,605	\$2,513
Revenue Per Station	\$13,744	\$1,676
Balance	-\$6,861	-\$837

Phase 4: 2020

100 Bike Share Stations

1,000 Active Bikes

	Annual	Per Month
Expense Per Station	\$19,141	\$2,334
Revenue Per Station	\$11,969	\$1,460
Balance	-\$7,172	-\$875

*"Active Bikes" are the average number of bikes on the street at any given time during the operational year (April - December)

10.3 Bike Ridership Revenue & Operational Expenses

Expansion Forecast

Current and Projected Bike Ridership Revenue & Operational Expenses Based on Sample Pro Formas for 10, 30, 50, 75, and 100 Bike Share Station Systems.

Soft Launch/Pilot: 2013

10 Bike Share Stations

55 Active Bikes

	Annual	Per Month
Expense Per Bike	\$5,668	\$691
Revenue Per Bike	\$1,485	\$181
	-\$4,183	-\$510

Phase 1: 2016

30 Bike Share Stations

255 Active Bikes

	Annual	Per Month
Expense Per Bike	\$2,698	\$329
Revenue Per Bike	\$1,428	\$174
Balance	-\$1,270	-\$155

Phase 2: 2018

50 Bike Share Stations

450 Active Bikes

	Annual	Per Month
Expense Per Bike	\$2,426	\$296
Revenue Per Bike	\$1,570	\$191
Balance	-\$856	-\$104

Phase 3: 2019

75 Bike Share Stations

700 Active Bikes

	Annual	Per Month
Expense Per Bike	\$2,208	\$269
Revenue Per Bike	\$1,476	\$180
Balance	-\$732	-\$89

Phase 4: 2020

100 Bike Share Stations

1,000 Active Bikes

	Annual	Per Month
Expense Per Bike	\$1,914	\$233
Revenue Per Bike	\$1,196	\$146
Balance	-\$1,197	-\$88

*"Active Bikes" are the average number of bikes on the street at any given time during the operational year (April - December)

10.4 Farebox Recovery Rate

A Farebox Recovery Rate is a financial measurement used in public transportation management that is equal to the percentage of operational expenses paid for by "fares" or tickets sold to the public. This is also known as Ridership Revenue.

	Ridership Revenue	Operational Expenses	Farebox Rate
Soft Launch/Pilot: 2013 10 Stations & 55 Bikes	\$81,700	\$311,741	26%
Phase 1: 2016 30 Stations & 255 Bikes	\$364,050	\$688,078	53%
Phase 2: 2018 50 Stations & 450 Bikes	\$706,400	\$1,091,570	65%
Phase 3: 2019 75 Stations & 700 Bikes	\$1,033,050	\$1,545,424	67%
Phase 4: 2020 100 Stations & 1,000 Bikes	\$1,196,950	\$1,914,108	63%

10.5 Conservative Expansion Plan Cost Summary

Estimated phased approach with operating expenses and annual operating costs for installing 10, 20, 25 and 25 stations with varying number of active bikes (refer to numbers below).

Implementation Phasing & Schedule	Phase Expansion Capital Cost	System Size	Per Station Operating Expenses	Annual Operating Costs
Existing System as of August 2014	-	20 Stations with 155 Active Bikes	\$23,756	\$475,120
Phase 1: Installed by 2016 Install 10 Stations & 100 Active Bikes	\$650,000	30 Stations with 255 Active Bikes	\$22,936	\$688,078
Phase 2: Installed by 2018 Install 20 Stations/195 Active Bikes	\$1,300,000	50 Stations with 450 Active Bikes	\$21,831	\$1,091,570
Phase 3: Installed by 2019 Install 25 Stations/250 Active Bikes	\$1,625,000	75 Stations with 700 Active Bikes	\$20,606	\$1,545,424
Phase 4: Installed by 2020 Install 25 Stations/300 Active Bikes	\$1,625,000	100 Stations with 1,000 Active Bikes	\$19,140	\$1,914,028
Anticipated Total Capital Investment (\$65,000 per station)	\$5,200,000			

11. Potential Grants

The chart on the following page provides an overview of potential sources of grants.

Utah Related Grant and Funding Opportunities

	Federal Lands Access Program (FLAP)	Surface Transportation Program (STP) (under MAP-21)	Transportation Alternatives Program (TAP) (under MAP-21)	Congestion Mitigation & Air Quality (CMAQ)
<i>Program Purpose</i>	To improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands.	Provides funds for projects or activities that improve surface transportation, including pedestrian and bicycle infrastructure	Provides funds for projects or activities related to surface transportation alternatives	Improving air quality and traffic congestion through transit and ped/bike facilities
<i>Eligible Infrastructure</i>	Transportation planning, engineering, preventive maintenance, rehabilitation, restoration, construction, and reconstruction of Federal Lands Access Transportation Facilities; operation and maintenance of transit facilities; and provisions for pedestrians and bicycles.	Bicycle transportation facilities; pedestrian walkways; recreational trails	Construction, planning, & design of ped/bike facilities; bike share programs; recreational trails; rail trails; turnouts & overlooks; safe routes to schools	Non-recreational bike/ped transportation improvements; projects that reduce air pollution or that shift traffic demand to other transportation modes
<i>Eligible Non-Infrastructure</i>	Research; acquisition of necessary scenic easements and scenic or historic sites ; and environmental mitigation in or adjacent to Federal land to improve public safety and reduce vehicle-caused wildlife mortality while maintaining habitat connectivity	Environmental mitigation; noxious weed control	Historic preservation of transportation facilities; vegetation management; environmental mitigation	Workforce development, training and education activities
<i>Key Project Requirements</i>	Projects provide access to Federal high-use recreation sites; and the project improves safety while improving access to a Federal facility			Priority for projects proven to reduce PM 2.5 emissions
<i>Process Timing</i>	Applications due May 15	Varies	Varies	Varies
<i>Local Match Required</i>	6.77%	Can vary; up to 20%	Can vary; up to 20%	Can vary; up to 20%
<i>Contact</i>	Bill Lawrence, UDOT billlawrence@utah.gov (801) 964-4468	Contact local planning organization / UDOT region	Evelyn Tuddenham, UDOT etuddenham@utah.gov (801) 964-4564	Contact local planning organization / UDOT region
<i>Website</i>	http://www.cflhd.gov/programs/flap/ut/	http://www.fhwa.dot.gov/map21/stp.cfm	http://www.fhwa.dot.gov/map21/tap.cfm	http://www.fhwa.dot.gov/map21/cmaq.cfm
<i>Funding Amount</i>	\$10,652,636 in Utah for FY 2013	Varies depending on federal funding & state allocation \$81,137,116 in Utah for FY 2013	Varies depending on federal funding & state allocation \$6,421,900 in Utah for FY 2013	Varies depending on federal funding and state allocation \$11,501,051 in Utah for FY 2013
<i>Status</i>	Active	Active	Active	Active

12. Next Steps

The GREENbike Strategic Plan is the first comprehensive document to guide Salt Lake City's downtown bike share program. GREENbike will use this plan as a roadmap for future site selections, to capture funding opportunities, and work strategically with its partners to implement the organization's mission, vision, and goals. This section outlines the near-term steps that GREENbike will pursue to realize the programs growth potential and provide a key transportation option to downtown Salt Lake City.

In order for GREENbike to create the most useful bike share program possible and enhance mobility options in downtown Salt Lake City, it's imperative that the Phase 1 and Phase 2 expansions are implemented in accordance with this plan and its timeline. Securing the remaining Phase 1 capital funds and seeking out Phase 2 capital funds is critical due to the nature of the program's funding structure (see Section 10). Because much of the program's operational funds (sponsorships and membership fees) are generated by capital expansion, many operational improvements—e.g., additional staff, expanded customer support, additional operational resources—rely on GREENbike's expansion coming to fruition. Consequently, as program phasing is implemented and more stations and bikes are available to more people, the projected increase to ridership will help pay for a larger overall percentage of the program's operational costs than it does currently with fewer stations.

While immediate capital expansion is being secured, GREENbike will continue to work closely with its partners to develop creative opportunities that may benefit the program in a similar capacity as funding assistance. For instance, GREENbike is working with its strategic partner UTA to obtain a low emissions van (electric or CNG fuel) through a fleet donation. An electric powered or CNG fuel van (or comparable) is needed for station and bike repairs and maintenance, and to quickly and easily transport a larger number of bicycles to special events and for high demand rebalancing while also maintaining the program's goal of reducing vehicle emissions. Capitalizing on available partner resources can help to reduce program expenditures while improving the quality of service, and, in some instances, can be easier than securing monetary contributions. GREENbike is fortunate to have a breadth of high caliber partners and board members with the ability to help the program succeed in many ways.

Consolidating all GREENbike staff, operations, and storage to a single location is also a top near-term priority. Up to the time of this plan, the program has been fortunate to find space to store its fleet during the winter, contract out bike maintenance, and rent repair space at an existing bike shop. However, this creates some operational challenges, and the program is best served by having all staff and operations centrally located. GREENbike is currently pursuing such a space that will provide for a more streamlined operation. This will aid the program as it continues to develop systems and procedures that maximize the efficiency of staff and program resources.

To enhance the program's customer service and outreach efforts with its partners and the public, GREENbike will begin next steps in developing and improving existing communication tools. This includes an ongoing and increased social media presence, developing an annual report and monthly newsletter, revamping the program's website, and improving program signage.

As bike share expands to new downtown Salt Lake City neighborhoods and is available to more people, GREENbike remains committed to providing the most convenient, affordable, and reliable bike share system possible.

Appendix

GREENbike Sample Operational Pro Forma 75 Bike Share Stations / 700 Active Bikes January - December 2019

 Jan - Dec 2019

Ordinary Income/Expense		
Income		
3500 · Sponsors & Strategic Partnerships		
3520 · Sponsorships & Partnerships		\$700,000
3530 · Handlebar Sponsors		\$35,000
Total 3500 · Sponsors & Partnerships		\$735,000
3600 · Ridership Based Revenue		
3610 · Pass/Membership Sales		
3610 · Annual Passes		\$273,000
3620 · Day Passes		\$378,000
3630 · Week Passes		\$24,000
Total 3610 · Pass/Membership Sales		\$675,000
3640 · Usage Fees		\$358,000
Total 3600 · Ridership Based Revenue		\$1,033,000
Total Income		\$1,783,000
Expense		
General Operational Expenses		
6000 · Payroll, Taxes & Benefits		\$826,000
7000 · Taxes and Fees		\$3,000
7100 · Rent, Warehousing & Utilities		\$28,000
7200 · Marketing, Promotions, Graphic Design, Printing		\$75,000
7300 · Community Engagement		\$8,000
7400 · Gas & Other Automotive		\$15,000
7500 · Conferences, Research, Meetings, Travel		\$12,000
7600 · Bank, Merchant Account & Credit Card Fees		\$82,644
7700 · Maintenance & Replacement Parts		\$160,000
7800 · Software Updates & Connectivity Fees		\$195,250
Total General Operational Expenses		\$1,455,000
7900 · Professional Services		
7910 · Construction & Infrastructure		\$10,000
7920 · Accounting, Audit & Legal		\$12,000
7930 · After Hours Customer Service		\$13,000
7940 · Property & Liability Insurance		\$60,000
Total 7900 · Professional Services		\$89,000
Total Expense		\$1,545,000
Total Income		\$1,783,000
Total Net Income		\$266,000

References

1. **Utah Department of Transportation.** Utah Highway Performance Monitoring System and Traffic on Utah Highways: 1988 Vehicle Miles of Travel Reported for Each County by Road Ownership. [Online] 2005. <http://www.udot.utah.gov/main/uconowner.g?n=200507140918541>.
2. —. Utah Highway Performance Monitoring System and Traffic on Utah Highways: 2012 Vehicle Miles of Travel by Functional Class by County. [Online] 2013. <http://www.udot.utah.gov/main/uconowner.g?n=10870309985229116>.
3. **AAA.** Cost of Owning and Operating Vehicle in U.S. Increases Nearly Two Percent According to AAA's 2013 'Your Driving Costs' Study. *aaa.com*. [Online] April 16, 2013. <http://newsroom.aaa.com/2013/04/cost-of-owning-and-operating-vehicle-in-u-s-increases-nearly-two-percent-according-to-aas-2013-your-driving-costs-study/>.
4. **Utah Transit Authority.** UTA Network Study Next Tier Program Final Report. [Online] 2013. http://www.rideuta.com/uploads/FinalNetworkStudy_9Oct2013.pdf.
5. **Utah Department of Transportation.** TravelWise Community Resource Kit. [Online] 2013. <http://www.travelwise.utah.gov/dld/home/TW-Community-Kit.pdf>.
6. **Salt Lake City.** Sustainable Salt Lake - Plan 2015. [Online] 2014. <http://www.slcgov.com/slccgreen/sustainableslc2015>.
7. **Bureau of Economic and Business Research, David Eccles School of Business, University of Utah. Wood, J. Downen, J. Benway, D.J. Li, D.** Salt Lake City Fair Housing Equity Assessment. [Online] 2013. <http://envisionutah.org/images/wc2040/housingfiles/data/saltlakecity.pdf>.
8. **U.S. Environmental Protection Agency, Assessment and Modeling Division.** Comparison of Start Emissions in the La92 and St01 Test Cycles. [Online] 2001. <http://www.epa.gov/otaq/models/mobile6/r01025.pdf>.
9. **Utah Department of Health, Office of Public Health Assessment.** Indicator Report-Overweight or Obese: 1989-2011. *Indicator-Based Information System for Public Health (IBIS-PH)* . [Online] http://ibis.health.utah.gov/indicator/view/OvrwtObe.UT_US.html.
10. **Bassett, D.R.** *Encouraging Physical Activity and Health Through Active Transportation*. 2012. *Kinesiology Review*, 1, pp. 91-99.
11. **Frank, L.D., Andresen, M. A. and Schmid, T. L.** *Obesity relationships with community design, physical activity, and time spent in cars*. 2004, January 1. *American Journal of Preventive Medicine*, 27, 2, pp. 87-96.
12. **Gaitan, Catalina.** New city program lets doctors 'prescribe' bike-sharing memberships. *The Boston Globe*. [Online] March 27, 2014. <http://www.bostonglobe.com/metro/2014/03/27/new-program-will-allow-boston-medical-center-doctors-prescribe-bike-sharing-program/zjwflfCEtAEGfWYxVn4CiN/story.html>.
13. **U.S. Department of Health and Human Services.** Healthy People 2020. [Online] <http://www.healthypeople.gov/2020/default.aspx>.
14. **Clean Air Partnership.** Bike Lanes, On-Street Parking, and Business: A Study of Bloor Street in Toronto's Annex Neighbourhood. [Online] February 2009. <http://grist.files.wordpress.com/2011/04/bike-lanes-parking.pdf>.
15. **Economides, A.** The Economic Case for Bicycle-Friendly Business Districts. [Online] September 2012. <http://www.transportationissuesdaily.com/nine-reasons-to-create-a-bicycle-friendly-business-district/>.
16. **Blue, E.** How bicycling will save the economy (if we let it). [Online] March 2011. <http://grist.org/biking/2011-02-28-how-bicycling-will-save-the-economy/>.
17. **University of Minnesota Center for Transportation Studies.** Nice Ride spurs spending near stations. [Online] July 2012. <http://www.cts.umn.edu/Publications/catalyst/2012/july/niceride/>.
18. **Howard, D.** A Conversation With Greg Ballard. [Online] <http://www.bicycling.com/news/advocacy/conversation-greg-ballard>.
19. **Jacobsen, P.L.** Safety in numbers: more walkers and bicyclists, safer walking and bicycling. *Injury Prevention*. 2003, Vol. 9, 3, pp. 205-209.

20. **Szczepanski, C.** Women on a Roll: Benchmarking women’s bicycling in the United States - and five keys to get more women on wheels. [Online] 2013. <http://usa.streetsblog.org/wp-content/uploads/2013/08/WomenBikeReportweb.pdf>.
21. **U.S. Department of Transportation, Federal Highway Administration.** 2009 National Household Travel Survey. [Online] 2009. <http://nhts.ornl.gov>.
22. **Shaheen, S.** *Public Bikes Sharing Around the World and in North America*. 2013.
23. **Davis, B., et al.** *Transportation and the new generation: Why young people are driving less and what it means for transportation policy*. Washington, DC: U.S : PIRG Education Fund, 2012.
24. **Snyder, T.** Census Breaks the News We Already Knew: The Exurbs Are History. *Streetsblog*. [Online] April 9, 2012. <http://usa.streetsblog.org/2012/04/09/census-breaks-the-news-we-already-knew-the-exurbs-are-history/>.
25. **Leinberger, C.** Death of the Fringe Suburb. *New York Times*. November 25, 2011, p. A19.