

Salt Lake City PEDESTRIAN & BICYCLE Master Plan

Prepared for Salt Lake City
by Alta Planning + Design
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EXECUTIVE SUMMARY

Vision

Walking and bicycling in Salt Lake City will be safe, convenient, comfortable, and viable transportation options that connect people to places, foster recreational and economic development opportunities, improve personal health and the environment, and elevate quality of life.

Goals



INTEGRATION

Integrate walking and bicycling into community planning to enhance livability, health, transportation, the environment, and economic development.



NETWORK

Develop a safe, comfortable, and attractive walking and bicycling network that connects people of all ages, abilities, and neighborhoods to the places they want to go.



MAINTENANCE

Maintain the walking and bicycling system year-round.



TRANSIT CONNECTIONS

Integrate pedestrian and bicycle facilities with transit routes, stations, and stops.

Complete Streets

Streets are an integral part of everyday life and public space. The term “Complete Streets” refers to designing streets for people of all ages and abilities who walk, bicycle, use transit, and drive. Salt Lake City’s Complete Streets ordinance seeks to balance the competing needs of different transportation modes within the unique contexts of each roadway. The walking and bicycling recommendations presented in this plan are consistent with and support Complete Street principles.

Why Invest in Walking & Bicycling

Access for All

Walking and bicycling are affordable transportation options available to everyone. This master plan emphasizes facilities that can be used by all City residents, not just those who are fit and fast walkers or those confident riding bicycles swiftly or in traffic. Street redesign can also result in safer driving, fewer user conflicts through consistency and predictability, and reduced peak hour congestion for motorists.

Personal Health

Active transportation is any self-propelled, human-powered mode of transportation such as walking or bicycling. Such activities help people meet recommended physical activity levels, thereby reducing chronic disease and associated health care costs. Improved walking and bicycling infrastructure for recreation and daily trips such as travel to work, run errands or take kids to school creates a sustained increase in physical activity, and a healthier community.

Economic Health

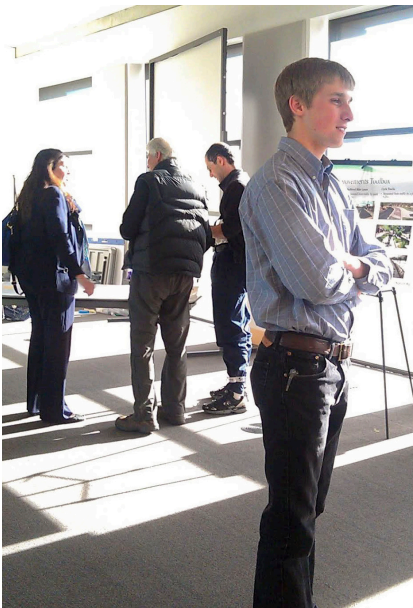
Business and employee relocation decisions are increasingly being made based on quality of life considerations such as walking and bicycling facilities. Active transportation infrastructure also generates tourism revenue, supports local business, and creates jobs.

Air Quality

Combustion engines and industry combine with geographic constraints to create air quality concerns in the Salt Lake Valley. Replacing driving trips with walking and bicycling trips can play an important part in a comprehensive strategy to improve air quality.

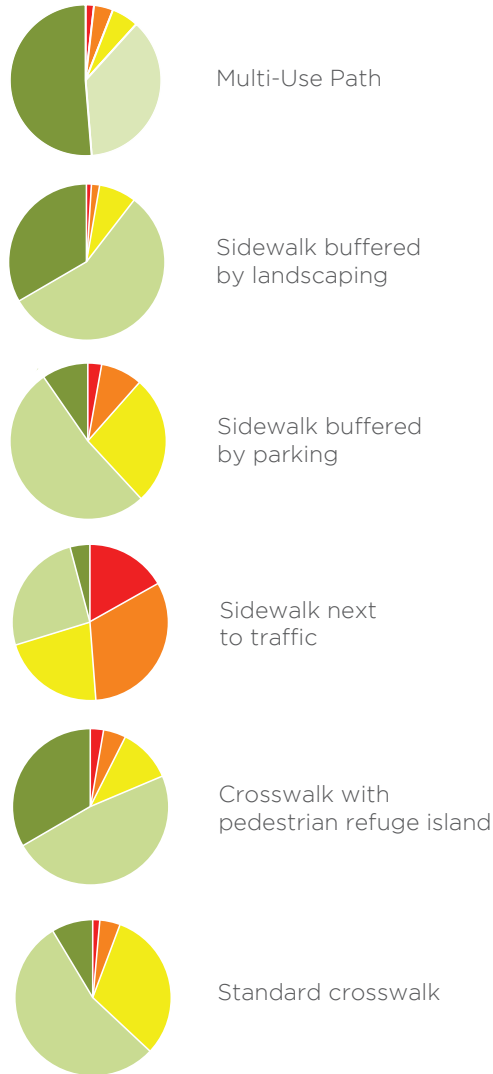
Outreach

- » Ongoing input from focus group, stakeholder committee, and steering committee.
- » Direct engagement with thousands of residents including through the following venues:
 - » 2 public open houses
 - » Online survey with nearly 1,000 responses
 - » Nearly 30 other community events such as farmers markets and community festivals
 - » Open City Hall

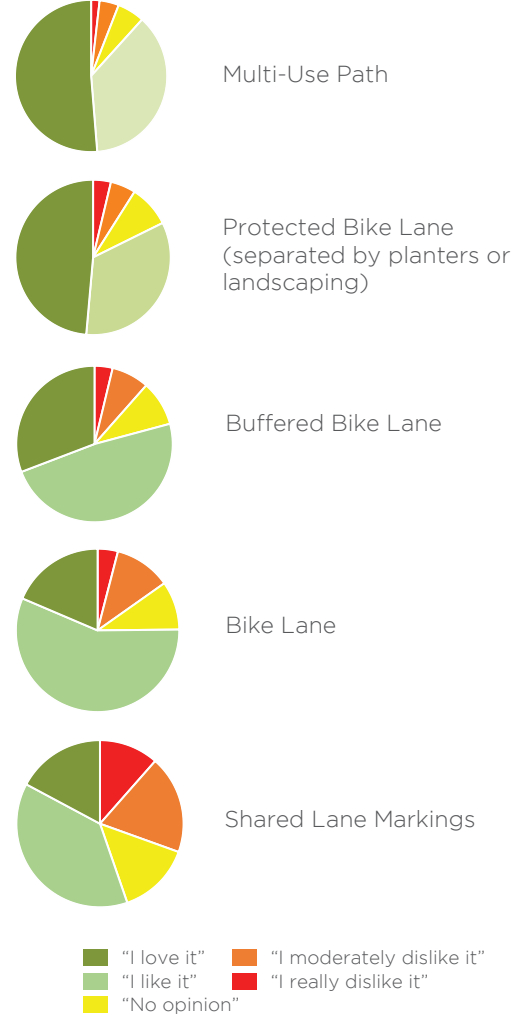


Attendees at a master plan open house

Pedestrian Preferences



Bicyclist Preferences



Results of the online survey show clear community preference for sidewalks buffered from traffic, safer pedestrian crossings, and low-stress bikeways that allow for all ages and abilities to ride a bicycle comfortably.

Key Themes

A number of key themes emerged amidst the large amount of information collected through the public input process:

- » Support for the plan's goals and objectives
- » Strong support of the City's efforts to install high-visibility pedestrian treatments to improve crossings of major streets
- » Desire for better winter maintenance, particularly enforcement of laws requiring landowners to clear snow
- » Support for conventional and low stress bikeways that are designed well, especially to minimize intersection conflicts

EXECUTIVE SUMMARY

Walking

The Importance of Walking

Salt Lake City is first and foremost a place where walking should be comfortable and safe. Many trips begin or end with a walk, and it is important to take a citywide view of infrastructure and programs that addresses conditions over a broad area, versus at only a few spot locations. This Plan recommends that the City treat all areas as walking environments, and provides guidance for several ‘typologies’ that are found throughout the City. The walking environment should be prioritized during any project of the City, as well as through regular review and study of the transportation network.



Pedestrian crossing at HAWK-controlled mid-block crosswalk near City Creek Center



Trail user walking her dog on the Jordan River Parkway Trail



Pedestrian crossing at 200 S/800 E in a high visibility school crosswalk

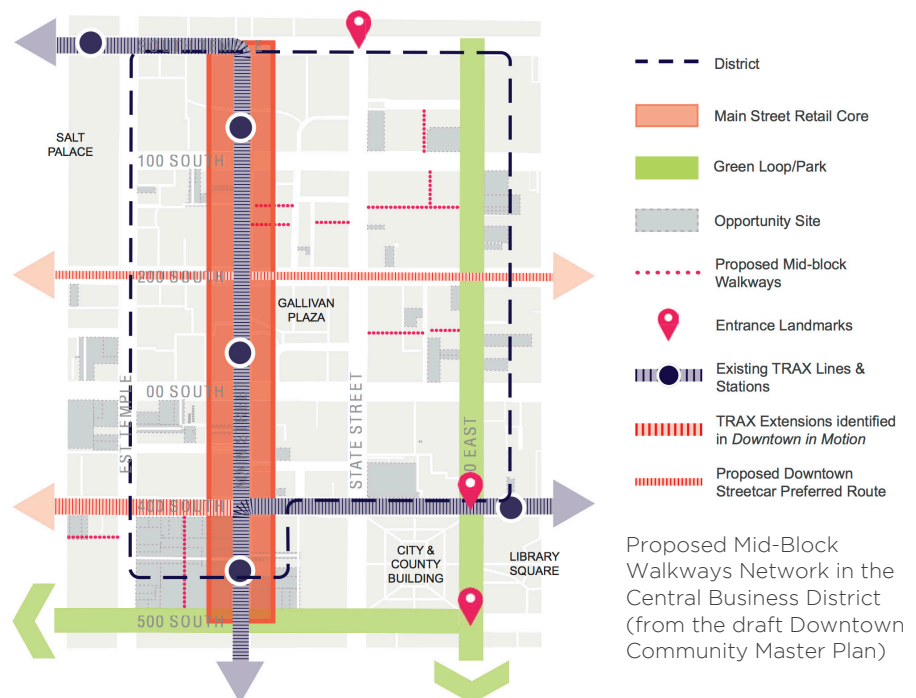
Salt Lake City has a robust system of sidewalks and pathways. However, the City’s wide streets and large blocks can create a challenging environment for pedestrians. Ultimately, every street and every intersection in the city should be designed with the pedestrian in mind – emphasizing safety, first, as well as comfort. Throughout this plan, the terms “pedestrian” and “walk” are meant to be inclusive of people of all ages and abilities, including those who use mobility aids, such as wheelchairs, scooters, strollers, or other devices.

The City has an established crossing prioritization process to evaluate locations for mid-block signals and enhanced crosswalks, as well as other pedestrian-friendly amenities such as bulb-outs, refuge islands, and pavement markings. Lower speed limits and tightened corner radii are recommended to improve the pedestrian experience by slowing traffic especially downtown and in other business areas.

Ultimately, pedestrian enhancements are very fine-grained and should be incorporated at the project design level. National guidelines such as the National Association of City Transportation Officials’ Urban Street Design Guide are also recommended.

Downtown Mid-Block Walkway Network

Within the downtown area, this plan incorporates the Downtown Community Master Plan’s recommendation to use alleys and minor streets as a network of walkways redesigned to become inviting places for pedestrians. In other areas of the City, especially where development is rapidly occurring, this same philosophy should be applied. This is especially relevant in Sugar House.

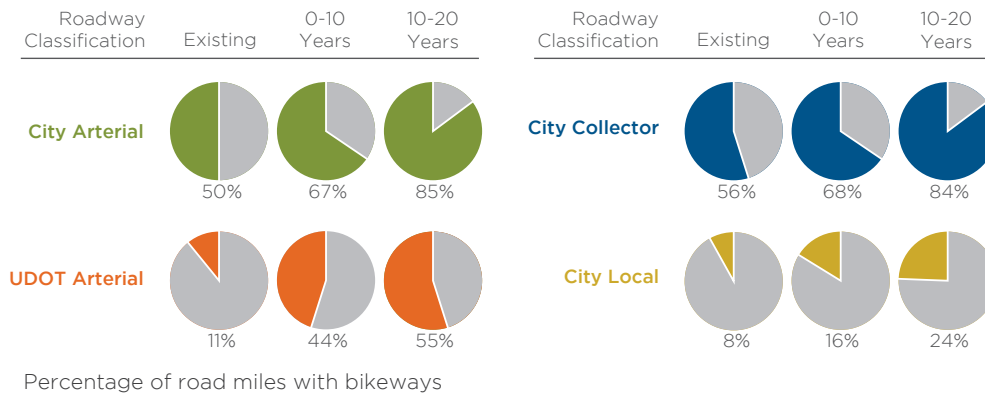
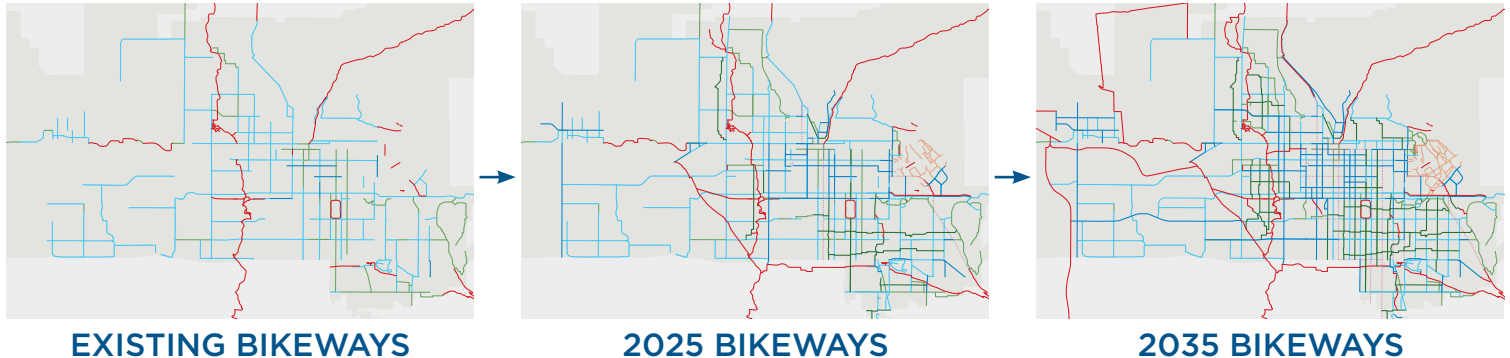


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Bicycling

Citywide Bikeway Network

The maps and graphic below show how Salt Lake City's bikeway system will grow over time as the plan recommendations are implemented.



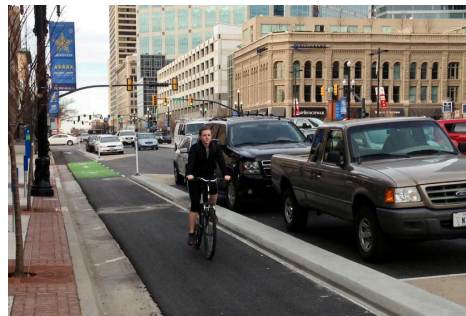
The entire 220-mile recommended bikeway network could be built for the same amount of money as widening 1.3 miles of freeway

Low-Stress Bikeway Network

Low-stress facilities such as multi-use paths, protected and buffered bike lanes, and neighborhood byways appeal to people who want more separation from traffic. Surveys show that 50-60% of people say they would like to bike more but are deterred by conventional bikeways. Development of a low-stress bikeway network is a key component of this master plan.



Multi-use path connecting 900 S to the 9-Line near 900 W



Protected bike lane on 300 S



Multi-use path in Liberty Park

EXECUTIVE SUMMARY

Programs

The programs recommended in this plan typically have an education, encouragement, or enforcement focus.

Multi-Modal Programs

The plan contains recommendations for multi-modal programs that benefit multiple user groups. Some are targeted at pedestrians and bicyclists only, while others include other groups such as transit riders and drivers. Programs include efforts such as driver education, media campaigns, comprehensive safety and crash analysis and enforcement, Smart Trips, and Open Streets events.



Pedestrian-Specific Programs

Examples of recommended pedestrian programs include walking school buses, targeted crosswalk enforcement, and mid-block walkway programming. These programs are geared toward encouraging people to walk and making their experience safer and more comfortable.



Bicycling-Specific Programs

Bicycling programs include user counts, training, bicycle-friendly business efforts, route mapping, social rides, and recreational route designation among others. They are geared toward encouraging people to bicycle more, particularly user groups who are less likely to ride now.



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A woman in a grey t-shirt and black skirt is walking a black bicycle on a city street. The bicycle has a red and black bag on the back. She is walking on a white-painted bike lane. In the background, there are green trees, parked cars, and a red flag on a pole.

CHAPTER ONE

WALKING & BICYCLING BACKGROUND

Americans increasingly demand walkable, bikeable cities, and Salt Lake City residents are no different. Providing quality, walkable places and transportation options is key to the City's ability to attract and retain people, businesses, and the convention and tourism economies.

Salt Lake City's previous Bicycle & Pedestrian Master Plan was adopted in 2004. While this document served the City well, much has changed in the past decade in the realm of active transportation. Some innovative facilities the City now constructs were not even invented a decade ago. While the sidewalk network is fairly complete, pedestrian facility innovations include crossing treatments especially appropriate for wide streets.

Historically, Salt Lake City's bicycle facilities have primarily served people comfortable riding in or near traffic, a group which comprises less than 10% of the population. This master plan leads Salt Lake City boldly into a new era where people of all ages and abilities can comfortably travel on foot or by bike. The plan outlines goals and objectives, proposes a 20-year build-out of bicycle facilities, and recommends changes to City processes and non-infrastructure programs.

Walking and bicycling investments benefit everyone. More people traveling on foot and by bicycle will boost our community's health, improve our air, invigorate local businesses, and incentivize employers to locate here. This chapter provides historical context for active transportation in the City, outlines important demographic trends, and discusses how this master plan interfaces with other City efforts.

Main subsections include:

- History of Active Transportation in the City
- National Trends
- Local Trends
- Relationship to City Plans
- Relationship to Regional Plans

1.1 History of Active Transportation in Salt Lake City

From the pioneers who founded it to those who continue its legacy, Salt Lake City has a long and rich history when it comes to active transportation, a term which includes walking, bicycling, and other people-powered transportation devices.

The City was founded 50 years prior to cars arriving on the scene, when walking was the dominant transportation mode. Pedestrians originally shared the dirt streets with horse-drawn carriages and streetcars. Soon afterwards, boardwalks were constructed allowing people to avoid the mud and filth found in the streets.

The bicycle became a popular device for both transportation and recreation in our community almost immediately after it was first introduced to the American public in the late 1800s. By the 1890s, much like today, the increasing presence of bicycles in the City brought conflict that required action, as well as a cultural shift, in how residents related to each other on streets and sidewalks. The recent and pending installation of protected bike lanes on 300 South and 200 West are just



Renowned cyclist Marshall "Major" Taylor at the Salt Palace race track, 1920 (Photo: Shipler Collection, Utah State Historical Society)

the latest changes residents are experiencing which aim to improve safety for all transportation modes. This Pedestrian and Bicycle Master Plan builds upon the many challenges and successes of Salt Lake City's past and present to work toward a more balanced and sustainable transportation future.

1890s

- » Bicycle **ownership** in the City, previously only afforded by people of substantial means, **becomes more widespread**.
- » Bicycles allow lower, middle, and working class families to **live further away from work** in more affordable areas of town.
- » **Bicycle shops** in the City **double from four to eight**.



Early bike shop in Salt Lake City (Photo: Shipler Collection, Utah State Historical Society)

- » Exclusive **clubs such as the Social Wheel Club begin to form** around cycling as a summer pastime.
- » Lagoon Amusement Park begins sponsoring an **annual Memorial Day Race** from Salt Lake City to Farmington.
- » Growing numbers of **bicyclists take to sidewalks** to avoid muddy streets during inclement weather. **Salt Lake City Council passes legislation** to make it illegal to ride a bicycle on many downtown sidewalks between the months of May and October or face a fine up to \$25 (more than \$650 today).
- » Citizen group proposes reserving one side of downtown streets and sidewalks exclusively for cyclists while **another group proposes that bicycles be licensed and taxed** \$1 per year to help pay to pave bike paths and make it easier for pedestrians to identify scofflaws. Both proposals are rejected.
- » Pedestrian and bicycle collisions necessitate **ordinances regulating cycling**.
- » Bicyclists lead the **movement to pave Salt Lake City streets**.

1900s–1920s

- » **Half of Salt Lake City's 50,000 residents own bicycles.**

- » **Streetlights** are installed primarily to make streets safer for pedestrians.
- » Amount of sponsorship money made available by Salt Lake City businesses for professional bicycle racers makes the City **one of the most important destinations for track cycling in the country.**

- » Salt Lake City boasts **three outdoor bicycle race tracks** located at the Salt Palace, Saltair, and Calder's Park (now Nibley Park).
- » Both Democratic and Republican mayoral **candidates vow to pave five-foot-wide bicycle paths** on several downtown streets including South Temple, Main Street, 200 South, 400 South, 800 South, and West Temple.



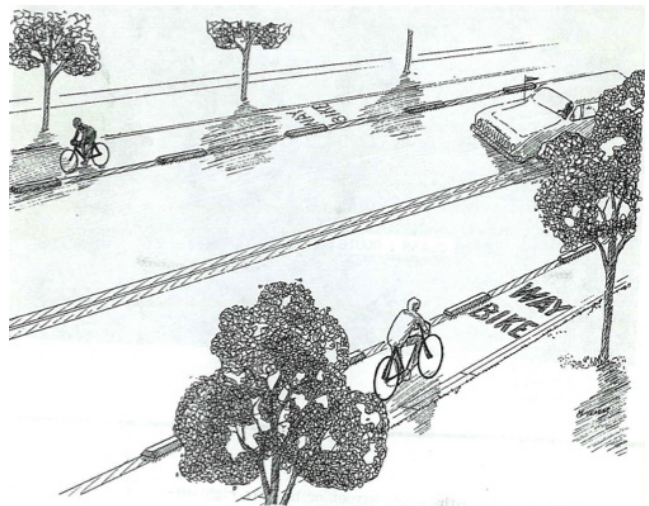
The Salt Lake YMCA Bike Club at 100 South/State Street, 1906 (Photo: Shipler Collection, Utah State Historical Society)

1930s–1950s

- » **Salt Lake City’s streetcar system closes** in 1941.
- » 1943 City Plan recommends parks within 1/4 mile of every residence so that **kids could walk to the parks.**
- » City adopts “Salt Lake City Major Street Plan” (1948) that called for **widening pavements widths for the sole purpose of moving automobiles.**

1960s–1970s

- » The Second Century Plan sets a strategy to **improve Main Street with emphasis on pedestrians:** widening sidewalks and planting trees.
- » An **underground crossing** of State Street at 50 South was constructed, and a **mid-block walkway system** was first proposed.
- » The City’s 1967 master plan proposes **bypasses for through traffic, including grade separated roadways** along Foothill Boulevard and 1300 East.
- » **Protected bike lanes** are proposed by regional and City planners for Foothill Drive, Redwood Road, Beck Street, and 1700 South.
- » The **concept of the Jordan River Parkway/Trail** was developed, primarily as a flood control measure.



Curb-separated protected bike lanes were proposed on streets in Salt Lake City in the 1970s

1980s

- » By the mid-80s, **lengthy sections of multi-use trail completed** within the Jordan River Parkway.
- » Urban Design Element recommends **pedestrian “launching pads” (curb extensions) and “gallerias” (enclosed pedestrian walkways) to improve downtown walkability.**
- » Salt Lake City constructs early **painted bike lanes**, and in 1985 publishes the City’s **first bikeways map.**

1990s

- » In the early 1990s, the Mayor's Bicycle Advisory Committee (MBAC) creates a **bicycle plan for the City**.
- » **The first TRAX light rail line opens** connecting downtown Salt Lake City to Sandy.

2000s

- » The City's first professionally-created **Bicycle & Pedestrian Master Plan is adopted**.
- » Salt Lake City becomes well-known for its **pedestrian crossing flags program**, and is **recognized nationally for improving pedestrian safety**.
- » **Bronze-level Bicycle Friendly Community status** is granted by the League of American Bicyclists in 2007.
- » **Downtown in Motion Master Plan balances pedestrian and bicycle needs** with transit, automobile, and service needs to create a balanced, integrated, efficient, and accessible Downtown.
- » Seeking a solution for some narrower streets Downtown, Salt Lake City invents the **"green shared lane"** or "super sharrow".

2010s

- » The City Council passes a **Complete Streets ordinance** in 2010, requiring the consideration of bicyclists and pedestrians in street repaving and design projects.
- » Salt Lake moves up to a **silver-level Bicycle Friendly Community** in 2010.
- » **North Temple is reconstructed as a multi-modal corridor** incorporating TRAX light rail, bike lanes, and wide sidewalks.
- » A new **downtown bike sharing system, GREENbike**, is launched to complement the City's growing bikeway network.
- » A first **downtown protected bike lane is constructed on Broadway (300 South)** including separator curbs and planters.
- » The **Sugar House Greenway and The Draw**, two key pieces of the Parley's Trail, are completed and open.

1.2 National Trends

Pedestrian and bicycle planning in the U.S. is a rapidly evolving field. The following sections describe national trends relating to bicycling and walking. Understanding these trends and the underlying reasons behind them helps to inform decisions here in Salt Lake City.

1.2.1 Demographic Shifts

The United States has experienced demographic shifts in recent decades. These shifts directly and indirectly impact transportation patterns. For instance, between 2010 and 2020 “Baby Boomers” will make more than 200 million residential moves. They also will increase the size and reshape the demographic character of rural areas and small towns throughout the country. Studies also show that quality-of-life considerations have begun to replace employment-related factors in decisions about when to move and where to live.¹

Recent studies have noted trends revealing that Millennials – those born between 1981 and 2001 – are a part of a generation of declining car ownership.² For example, people between the ages of 18 and 34 make up just 11% of today’s auto market – down from 17% in 2007.³ A number of

factors contribute to the decline in car ownership among Millennials: economic recession, recent trends toward urban living, and the desire to stay connected to social media sites and other technologies that are not conducive to driving. The younger generation appears to place less value on vehicle ownership and suburban living due to a combination of high costs, improved travel options, and changing preferences for living and commuting.⁴

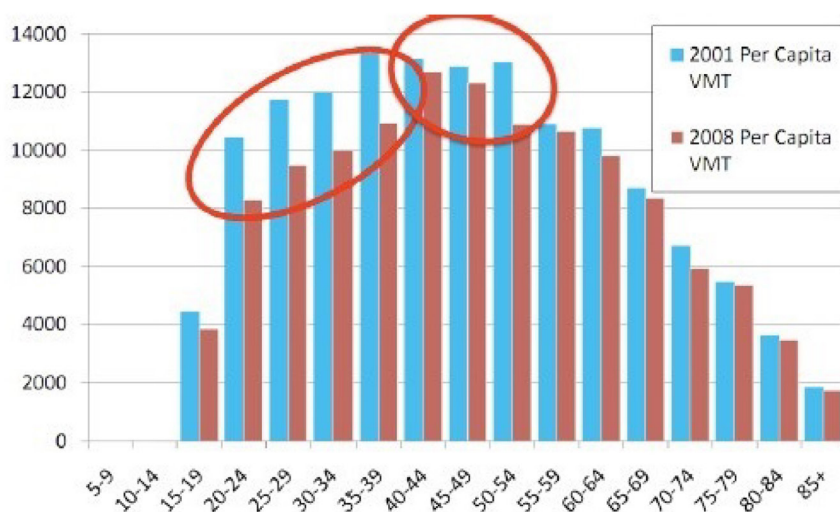
In 2011, Zipcar performed a travel preference survey that confirmed these trends, as illustrated in Figure 1-1.⁵ Based on these trends and forecasted predictions, it is estimated that the size of the U.S. vehicle fleet and annual vehicle sales will continue to decline (Figure 1-2).⁶

1.2.2 Benefits of Walking & Bicycling

Bicycling and walking provide a wide range of benefits to individuals, their communities, and the surrounding environment.

1.2.2.1 Safety Benefits

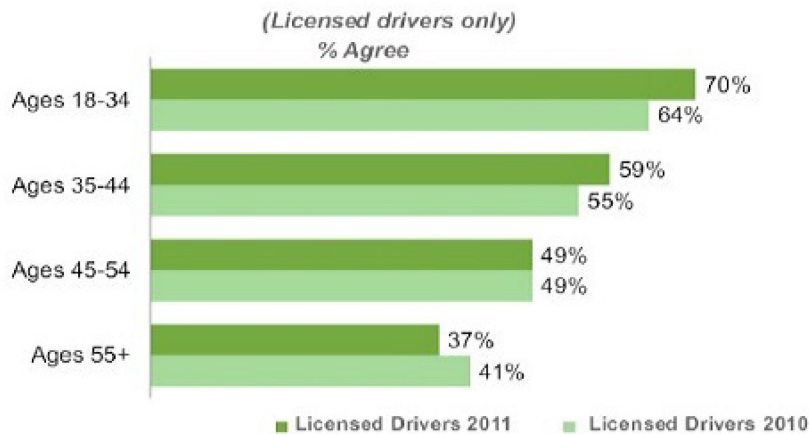
Studies show that installing pedestrian and bicycle facilities directly improves safety by reducing the risk of pedestrian-automobile and bicycle-



Annual motor vehicle travel is significantly lower for people born after 1978 than previous generations at the same age. This indicates intergenerational changes in consumer preferences and lifestyles. Although younger people are likely to increase their vehicle travel as they earn more and become parents, they are unlikely to drive as much as the Baby Boom generation.

Figure 1-1 Annual Vehicle Miles Traveled (VMT) by Age Group

If there were more options in my areas, such as public transportation, car sharing, or convenient carpooling, I would drive less than I do now.



Consumer preference surveys indicate that younger people want to drive less and rely more on alternative modes than older people.

Figure 1-2 Average Annual Mileage by Age

automobile crashes. For example, streets with bike lanes have been shown to be safer not just for bicyclists (compared with no bicycle facilities), but also for pedestrians and motorists.⁷ Streets without bicycle facilities may pose a greater collision risk. When walking and bicycling rates double, per-mile pedestrian-motorist collision risk can decrease by as much as 34%.⁸

Improved walking and bicycling environments contribute to a safer transportation system in two important ways: by directly reducing collision risk and by increasing walking and bicycling rates. New York City saw a 73% decrease in the average risk of serious injury to bicyclists at the same time they experienced a 400% increase in ridership. Portland (OR) saw a similar dip in injury rates concurrent with an increased bicycling rate. Safe places to walk and bike are especially important for non-drivers who require safe, reliable, and convenient transportation options.

1.2.2.2 Health Benefits

Lack of physical activity is associated with increased risk of many health problems, particularly obesity, diabetes, and heart

disease.⁹ It is also the third-highest cause of preventable death in the U.S., behind only tobacco use and poor nutrition.¹⁰ Today many cities and businesses are facing a crisis as they attempt to cope with the growing healthcare costs associated with preventable chronic diseases. A recent Institute of Medicine report states that the estimated annual cost of obesity-related illness is \$190.2 billion (in 2005 dollars), or nearly 21% of annual medical spending in the United States.

The Centers for Disease Control and Prevention recommend at least 2.5 hours of moderate exercise each week, yet many people do not have convenient access to places where they can be physically active. Walking and bicycling are some of the most basic forms of physical activity. Improving facilities for these activities and linking them to recreational and daily destinations would help better connect people with convenient exercise options.

Active transportation options such as walking and bicycling help people meet recommended physical activity levels, thereby reducing chronic disease and associated health care costs. About half of Utahns are overweight and do not exercise

enough (see Figures 1-3 and 1-4).^{11,12} According to the Salt Lake Valley Health Department, these statewide obesity and physical activity data match local data closely.¹³

Studies show that people walk more in safe, walkable, and aesthetically pleasing places. Improved facilities promote physical activity by making walking and bicycling more appealing, easier, and safer.¹⁴ A Portland (OR) study on the benefits of bicycle projects found that by 2040 Portland's investment of \$138-605 million in bicycling will have saved \$388-594 million in health care costs and provided an additional \$7-12 billion in the value of increased life span.¹⁵

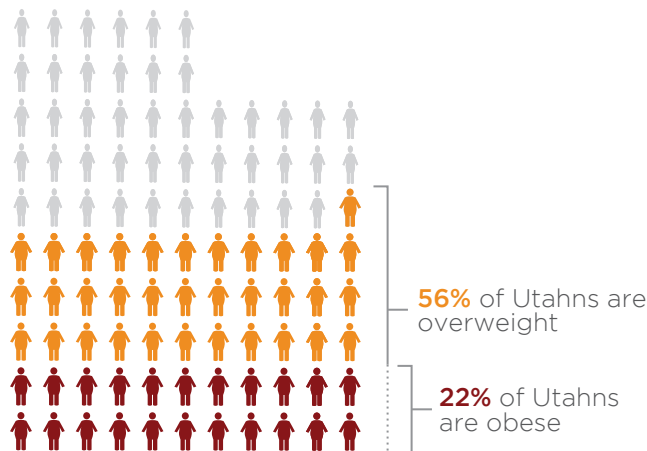


Figure 1-3 Overweight & Obese Population In Utah

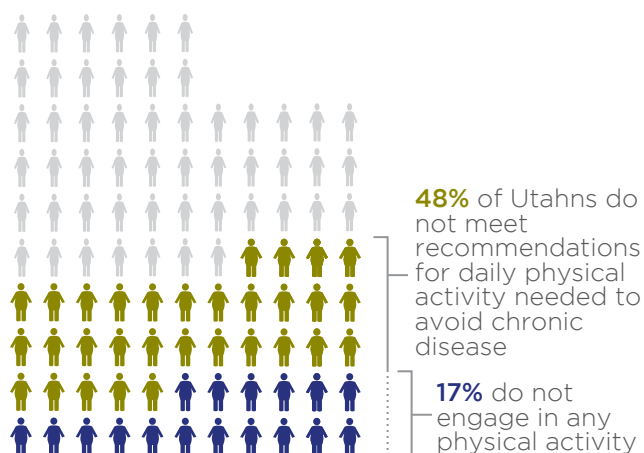


Figure 1-4 Utahns' Physical Activity Habits

Walking and biking also provide greater social interactions than some other forms of transportation. These interactions may be associated with mental health and social engagement benefits.

1.2.2.3 Economic Benefits

Walking and bicycling are affordable transportation options. Walking is virtually free and owning and operating a bicycle for one year costs approximately \$121.¹⁶ The average cost of owning and operating a vehicle for one year is \$8,946.¹⁷

Cities that invest in active transportation are investing in people and their quality of life. Business decisions are increasingly being made based on quality of life amenities for employees and their families. Sidewalks, on-street bicycle facilities, multi-use paths, and transit service are important quality of life indicators. They demonstrate a commitment to healthy transportation options and lifestyles.

According to the National Association of Homebuilders, trails are consistently ranked as one of the most important community amenities by prospective homebuyers – above golf courses, parks, and security.¹⁸ More than two-thirds of Americans say that having bike lanes or paths in their community is important to them, and two-thirds of homebuyers consider the walkability of an area in their purchase decision.¹⁹ This preference for communities that accommodate walking and bicycling is reflected in property values across the country.²⁰ Houses in walkable neighborhoods have property values \$4,000 to \$34,000 higher than houses in areas with average walkability.²¹

Active transportation infrastructure and programs generate tourism revenue, support local business, and create jobs.²² In the North Carolina Outer Banks, an investment of \$6.7 million in paths and wide paved shoulders has generated \$68 million

in annual tourism revenue from bicyclists.²³ After bike lanes were added to Valencia Street in San Francisco, two-thirds of merchants surveyed said that the lanes had a positive overall impact on their business.²⁴ New York City installed the first protected bike lanes in the U.S. on 8th and 9th Avenues in Manhattan in 1997 and by so doing brought more people to these streets. As a result, 9th Avenue had a 49% increase in retail sales at locally based businesses compared to a 3% increase across Manhattan as a whole.²⁵

Employers are increasingly locating in vibrant urban centers with diverse transportation options in order to attract young workers and improve current employees' satisfaction. Active transportation investments heighten Salt Lake City's appeal to existing and potential employers.

1.2.2.4 Transportation Efficiency

Short trips typically taken in cars²⁶ can more easily be made on foot or by bike if safe, comfortable, and convenient facilities are provided. By shifting 160 annual trips (about three per week) averaging 2.4 miles in length from driving to bicycling, an individual can reduce congestion costs to other road users by approximately \$216 in urban areas and about \$108 in rural settings.²⁷ Providing a variety of travel options also reduces dependency on foreign oil and promotes energy efficiency.

1.2.2.5 Climate Impacts

Over the past four decades, population has grown rapidly in the western U.S., an area sensitive to drought, air pollution, and heat waves.²⁸ Scientists project that warmer temperatures from climate change will increase the frequency of days with unhealthy levels of air pollution.²⁹

As of 2003, 27% of U.S. greenhouse gas emissions were attributed to the transportation sector and personal vehicles accounted for 62% of all transportation emissions.³⁰ Replacing two miles of driving each day with walking or



The majority of short trips are currently made by car

bicycling prevents 730 pounds of carbon dioxide from entering the atmosphere annually.³¹ This reduction minimizes the transportation sector's air quality impacts, improves air quality, and decreases public health concerns such as asthma.

1.2.3 State of the Planning Practice for Walking & Bicycling

Though still a small fraction of total travel, the number of people bicycling for transportation has grown dramatically in major cities during the last 10 years. Cities with high walking and bicycling rates realize that conditions need to be safe, pleasant, and convenient for people of all ages and physical abilities in order to have broad appeal.

The League of American Bicyclists awards Bicycle Friendly Community (BFC) status to communities that have made significant strides toward becoming comfortable places to bicycle. Bicycle commuting rates in large BFCs increased by 80% between 2000 and 2010 and 47% across the U.S. as a whole (Figure 1-5).³²

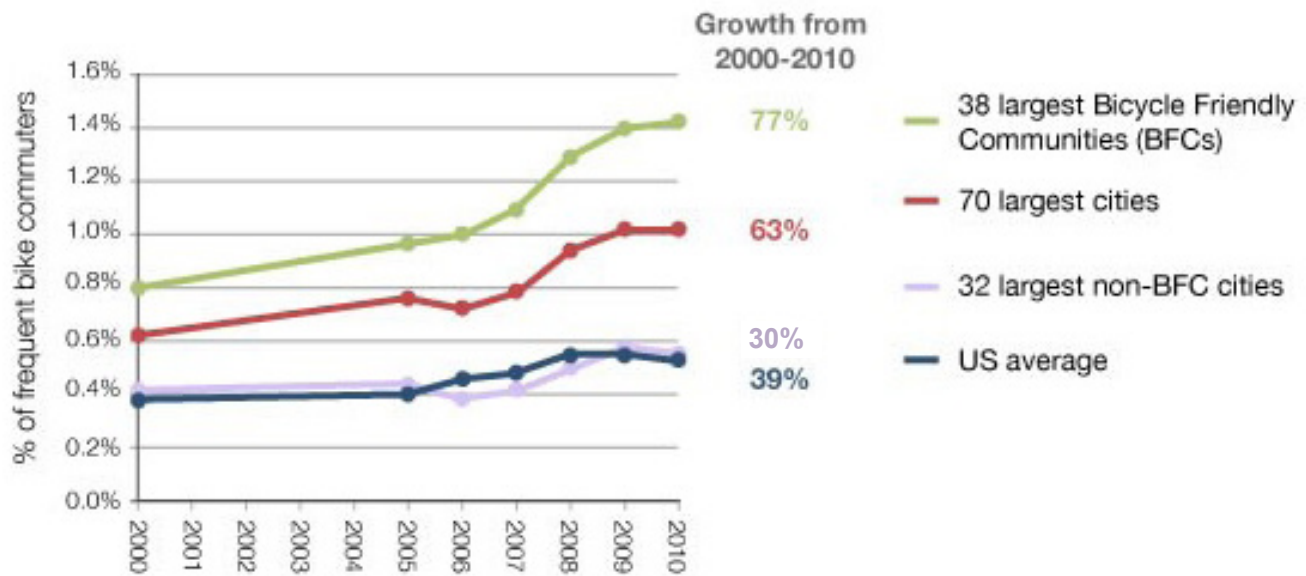


Figure 1-5 U.S. Bicycle Commuting Growth, 2000-2010 (Source: American Community Survey & League of American Bicyclists)

Research indicates the need for improved walking and bicycling facilities. A 2014 report from Smart Growth America ranks U.S. cities by pedestrian safety and examines the types of roads where fatalities are most likely to occur.³³ In a 2002 National Highway Transportation Safety Administration survey, 84% of respondents said that bicycling is “a great form of exercise” for them. More than two-thirds said they would like to ride more than they do now. However, less than 50% were satisfied with the current bicycle infrastructure in their community.

Salt Lake City continues to be at the forefront of walking and bicycling innovation, pioneering the use of green shared lanes, making efficient use of pavement management systems to affordably expand the bikeway network, and becoming well known for pedestrian crossing enhancements such as countdown timers, orange crossing flags, and “LOOK” pavement messages.

In 2007, the League of American Bicyclists rated Salt Lake City as a bronze “Bicycle-Friendly Community (BFC)”. In the years that followed,

the City hired a bicycle/pedestrian coordinator (followed by additional staff), increased active transportation expenditures, increased outreach and enforcement efforts by the Police Department, initiated an annual bicycle summit, instituted annual bicycle counts, and formalized a Complete Streets policy. These efforts were rewarded in 2010 with a silver BFC designation. The City is now focused on achieving gold status.

As a result of dissatisfaction with traditional designs, many cities developed new bicycle facility types and intersection treatments that respond to uniquely urban challenges. In 2009, the Cities for Cycling initiative was launched within the National Association of City Transportation Officials (NACTO). NACTO produced its own Urban Bikeway Design Guide in 2011 and has since published two updates. This new resource includes guidance for protected bike lanes, intersection treatments, signals, and neighborhood byways. Salt Lake City endorsed the NACTO Urban Bikeway Design Guide in 2010 and the NACTO Urban Street Design Guide in 2013.

1.2.3.1 Types of Bicyclists

Bicycle planning and engineering professionals historically classified bicycle users into three types – Advanced, Basic, or Child.³⁴ Another methodology was developed by planners in Portland (OR) and has since been corroborated by data from other U.S. cities. This classification, illustrated in Figure 1-6, provides the following four categories:³⁵

- **Strong & Fearless:** People who will ride anywhere regardless of roadway conditions or weather. They ride faster than other user types and prefer direct routes even if they must share lane space with cars.
- **Enthusiased & Confident:** People who are comfortable riding all types of bikeways but usually choose lower-volume streets or multi-use paths when available. They may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists – commuters, recreationalists, racers, and utilitarian bicyclists.
- **Interested But Concerned:** People who typically only ride a bicycle on low traffic streets or multi-use paths under favorable weather conditions. They perceive significant barriers to bicycling more, specifically traffic and other safety concerns. This group may become “enthused and confident” with encouragement, education, and experience.
- **No Way, No How:** People who don’t desire to bicycle. They may perceive severe safety issues with riding near traffic. Though some of them may eventually bicycle, a significant portion will not ride under any circumstances.

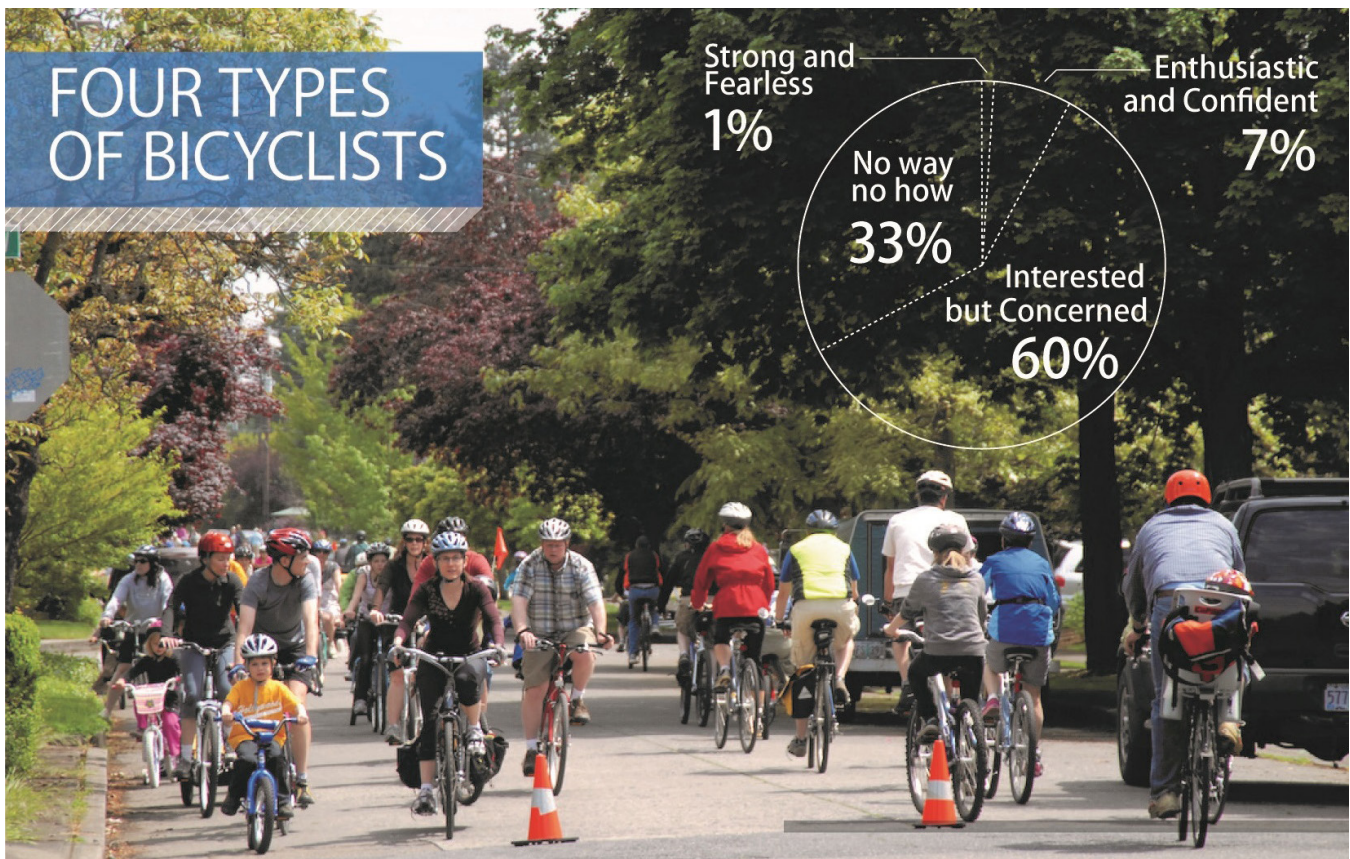


Figure 1-6 Types of Bicyclists

1.3 Local Trends

According to the 2012 American Community Survey (ACS), Salt Lake City has one of the highest bicycling and walking mode shares in Utah, surpassed only by the college cities of Logan and Provo. This is not surprising given the higher concentrations of college-age students in Logan and Provo that normally live very close to their daily destinations.

1.3.1 Local Demographic Shifts

Utah is the youngest state in the union, and the Salt Lake region is growing rapidly. In the next 30 years, the population along the Wasatch Front is anticipated to increase by 65%, adding another 1.4 million residents. The regional Wasatch Choices for 2040 Plan provides guidance to communities in directing this growth, including providing transportation choices to decrease congestion, reduce air quality, and strengthen neighborhoods and quality of life.

Salt Lake City, as the capital city, economic center of the state, and home to several institutions of higher learning, will be pivotal in this growth, including increased residential density downtown and in surrounding neighborhoods. The City's population is also shifting in tandem with national trends. With the millennial generation raising families and baby boomers retiring to the city, Salt Lake has an increasing need for walking and bicycling facilities appropriate for all ages and abilities.

1.3.1 Utah Travel Survey

A coalition of regional transportation planning agencies jointly conducted a Utah-specific travel survey in 2012. Results shed light on walking and bicycling trends in Utah.

1.3.1.1 Walking Mode Share

On average, Salt Lake City residents take about three to four times more walking trips than bicycling trips (see Table 1-1). Walking trips include short segments of a multi-modal

commute, such as walking from a transit stop or parking garage to an office building.

Walking is more common in urban areas like Salt Lake City because destinations are closer together and more easily accessible by foot. Additionally, walking to lunch, meetings, or to other destinations may be more convenient than driving. This trend is apparent in the downtown Salt Lake City data represented in Table 1-2.

Table 1-1 Statewide Walking & Bicycling Mode Share

Region	All Trips		Commute Trips	
	Walk	Bike	Walk	Bike
Salt Lake City	17.4%	4.8%	18.2%	4.3%
Wasatch Front	7.8%	1.7%	3.1%	1.9%
Cache	7.7%	2.7%	3.8%	4.3%
Dixie	6.0%	1.3%	0.5%	2.4%
Utah Total	7.5%	1.8%	2.9%	2.0%

Source: Utah Travel Survey

Table 1-2 Downtown Walking & Bicycling Mode Share

Purpose*	To Downtown SLC		Within Downtown SLC	
	Walk	Bike	Walk	Bike
Commute	30.5%	5.0%	53.6%	3.4%
All Trips	27.5%	5.8%	48.0%	5.5%

Source: Utah Travel Survey

*Including trip segments of multi-modal journeys

1.3.1.2 Bicycling Mode Share

In Salt Lake City, 70.5% of households own at least one adult bicycle and 50% own two or more. In households with children, 31% own at least one child's bike. Salt Lake City far surpasses all other communities in the State when it comes to bicycle mode share, except for commute trips where it is tied with the Cache Valley area.

1.3.1.3 Trends

Salt Lake City residents enjoy walking and bicycling for many of the same reasons. Figures 1-7 and 1-8 show the relative breakdown of trip purposes for walking and bicycling, respectively.

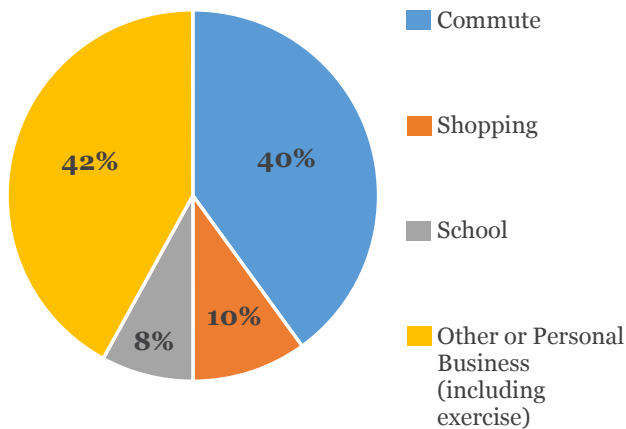


Figure 1-7 Bike Trip Purposes in Salt Lake City (Utah Travel Survey)

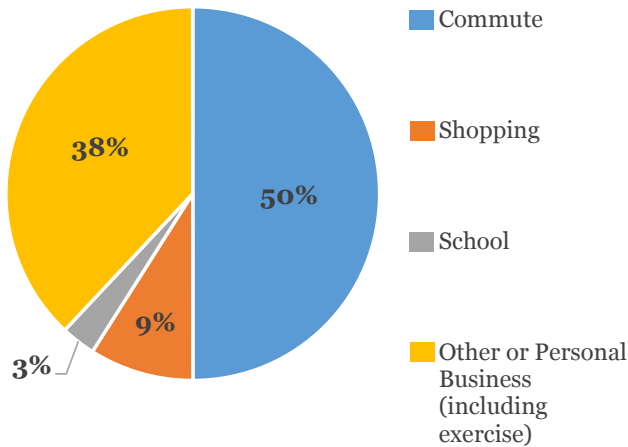


Figure 1-8 Walk Trip Purposes in Salt Lake City (Utah Travel Survey)

Other commonly cited benefits of walking and bicycling are enjoyment of the outdoors, saving money, and improving the environment.³⁶

1.3.2 Bicycle Infrastructure Focus

Salt Lake City's on-street bikeway efforts going back to the 1970s have primarily focused on conventional painted bike lanes complemented by multi-use paths such as the Jordan River Parkway. More recently, the City's focus has shifted to "lower stress" bikeways both on-road and off-road that accommodate a wider range of people, abilities, and experience. Low stress facilities are discussed further in Chapter 6.

1.3.3 Air Quality

Urban air quality is a national concern, with many cities across the country falling short of Clean Air Act standards. In the Salt Lake Valley, industry, automobiles, trucks, fires, and various other small air pollution sources combine with geographic constraints to create air quality and health concerns for residents. Air quality concerns are most acute during winter months but may also occur at other times of year.

Air quality issues are often raised by businesses and individuals looking to relocate to or stay in Salt Lake City. The City hosts many conventions such as Outdoor Retailers and air quality issues have been raised by organizers when considering alternate venues.

Salt Lake City's investments in walking and bicycling help to mitigate transportation impacts to air quality. While active transportation cannot solve all air quality issues, it can be one of the vital components within a comprehensive strategy, particularly combined with transit.

1.3.4 Safer and More Comfortable Driving

With some changes to street designs for bicycling and walking, motorists may be concerned that lanes are being taken away or congestion created. In reality, many street changes increase safety and comfort for motorists as well as bicyclists and pedestrians. Lane repurposing designs, such as from four automobile lanes to three automobile lanes with a center turn lane and new bike lanes, improve driver safety. Providing pedestrian and bicycle facilities also increases predictability interactions between motorists and those walking or bicycling, thus creating a safer and more comfortable environment for everyone.

1.3.5 Pedestrian Counts

Pedestrian counts were conducted at six downtown mid-block walkways in June 2012 as part of a study conducted by the City. Four counts were conducted at each site – three on weekdays from 8-9 am, noon- 1 p.m., and 5-6 p.m., and one on Saturday from noon-1 p.m.

1.3.5.1 Count Locations

Each of the six count sites shown in Figure 1-9 is a mid-block walkway. Prior to the counts, use of these walkways was unknown, as was the extent to which quality of the pedestrian environment impacts use.

On average, foot traffic ranged from 46 people per hour at the Edison Street/300 South location to 265 people per hour at the Regent Street/100 South location near City Creek. Figure 1-10 shows the full results of the weekday counts.

The Regent Street/100 South walkway offers more pedestrian-friendly elements than the other five locations, which coincides with its high use. Many of the lesser-used walkways like Gallivan Avenue, East Exchange Place, and Edison Street were designed as pedestrian-friendly spaces but lack programming, nearby multi-use buildings, and the attention to design detail that would make them more inviting or useful to pedestrians.

1.3.5.2 Surveys

During the counts, surveys were administered to determine opinions about the mid-block walkways. Respondents said that convenience and safety contribute to a good walking environment. Some people stated that trees and landscaping contribute positively. Others mentioned the number of people on the street and adequate maintenance.



Figure 1-9 Pedestrian Count & Survey Locations

1. Regent Street/100 South
2. Regent Street/200 South
3. Alleyway at 222 South Main Street
4. Gallivan Avenue
5. Edison Street/300 South
6. East Exchange Place

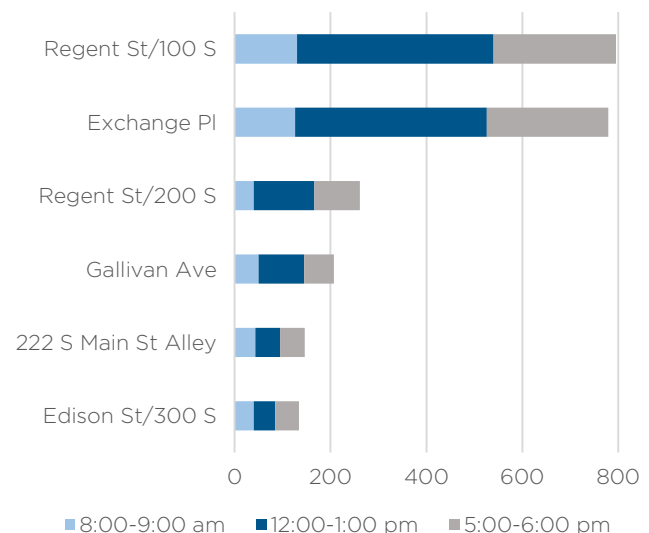


Figure 1-10 June 2012 Weekday Pedestrian Counts



Regent Street mid-block walkway at 100 South had the highest pedestrian counts

1.3.6 Bicycle Counts

Beginning in September 2010, Salt Lake City has conducted annual bicycle user counts during the second full week of September. Counts are taken at each location on Tuesday, Wednesday, and Thursday evenings (5-7 pm) and Saturday and Sunday afternoons (12-2 pm).

In 2011, Salt Lake City reported a citywide 27% increase in bicycling from the previous year. Major local media outlets and national organizations reported the significant change. Bicycling Magazine listed the 27% increase in bicycling as one of the reasons that Salt Lake City jumped from 43rd (2010) to 26th (2012) in the magazine's "America's Most Bicycle-Friendly Cities" biennial ranking. Since 2011, there has not been another dramatic yearly increase, but the following year saw a modest increase. Weather during the 2013 counts was very rainy, which likely impacted numbers. 2014 data, recently available, was not included in this analysis.

This is mirrored in the 2012 ACS Journey to Work data (2008-2012 5-Year Estimates) as compared to the same data source for 2010. In that two year

period, bicycle commuting rates rose from 2.2% to 2.5%, while male bicycle commuters increased from 3.0% to 3.2% and females from 1.3% to 1.7%.

1.3.6.1 Count Locations

The original count in 2010 involved 12 locations. In subsequent years, the City has incorporated two or three new locations per year in order to collect before/after data for specific facility improvements. The first "after" data was collected in 2014.

Count locations with consistently high ridership are 800 E/800 S, 200 S/Main, Sunnyside/Arapeen, Sunnyside/Guardsman, and Parley's Crossing. This may be due in part because they are on popular commuting routes, provide access to the University of Utah, or are frequented heavily by recreational bicyclists.

1.3.6.2 Analysis of Bicyclist Totals

Figure 1-11 shows observed trends in overall riders counted, helmet use, sidewalk riding, and female ridership.

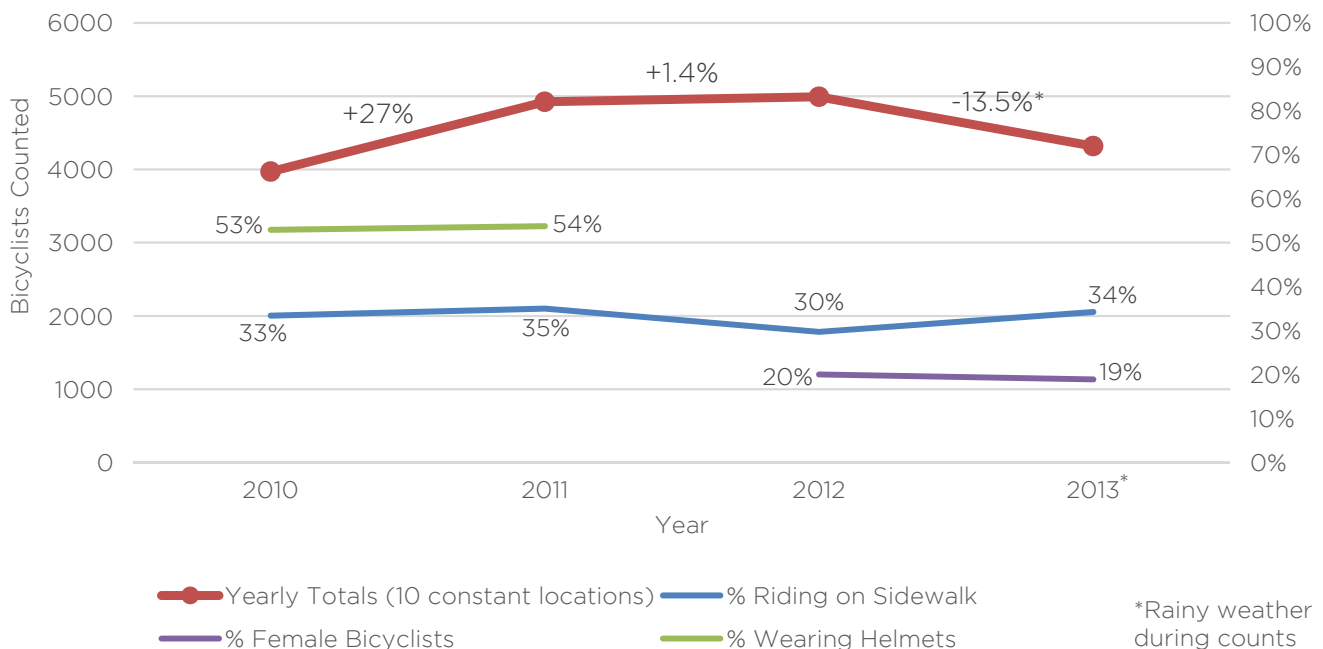


Figure 1-11 Bike Counts, Sidewalk Riding, Female Bicyclists, & Helmet Use by Year

1.3.6.3 Sidewalk Riding

Sidewalk ridership is lower at locations near the University of Utah, at 800 E/800 S, and Beck St/Chicago Ave. Conversely, west side count locations have higher levels of sidewalk riding.

1.3.6.4 Helmet Use

Helmet use was observed during the 2010 and 2011 counts. It was highest in locations frequented predominately by recreational bicyclists and those commuting long distances. Count locations downtown and on the west side had lower levels. After collecting adequate baseline data, collecting helmet use data was discontinued after 2011.

1.3.6.5 Female Bicyclists

Since 2012, rider gender has been recorded during counts. This data enables City staff to see how changing infrastructure types (from conventional bike lanes to lower stress facilities), other improvements, and weather affect the share of female bicyclists.

The 600 E/1300 S count location had a higher share (30%) of female bicyclists than any other location. Like helmet use, count locations on the east side of the City generally had a higher share of female bicyclists, while the west side had lower percentages.

1.3.6.6 Context & Comparison

Salt Lake City is the only city in Utah that performs regular bicycle user counts. Portland (OR) has conducted annual counts since the early 1990s. They have experienced a two-decade-long upward trend, which includes a 211% increase since 2000. Portland and Tucson (AZ) have both experienced ups and downs at specific locations or in their overall annual totals for individual years while maintaining an upward long-term trend.

1.4 Relationship to City Plans

Many other City planning documents influence and are influenced by this Pedestrian and Bicycle Master Plan. Some of the major related planning efforts include:

- Plan Salt Lake (still in draft form)
- Downtown Master Plan
- West Salt Lake Master Plan
- 9 Line Corridor Plan
- Jordan & Salt Lake Canal Trail Implementation Study

1.4.1 Plan Salt Lake

Plan Salt Lake is still in process and has not yet been adopted. The purpose of this plan is to set a citywide vision for the next 25 years and create an overarching master plan for the City. It considers where the City currently is, where people want to be, and establishes the framework for decision making that will accomplish the desired end result.



All community and system plans will be subsets of Plan Salt Lake and help to implement the goals contained within it. The City's Transportation Master Plan is one such system plan and the Pedestrian and Bicycle Master Plan fits within its umbrella.

Public input for Plan Salt Lake mirrors the strong interest in active transportation found during the public process conducted for the Pedestrian and

Bicycle Master Plan (see Chapter 3). Comments received through Plan Salt Lake reflect a high level of interest in walking and bicycling, even outside of the “transportation” category. The following categories all had input related to active transportation:

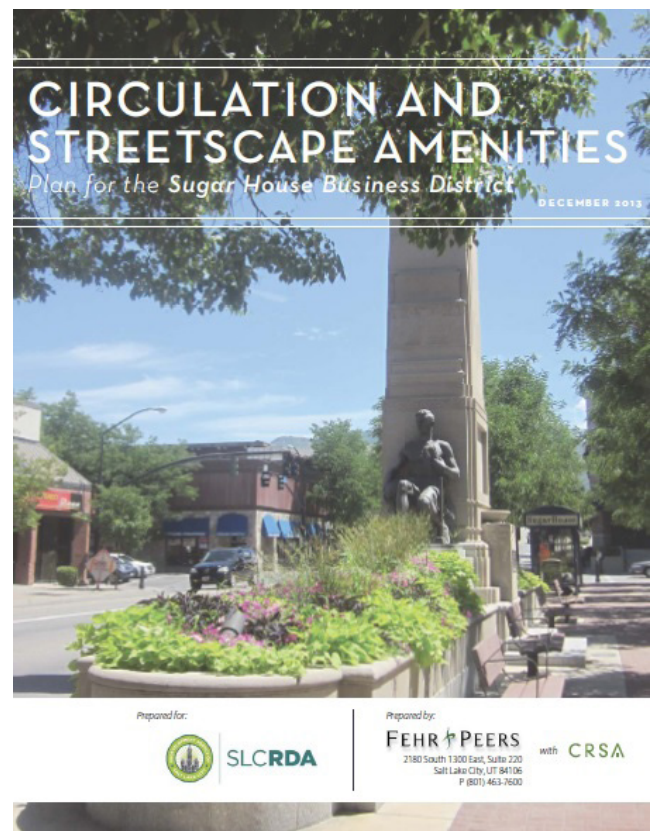
- Air quality – while most comments were related to public transit and idling, about 25% of responses mentioned walking or bicycling as partial solutions.
- Diversity – about 15% of responses related to diversifying transportation choices with walking and bicycling strongly mentioned.
- Neighborhoods, Downtown, and Outdoors – each category included comments (about 10-20% of those received) in support of walking and bicycling.
- Transportation – between a third and half of comments referenced walking or bicycling, with expansion of the bikeway network being requested in about half of the comments. Nearly all comments were positive.

Public input for Plan Salt Lake closely mirrors results of local opinion polls. The most recent edition of the biennial Dan Jones phone survey found that approximately two-thirds of City residents would be very willing or somewhat willing to support tax increases for improving pedestrian and bicycling facilities.

Plan Salt Lake identifies connectivity and circulation as a necessary component of sustainable growth. Plan Salt Lake and the Pedestrian and Bicycle Master Plan share the goal of providing transportation options and improving connections. Plan Salt Lake also identifies key initiatives related to the Pedestrian and Bicycle Master Plan, including providing a complete network for all modes of travel and making walking and cycling viable, safe, and convenient transportation options in all areas of the City.

1.4.2 Other City Plans

This modal plan provides detail in support of the City’s Transportation Master Plan (1996). It also provides corridor-specific recommendations for many of the general concepts recommended in the Downtown In Motion Master Plan (2008), a multi-modal plan focused on transportation in the downtown area. Some of the transit-focused recommendations of this plan will be furthered in the upcoming Transit Master Plan, which is just beginning as this plan approaches adoption. The updated Pedestrian & Bicycle Master Plan and Transit Master Plan will be incorporated into an update to the Transportation Master Plan in the future.



Recommendations from the Sugar House Circulation and Streetscape Amenities plan were incorporated into the Pedestrian and Bicycle Master Plan

Recommendations from the City's area, modal, and corridor master plans were also reviewed at the beginning of the master plan effort to gain ideas and make sure that previous planning efforts were appropriately incorporated. The Downtown, West Salt Lake, 9 Line, and Jordan and Salt Lake Canal Trail plans mentioned above are just a few examples of such plans that provided input and background for the Pedestrian and Bicycle Master Plan.

The Circulation and Streetscape Amenities Plan for the Sugar House Business District is also illustrative of how information from these plans was used. That plan included specific recommendations for bikeways in the area. Those recommendations were reviewed and included in the Pedestrian and Bicycle Master Plan.

1.5 Relationship to Regional Plans

This plan primarily recommends infrastructure and programs within the Salt Lake City municipal limits. The plan also strongly supports collaboration with regional efforts and neighboring municipalities in project and

program implementation. As the Wasatch Front's premier urban center and capital city, Salt Lake City has for years been a regional leader in pedestrian and bicycle planning, implementation, and innovation.

Regional plans such as Wasatch Choices for 2040³⁷ and the Utah Collaborative Active Transportation Study (UCATS)³⁸ were considered and incorporated in developing this plan, including sharing data, comparing notes about relative municipal and regional priorities, and providing input through staff crossover on steering and stakeholder committees. In some cases, the regional plans seek to extend facilities out from Salt Lake's already-established core. In other cases, regional plans suggest a corridor driven by preferable conditions either north or south of the City's boundary. In both instances, the regional routes and priorities are generally compatible with the recommendations of this plan. Additional collaboration regionally and with neighboring municipalities also occurs as projects are implemented.³⁹

Chapter 1 Sources

1. <http://www.ers.usda.gov/publications/err79/>
2. "The Future Isn't What It Used To Be: Changing Trends and Their Implications for Transport Planning." Victoria Transport Policy Institute. Page 6. 27 December 2012.
3. "Gen Y Eschewing V-8 for 4G Threatens Auto Demand: Cars." Bloomberg. Hasan Dudar & Jeff Green, 7 August 2012.
4. Santos, et al. (2011), Summary of Travel Trends: 2009 National Household Travel Survey. FHWA (<http://nhts.ornl.gov>); at <http://nhts.ornl.gov/2009/pub/stt.pdf>. Also see, Nancy McGuckin (2011), Summary of Travel Trends 1969 to 2009, Travel Behavior Associates (www.travelbehavior.us); at www.travelbehavior.us/Nancy-pdfs/Summary%20of%20Travel%20Trends%201969%20to%202009.pdf.
5. Zipcar (2011), Millennials & Driving: Survey Results. Zipcar (www.zipcar.com); at www.slideshare.net/Zipcar_Inc/millennial-slide-share-final.

6. Lester Brown (2010), U.S. Car Fleet Shrank by Four Million in 2009. Earth Policy Institute (www.earth-policy.org); at www.earth-policy.org/index.php?/plan_b_updates/2010/update87.
7. Ewing, R. and Dumbaugh, E. (2010). The Built Environment and Traffic Safety: A Review of Empirical Evidence. *Injury Prevention* 16: 211-212.
8. Jacobson, P. (2003). Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling. *Injury Prevention* 9: 205-209.
9. North Carolina Department of Health and Human Services, Physical Activity and Nutrition Branch. Eat Smart, Move More NC: The Obesity Epidemic in North Carolina. Retrieved from: www.eatsmartmovemorenc.com/ObesityInNC/ObesityInNC.html.
10. Mokdad, A., Marks, J., Stroup, D., & Gerberding, J. (2000). Actual Causes of Death in the United States. 2000. *Journal of the American Medical Association* 291: 1238 – 1245.
11. CDC Behavioral Risk Factor Surveillance System: Prevalence and Trend Data – Overweight and Obesity, U.S. Obesity Trends, Trends by State. 2010. Available online at <http://www.cdc.gov/brfss/>.
12. CDC. BRFSS Behavioral Risk Factor Surveillance System: Prevalence and Trend Data – Physical Activity, U.S. Physical Activity Trends by State 2009–2010. Available online at http://nccd.cdc.gov/NPAO_DTM/.
13. <http://www.slvhealth.org/programs/weighActiveAndHealthy/obesity.html>.
14. Robert Wood Johnson Foundation. Active Transportation: Making the Link from Transportation to Physical Activity and Obesity. Active Living Research. Research Brief; 2009. Available at http://www.activelivingresearch.org/files/ALR_Brief_ActiveTransportation.pdf.
15. Gotschi, Thomas (2011). “Costs and Benefits of Bicycling Investments in Portland, Oregon.” *Journal of Physical Activity and Health*, 8 (Suppl 1), S49-S58.
16. USGCRP (2009). Global Climate Change Impacts in the United States . Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson (eds.). United States Global Change Research Program. Cambridge University Press, New York, NY, USA.
17. AAA (American Automobile Association)
18. National Association of Homebuilders. www.nahb.com.
19. Bureau of Transportation Statistics. (2010). Transportation Statistics Annual Report. Retrieved from http://www.bts.gov/publications/transportation_statistics_annual_report/2010/.
20. Racca, D.P. and Dhanju, A. (2006). Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas. Prepared for Delaware Center for Transportation and the State of Delaware Department of Transportation.
21. Cortright, J. (2009). Walking the Walk: How Walkability Raises Housing Values in U.S. Cities. CEOs for Cities.
22. Garrett-Peltier, H. (2010). Estimating the Employment Impacts of Pedestrian, Bicycle, and Road Infrastructure: Case Study: Baltimore. Political Economy Research Institute, University of Massachusetts, Bike League.

23. “Pathways to Prosperity: The Economic Impact of Investments in Bicycle Facilities” (<http://atfiles.org/files/pdf/NCbikeinvest.pdf>).
24. “Economic Effects of Traffic Calming on Urban Small Businesses” (http://www.bikewalk.org/2004conference/sessions/28_Business_calm/TrafficCalming_summary.pdf).
25. New York City Department of Transportation (2012). Measuring the Street: New Metrics for 21st Century Streets.
26. SQW. (2007). Valuing the Benefits of Cycling: A Report to Cycling England. Cycling England, UK Department for Transport. Retrieved from www.dft.gov.uk/cyclingengland/site/wp-content/uploads/2008/08/valuing-the-benefits-of-cycling-full.pdf.
27. League of American Bicyclists. <http://www.bikeleague.org/>.
28. CCSP (2008). Analyses of the effects of global change on human health and welfare and human systems . A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Gamble, J.L. (ed.), K.L. Ebi, F.G. Sussman, T.J. Wilbanks, (Authors). U.S. Environmental Protection Agency, Washington, DC, USA.
29. EPA (2010). Our Nation’s Air: Status and Trends Through 2008 (PDF). U.S. Environmental Protection Agency. EPA -454/R -09-002.
30. Office of Transportation and Air Quality, Environmental Protection Agency. (2006). Greenhouse Gas Emissions from the U.S. Transportation Sector: 1990-2003. Report number EPA 420 R 06 003.
31. Federal Highway Administration. (1992). Benefits of Bicycling and Walking to Health.
32. Flusche, Darren. “The Economic Benefits of Bicycle Infrastructure Investments.” League of American Bicyclists. June 2009.
33. <http://www.smartgrowthamerica.org/documents/dangerous-by-design-2014/dangerous-by-design-2014.pdf>
34. Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073.
35. Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation: <http://www.portlandonline.com/transportation/index.cfm?&a=237507>.
36. Utah Household Travel Survey. (2013). Resource Systems Group, Inc., prepared for Wasatch Front Regional Council, Cache Metropolitan Planning Organization, Dixie Metropolitan Planning Organization, Mountainland Association of Governments, Utah Department of Transportation, and Utah Transit Authority: http://www.wfrc.org/new_wfrc/publications/Utah_FinalReport_130228.pdf.
37. <http://envisionutah.org/wasatch-choice-2040>
38. <http://www.udot.utah.gov/main/uconowner.gf?n=9809803039696480>
39. http://www.wfrc.org/new_wfrc/index.php/wfrc-programs/bike-and-pedestrian-planning



Vision statements, goals, and objectives are the guiding forces behind the development and implementation of infrastructure and programs. They direct resource allocations and priorities. A vision statement outlines what a city wants to be. It concentrates on the future and is a source of inspiration. Goals provide a guide to fulfilling the vision. Objectives are more specific statements that define how each goal will be achieved. They are measurable and allow tracking of progress toward achieving the goals and overall vision.

Main sections of this chapter are as follows:

- Updating the 2004 Plan
- Vision
- Goals & Objectives

CHAPTER TWO

GOALS & OBJECTIVES

2.1 Updating the 2004 Plan

A vision statement, goals, and objectives were part of the previous Bicycle and Pedestrian Master Plan adopted in 2004. These items were all updated during the course of this current master plan effort. The public had opportunities at both open houses to comment on how they would like to see the vision, goals, and objectives updated. The Steering and Stakeholder Committees were able to provide targeted input during their meetings. The documents were then reviewed and refined based on a series of meetings, including City Council meetings.

2.2 Vision

This master plan is guided by the following vision statement:

“Walking and bicycling in Salt Lake City will be safe, convenient, comfortable, and viable transportation options that connect people to places, foster recreational and economic development opportunities, improve personal health and the environment, and elevate quality of life.”



Library patrons walking between the Downtown Main Branch and the City-County Building

Goal #1

Integrate walking and bicycling into community planning to enhance livability, health, transportation, the environment, and economic development.

Objectives

- Update City policies and ordinances, including the Complete Streets Ordinance, to foster desired walking and biking outcomes.
- Educate City staff and leadership on benefits of active transportation to individuals, government, and business.
- Provide walking and bicycling context to the City's area master plans including support for neighborhood business areas and mixed use development to enable shorter trips that people are more likely to make by walking and biking.
- Coordinate with Plan Salt Lake, community master plans, and other City divisions on their planning documents and processes, including updates to zoning to allow for more commercial and retail within walking or bicycling distance of neighborhoods throughout the City.
- Use best design practices from appropriate publications.
- Participate in long-term regional active transportation planning efforts.
- Work with neighboring cities to extend walkways and bikeways beyond Salt Lake City boundaries, with special emphasis on connections to transit stations.
- Coordinate with UDOT regarding desired improvements on their roadways within the City.
- Work with the State of Utah Driver License Division to enhance active transportation curricula.
- Achieve higher level Bicycle Friendly Community status and continue to improve ranking.
- Partner with clean air advocates and health insurers to increase walking and bicycling rates.
- Work with the police department, used bicycle dealers, pawn shops, and other entities to address bike theft.
- Expand the bike sharing system throughout the City.
- Continue to support the annual Utah Bike Summit.
- Continue efforts to host conventions and conferences such as Outdoor Retailers, Interbike, and ProWalk/ProBike, and recruit bike-related retailers and manufacturers to the City.
- As density of an area increases, evaluate neighborhood business districts and other areas as appropriate to ensure sidewalks are wide enough for pedestrian traffic.



Walking, running, and bicycling are healthy activities enjoyed by many Salt Lake City residents

Goal #2

Develop a safe, comfortable, and attractive walking and bicycling network that connects people of all ages, abilities, and neighborhoods to the places they want to go, such as work; home; school; shopping; places to socialize; places to worship; and parks, trails, and open space.

Objectives

- Expand walking and bicycling networks to enhance connectivity across barriers such as freeways, rail lines, waterways, and disconnected street networks.
- Conform to pedestrian design standards that promote accessibility for people with disabilities and implement innovative ideas that enhance the pedestrian experience for a diversity of types of pedestrians.
- Implement a low stress bikeway network (multi-use paths, protected bike lanes, buffered bike lanes, and neighborhood byways) citywide to provide access for people who are uncomfortable riding close to or in traffic.
- More fully connect the various multi-use path systems (e.g. Jordan River Parkway, 9 Line Trail) and enhance wayfinding between them and other important cross-streets and destinations.
- Educate the community about neighborhood byways and protected bike lanes as they are constructed to heighten awareness and understanding of these new bikeway types, as well as highlight benefits to pedestrians.
- Educate the school district about planned active transportation projects that will help students walk or bike to school.
- Enhance traffic signal systems to detect bicycles through use of pavement markings and sensor technology.
- Enable connections to all destinations by walking and bicycling as well as by driving.
- Use turn queue boxes, intersection crossing markings, curb extensions, and other innovations to increase bicyclist and pedestrian comfort and safety at intersections. In areas with high pedestrian traffic, design streets to reduce motor vehicle speeds through smaller turn radii, pedestrian refuges, bollards, and lighting.
- Conduct bike counts throughout the year to determine long-term trends and seasonal ridership, and consider adding trend-monitoring pedestrian counts.
- Seek opportunities to enhance existing (and develop new) bicycle recreation facilities such as BMX and pump tracks.



Families enjoy walking and bicycling in Liberty Park

Goal #3

Maintain the walking and bicycling system year-round.

Objectives

- Increase enforcement of the City's sidewalk shoveling and landscape encroachment ordinances to encourage landowners to responsibly maintain their sidewalks for the public's safety.
- Provide City resources to maintain winter access to pedestrian refuge islands and sidewalks where public properties abut overpasses and underpasses, including State roads.
- Create a prioritized snow plowing schedule for bikeways.
- Create a snow plow team for plowing the bike lane network with appropriate equipment at the same time as car lanes are plowed.
- As needed, increase sweeping frequency and effectiveness for on-street facilities and multi-use paths.
- Consider maintenance needs during design of protected bike lanes to ensure that they can be maintained properly after construction.
- Enhance current efforts to manage undesirable plant growth (e.g. puncturevine) along multi-use paths, city streets, sidewalks, and private property.
- Formalize maintenance of unpaved bike parks and trails such as the I Street Jumps and Tanner Park trail system.
- Develop a system to evaluate and prioritize capital maintenance needs of the multi-use path network and end-of-trip facilities, similar to the pavement management monitoring of the City's street network.
- Prioritize the elimination and prevention of standing water and ice dams that obstruct pedestrian facilities.
- Identify and eliminate unsafe, deteriorated, and non-ADA compliant facilities.
- Continue to maintain sidewalks to remove trip hazards and other barriers to pedestrians and people with disabilities.



Salt Lake City snow plow during a winter storm

Goal #4

Promote the safety and attractiveness of walking and bicycling through education, encouragement, and enforcement programs.

Objectives

- Continue to support efforts by the police department to enforce against driving and bicycling practices that endanger pedestrians.
- Educate all users on rules of the road regarding safe interaction: educate drivers about safely operating around people on foot and on bike, and educate people on foot and on bike about safe compliance with traffic laws.
- Use various forms of media to disseminate information to the public and heighten awareness of walking and bicycling issues.
- Distribute information to residents, employers, and other organizations about the health, environmental, and cost benefits of active transportation and educate them about how to more fully utilize the walking, bicycling, and transit systems.
- Encourage pedestrian and bicycle-friendly commercial/residential development and business practices through zoning requirements and encouragement incentives.
- Continue to support Open Streets events and explore other opportunities to selectively open roads to more walking and bicycling activities.
- Continue to produce online and printed bikeway maps and disseminate them to the public.
- Continue to coordinate with and support the Bicycle Collective's community education and encouragement efforts.
- Integrate active transportation education and encouragement activities into K-12 schools.
- Continue to enhance training of police officers so that they have the tools to properly enforce laws and regulations pertaining to walking and bicycling.
- Provide options for people to complete road safety courses in lieu of paying for pedestrian or bicycle related citations.



Information booth on the 2013 Road Respect Tour in Salt Lake City
(Photo: Road Respect, UDOT)

Goal #5

Integrate pedestrian and bicycle facilities with transit routes, stations, and stops.

Objectives

- Plan and implement active transportation routes to serve major transit stops in order to foster access to destinations within 1/4-mile or 1/2-mile of the stations.
- Work with UTA to conduct a station-by-station, or stop-by-stop, audit for pedestrian and bicycle access.
- Work with UTA to include benches and bike parking at bus stops using UTA guidelines as a baseline for what should be installed.
- Work with UTA to install bike racks on TRAX light rail trains.
- Work with UTA to install bike racks capable of holding at least three bikes on all buses in the City (most buses currently accommodate two bikes each).
- Work with UTA to provide secure and sheltered bike parking at high demand transit stops.
- Locate additional bike sharing stations near fixed-route transit stops and major destinations.
- Coordinate with UTA to submit applications for bikeways eligible for Federal Transit Administration grant money.



Bike rack & seating near the Gallivan Center TRAX station

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Community engagement was vital to creating this plan. Various avenues were available for City staff, key community stakeholders, and the general public to participate in the Pedestrian and Bicycle Master Plan development. The planning process included direct input from thousands of residents in addition to the related comments received through Plan Salt Lake.

Conventional outreach such as open houses and more community-based outreach such as social media, online surveys, and attendance at events, concerts, and street fairs were cornerstones of the public engagement. This chapter describes the various input opportunities and summarizes the public feedback.

Main sections of this chapter are as follows:

- Master Plan Committees
- Public Open Houses
- Online Survey
- Other Outreach Events
- Key Themes

CHAPTER THREE

PUBLIC PROCESS

3.1 Master Plan Committees

Several distinct committees were convened to accomplish specific purposes in support of this master plan. Their various roles are outlined below.

3.1.1 Stakeholder Committee

The Stakeholder Committee provided direct and strategic input from community representatives with diverse interests in the outcome of the Pedestrian and Bicycle Master Plan. In general, documents and coordination items were taken to the Stakeholder Committee after they had already been vetted through the City's internal Steering Committee. Groups with representation on the Stakeholder Committee included:

- Active transportation advocates
- Downtown business community
- Government agencies with a regional or statewide transportation focus
- University of Utah staff
- Key members of the project steering committee for the Utah Collaborative Active Transportation Study (UCATS) (i.e. UDOT, WFRC, UTA)
- Residents with strong convictions about both walking and bicycling

3.1.2 Downtown-to-University Focus Group

Providing a recommendation for a prioritized bikeway between the University of Utah and the downtown area was a specific focus of the master plan. A focus group was set up to provide guidance and feedback for concepts as they were developed. The focus group met twice and included representatives of:

- Affected community councils and neighborhood groups
- University of Utah staff

“When interviewing teachers for employment at my school, candidates ask whether they can easily walk or bike to school. Improving walking and bicycling is very important to me because it allows me to attract and hire good teachers.”

- Vicki Mori, Principal,
Guadalupe School

- Active transportation advocates, specifically residents in the area
- Downtown businesses

The focus group's input informed the City's selection of 300 South as the preferred corridor for a low-stress bikeway, beginning first with downtown and then extending to the University of Utah and to the Intermodal Hub. This has been incorporated into the bikeway recommendations in Chapter 6.

3.1.3 Steering Committee

The Steering Committee consisted of approximately 25 people from various City divisions and committees. Engineering, Planning, Parks and Public Lands, Streets, and Sustainability were just some of the City divisions with representation on the committee. The Steering Committee met a total of eight times to provide direction on such topics as key working documents, route planning, maintenance, public open house planning, and final document review.

3.2 Public Open Houses

Two public open houses were held, one near the beginning of the project and another after recommendations had been developed.



The first public open house in April 2013

3.2.1 Open House #1

The first public open house for the plan was held in April 2013. The purpose was to introduce the project to the public, disseminate information about the master planning process, and receive feedback about key elements of the process. Approximately 100 people attended. Attendees learned that the master plan would:

- Provide a blueprint for enhancing the City's walking and bicycling networks
- Recommend ways to strengthen education, encouragement, and enforcement programs
- Identify and prioritize an enhanced bikeway between downtown and the University of Utah
- Identify low-stress, family-friendly bikeways
- Provide phasing recommendations

Interactive informational stations highlighting different elements of the master planning

process were set up. Attendees circulated to different stations and conversed with City staff and members of the consultant team about each topic. The stations addressed the following project emphases:

- Master plan vision and goals
- Importance of accommodating people of all ages and physical abilities
- Popular origins and destinations for people walking and bicycling
- Different types of infrastructure for pedestrians and bicyclists
- Desired improvements for walking
- Desired improvements to the bikeway network
- Education, encouragement, and enforcement programs to support walking and bicycling

Feedback received at this open house was used to inform the detailed project documents developed later in the process.

3.2.2 Open House #2

A second open house held in October 2013 presented the infrastructure and program recommendations to the public, explained how they were developed, and asked for feedback. Specific stations addressed the following topics:

- Vision and goals
- Feedback received from Open House #1 and other City outreach events
- Pedestrian and bicycle facility descriptions
- Pedestrian design typologies
- Proposed pedestrian and bicycle spot improvements
- Proposed citywide bicycle network, including a network of downtown low-stress routes and a prioritized route from the University to downtown
- Proposed education, encouragement, and enforcement programs for walking and bicycling

There was general support for the goals and vision with very few specific critiques. Attendees strongly supported protected bike lanes and other low stress bikeways as a whole. However, there was targeted feedback about perceived problems with protected bike lane designs from a convenience and safety standpoint, particularly at intersections. It was clear that although the majority of people want more protected bike lanes, some experienced bicyclists would like to see their concerns addressed through changes to future designs.

An online version of the second open house was also available for those who could not attend the live event. Online input was added to the feedback received at the live open house.

3.3 Online Survey

An online survey soliciting preferences for different types of pedestrian and bicycle facilities as well as non-infrastructure programs was available to the public for nearly two months during Summer 2013. The survey received 969 responses. Figure 3-1 shows a demographic breakdown.

Responses to pedestrian questions showed a strong preference for sidewalks buffered from

traffic by parking or landscaping. They also showed an overwhelming emphasis on the importance of winter sidewalk maintenance.

Three-quarters of people support mid-block high-intensity activated crosswalk (HAWK) signals (only 11% dislike) and 78% support LED-illuminated flashing signs at crosswalks (only 5% dislike), with similar results for overhead flashing crossing beacons. Nearly everyone supports inclusion of countdown timers on pedestrian signals (only 2% dislike). Together these results show strong support for mid-block crossing and intersection features that make it easier and safer for people to cross busy streets.

Figure 3-2 illustrates how respondents self-identified as different types of bicyclists. It is

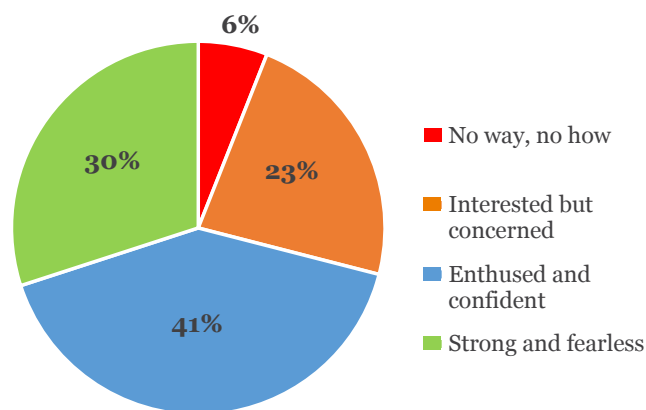


Figure 3-2 Types of Bicyclists (Pedestrian & Bicycle Master Plan Public Survey)

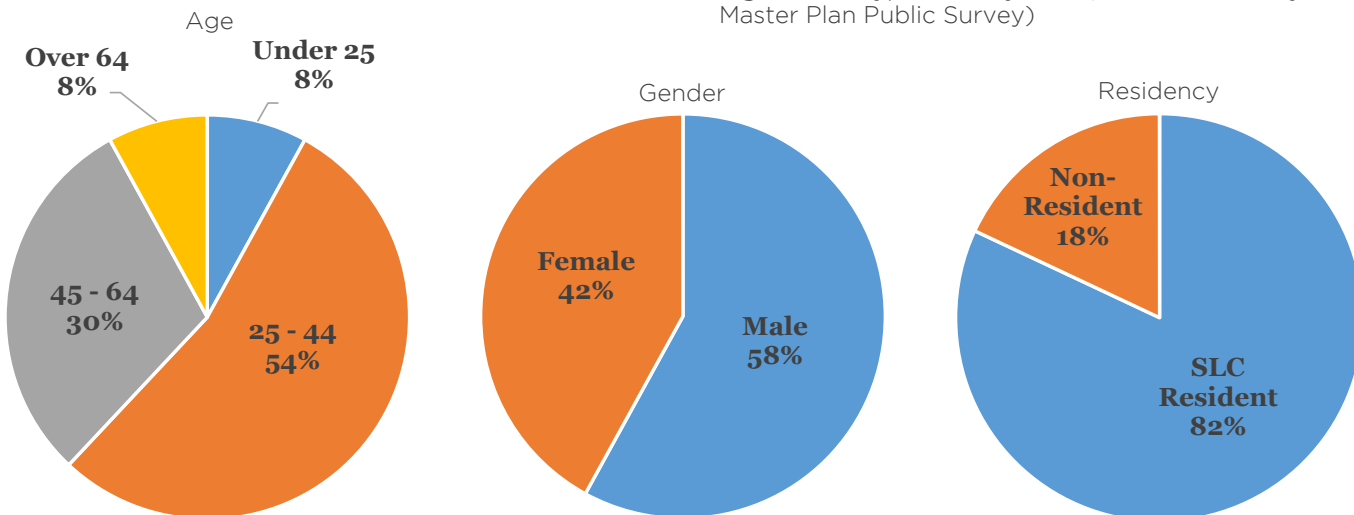


Figure 3-1 Demographics of Public Survey Respondents

evident from this cross-section of the respondents that people with an interest in bicycling were much more likely to take the survey than those without such an interest.

Section 6.2 and Figure 6-1 in Chapter 6 describe survey respondents' preference for more protected, low-stress bicycling facilities.

3.4 Other Outreach Events

City staff set up tables and booths at nearly 30 events in Summer 2013 to inform people about this plan and solicit more input. Events included:

- Downtown Master Plan open house
- Downtown Streetcar Master Plan open house
- Rose Park Community Festival
- West Salt Lake Street Festival
- 9th & 9th Street Festival
- People's Market, Downtown Farmer's Market, and Sugarhouse Farmer's Market
- Twilight Concert Series (4 separate days)
- UTA Bike Bonanza
- Road Respect Festival
- Utah Arts Festival (2 separate days)
- Tour de France Viewing Party
- Midtown Employee Clinic open house
- Solar Day
- Bike light giveaway
- Night Out Against Crime (3 separate days)
- Tour of Utah Stage 4 Circuit Race
- Bike To the U Day
- Greek Festival (2 separate days)
- Active Transportation & Health Summit
- Blessing of the Bikes

Approximately 50 people also submitted comments through the Open City Hall web forum.

3.5 Key Themes

A number of key themes emerged amidst the large amount of information collected through the public input process. The most common and pervasive themes are:

- Support for the goals and objectives shown in Chapter 2, with few specific critiques or feedback.
- Heavy support of the City's efforts to install high-visibility pedestrian treatments such as HAWKs and LED-illuminated signs to improve crossings of major streets.
- A desire for better winter maintenance, particularly enforcement of laws requiring landowners to clear snow from public sidewalks.
- Support for all types of bikeways, both conventional and low stress.
- Heavy support for the City's vision of creating a system of low stress bike facilities, including protected bike lanes.
- Concern from some very experienced bicyclists about specific design elements of protected bike lanes, and a desire for the City to implement these types of facilities in ways that minimize intersection conflicts.
- Support for a designated low stress bikeway between the University and downtown, and a preference for it to be located on 300 South.

General support for the plan is mirrored by strong support for bicycle and pedestrian improvements in the City's biennial Dan Jones polling. For example, in the 2011 edition of the poll, the city asked about a tax increase:

- 66% would be very willing or somewhat willing to support a tax increase to improve pedestrian and bicycle trails.
- 63% would be very willing or somewhat willing to support a tax increase to improve commuter bike lanes.

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CHAPTER FOUR

COMPLETE STREETS

Streets are an integral part of everyday life and public space. The term “Complete Streets” refers to designing streets for people of all ages and abilities using various travel modes such as walking, bicycling, transit, and driving.

Salt Lake City adopted a Complete Streets ordinance in 2010. The ordinance seeks to balance the competing needs of different transportation modes within the unique contexts and needs of each roadway.

The City proactively implements Complete Streets principles during roadway projects. Examples include the many new bike lanes that have been striped in conjunction with pavement overlay projects. Crosswalks are also evaluated and curb extensions have been added with some projects. Striping changes, such as repurposing space from a four lane to three lane change, can improve safety for all modes while maintaining motor vehicle capacity.

Main sections of this chapter are as follows:

- Relationship to Pedestrian & Bicycle Master Plan
- Strengthening the Complete Streets Ordinance
- Design Guidance for Complete Streets
- Complete Streets for East-West Connections
- Policy Considerations for Non-Bicycle Wheeled Transportation
- Speed Limit Policies

4.1 Relationship to Pedestrian & Bicycle Master Plan

The recommendations for enhanced facilities and programs presented in Chapters 5, 6, and 7 are consistent with and support Complete Streets principles. Table 4-1 illustrates how implementing the 10-year and 20-year bikeway recommendations in Chapter 6 would make Salt Lake City's transportation backbone much more accessible by bicycle in the future. Likewise, the pedestrian recommendations will enable people to more comfortably walk along and across streets.

Table 4-1 Percentage of Roads with Bikeways

Roadway Class	Existing	10 Yr	20 Yr
City Arterial	50%	67%	85%
State Arterial	11%	44%	55%
City Collector	56%	68%	84%
City Local	8%	16%	24%

4.2 Strengthening the Complete Streets Ordinance

The National Complete Streets Coalition annually evaluates policies from across the country. The Coalition's assessment of Salt Lake City's current ordinance reveals strengths and improvement opportunities. Based on this assessment, the City should consider the following enhancements:

- Modify language to explicitly reference other transportation options, particularly transit.
- Modify language in the ordinance's "Purpose" section to include users of all ages.
- Extend the ordinance to cover privately-built roads.
- Explicitly state the importance of the need to work with partnering agencies on roads passing through the City that are owned, operated, and maintained by other jurisdictions.
- Include specific references to additional best practice design guidance.

- Include language allowing for design flexibility to meet the needs of all transportation users.
- Include language pertaining to context-sensitive design.
- Include specific performance measures (e.g. changes in walking/bicycling mode shares, changes in pedestrian/bicyclist crash rates, number of ADA accommodations built) so that the City can evaluate the ordinance's effectiveness over time.
- Clearly state the City's implementation process, project selection criteria, and reporting requirements in the ordinance.

4.3 Design Guidance for Complete Streets

While this document touches on design guidance for both pedestrian and bicycle facilities, this master plan is not intended to be a design guide. Salt Lake City has recently endorsed the National Association of City Transportation Officials' (NACTO) Urban Street Design Guide and Urban Bikeway Design Guide; a Transit Design Guide is in the works. In some cases, these documents may benefit from local addenda specifying Salt Lake City's decisions when national guides provide several choices.

This plan generally makes recommendations that work within Salt Lake City's existing right of way, and in many cases within existing curbs. In this respect, this plan concentrates on providing doable guidance. However, when, in rare instances, the roadway condition; utility work; or significant redesign such as a light rail, streetcar, or other corridor redevelopment provide greater opportunity to incorporate pedestrian and bicycle accommodation, additional significant improvements should be incorporated as appropriate to the network concepts and connections in this plan.

Locally, the Mid-Block Walkway Design Guide informs the development of the downtown walking network. Salt Lake City's Urban Design

Element, compiled in the 1980s and finalized in 1990, should also be updated to reflect current best practice in urban design. This document primarily addresses land use, development, and buildings, but also offers some guidance on transportation corridors.

4.4 Complete Streets for East-West Connections

Salt Lake City's division by I-15 and freight and passenger rail lines is challenging for all modes of transportation, but is especially problematic for those walking and biking.

Many east-west streets do not traverse this division, and those that do may be inhospitable due to freeway interchanges and railroad crossings where trains routinely stop across an intersection. When a corridor is blocked by a train for an hour or more at a time, pedestrians and bicyclists must make a long detour which may add 2-3 miles and up to an hour of walking. A considerable safety concern arises in that many people choose instead to scramble between the railroad cars of a stopped train.

This plan recommends improvements to several east-west corridors, including low-stress bikeway connections at 300 North, North Temple, 400 South, 900 South, and 1700 South.

As part of these vital east-west corridor connections, the City and UDOT should consider pedestrian and bicycle overpasses/underpasses, redesign of freeway interchanges, significant changes to train operations, or other innovative solutions to address the considerable safety concerns and transportation barriers of these crossings. In addition to basic functionality, these crossings should be transformed into safe, inviting passages that are safe, comfortable and aesthetic. Art and placemaking creativity, in addition to engineering solutions, could help transform these crossings into landmark experiences.

4.5 Policy Considerations for Non-Bicycle Wheeled Transportation

As the City moves forward in planning a connected bicycle network, policy questions may arise regarding accommodations for other wheeled transportation devices such as skateboards, inline skates, motorized wheelchairs, and scooters. Such questions should be referred to the City's Transportation Advisory Board, ADA Committee, and Bicycle Advisory Committee for further consideration.

This is generally an esoteric area of vehicle code, with many cities and states having original language. There is little national guidance or accepted best practice; for example, the Uniform Vehicle Code is mostly silent on these topics. There have been only a few academic and governmental papers published providing solid recommendations or suggestions.

Motorized wheelchair users are most often legally considered to be pedestrians, but questions may arise whether motorized wheelchairs may also be used in bike lanes, especially protected bike lanes. Neither Utah nor Salt Lake City codes currently address this potential use. Some states, including Oregon and Rhode Island, have statutes that permit motorized wheelchairs to use bicycle lanes.

Utah statute is currently silent on the topic of skateboards, roller-skates, and other similar devices being used on roadways, other than to allow local governments to regulate these uses. Additionally, state law protects these users as "vulnerable users" in a recent statute providing that motorists must give at least three-feet of clearance to bicyclists, pedestrians, and others. The City's current ordinances regarding skateboards, inline skates, and non-motorized scooters provide that these devices may be used in bike lanes while having the responsibilities of pedestrians – thus facing traffic rather than going with the flow of traffic. The City ordinance does

not permit skateboards on neighborhood streets without bike lanes. The use of skateboards, inline skates, and similar devices is currently prohibited on sidewalks in the Central Traffic District, as well as in the Sugar House Traffic District. Bicycles are currently prohibited on sidewalks in the Central Traffic District, but are permitted in the Sugar House Traffic District.

Electric bicycles are legally defined in Utah statute as equivalent to a bicycle. City code does not currently address electric bicycles. Within the context of the state law, the City could regulate some aspects of electric bicycle use such as speed limits.

The above discussion serves to illustrate that these are complex topics, with little standard guidance, and many nuances for safety considerations between many types of users traveling at different speeds. The City has an interest in promoting transportation choice, balanced with safety for all, and may wish to further consider these topics for additional public input and possible policy changes:

- Allowing devices other than bicycles in on-road bikeways
- Clarifying the applicability of shared lane markings
- Allowing devices on slow-speed, low-traffic residential streets
- Requiring safety equipment, such as lights, for other on-road uses
- Providing storage for non-bicycle devices at destinations
- Allowing devices on City sidewalks or in certain sections of the City
- Allowing devices on transit vehicles

4.6 Speed Limit Policies

Appropriate speed limits, in tandem with other changes to the streetscape, are a vital part of making urban streets safe and comfortable for

pedestrians and bicyclists. Since the rise of the automobile, major urban arterials throughout the country have been designed for increasing capacity and higher speeds, to the potential detriment of those walking and bicycling.

Around the country, cities are now reconsidering lower speed limits, particularly on downtown streets. Cities as diverse as New York City, Burlington (VT), Miami Springs (FL), and San Mateo (CA) have recently implemented downtown speed limits of 25 mph. While some larger arterials in Salt Lake City are likely to keep higher speeds in keeping with their role in regional travel, many downtown collector streets are appropriate for reduced speed limits. Lower speeds produce less traffic noise, improve crosswalk yielding behavior, and contribute to a more people-friendly environment.

In addition to creating a more pleasant urban streetscape for people, reduced speed limits are critical for safety. Research shows that a pedestrian who is hit by a car traveling 30 mph is over twice as likely to die as someone hit by a car traveling 25 mph, and five-times more likely than someone hit by a car traveling only 20 mph.

The de facto speed limit in Salt Lake City is 25 mph when not otherwise posted. This applies to many local streets. However, most through streets in downtown are classified as collectors or arterials and many speed limits have been posted at 30 or 35 mph.

Downtown speed limits were considered in the 2008 Downtown in Motion Master Plan, which recommends lowering speed limits in the downtown area to a maximum of 25 mph, with local and collector streets preferably at 20 mph, toward the goal of maintaining speeds “compatible with pedestrian and bicycle activity”. In accordance with these recommendations, speed limits on several downtown streets were lowered to 20 or 25 mph in 2010.

Lower speeds will also contribute to the safety and comfort of the emerging low stress bikeway network that the City seeks to expand. In 2014, the 20 mph speed limit on 300 South was extended east to 600 East in conjunction with the 300 South protected bike lane project.

Speed reductions should generally be achieved through physical roadway changes rather than only changing signs. Studies show that most people will drive at a speed that feels safe based on the physical conditions presented to them. Arbitrarily lowering speed limits leads to poor compliance, difficult enforcement, and resentment of regulatory speed limits.

As part of the Complete Streets approach, the City should evaluate each street for potential lowered speed limit in conjunction with road striping and other design changes. Additionally, a 20 mph speed limit should be considered for neighborhood byways and other local residential streets. Lowered speed limits should be particularly considered where a review of crash data indicates a safety concern.

Consideration of speed limits, tighter curb radii, and updated considerations for turn lanes citywide should be further incorporated in an update to the City's Transportation Master Plan, as the overarching multi-modal document guiding transportation in the City.

Chapter 4 Sources

1. Rosen, Erik and Sander, Ulrich. "Pedestrian fatality risk as a function of car impact speed". Accident Analysis and Prevention 41 (2009). Viewed online at: http://nacto.org/docs/usdg/pedestrian_fatality_risk_function_car_impact_speed_rosen.pdf

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CHAPTER FIVE

PEDESTRIAN RECOMMENDATIONS

Complete Streets principles dictate that the transportation network should accommodate pedestrians with a variety of needs, abilities, and possible impairments. Sidewalks are the most fundamental element of the pedestrian network. They provide an area for pedestrian travel that is separated from vehicle traffic. Fundamental tenets of good sidewalk design include:

- Accessibility for all users
- Separation from traffic by landscaped park strips and/or parking
- Continuity
- Proper drainage
- Street lighting
- Sun in winter and shade in summer
- Social space for standing, sitting, and visiting in neighborhood and business districts

Intersections are also an important piece of the pedestrian realm. Although design decisions will vary according to context, typical attributes of pedestrian-friendly intersection design include:

- Areas for pedestrians to congregate
- Appropriate accessibility to (and maintenance of) all corner pedestrian features
- Corner and intersection design for pedestrian safety and comfort
- Minimization of pedestrian crossing distances
- Lighting that promotes visibility, legibility, and accessibility
- Transit stops where appropriate

Primary subsections of this chapter include:

- Walking Facility Descriptions
- Traffic Signal & Warning Beacon Considerations
- Pedestrian Counts
- Enhancing Corridors and Neighborhood Byways for Pedestrians
- Pedestrian Spot Improvements
- Pedestrian Typologies

5.1 Walking Facility Descriptions

Most trips begin and end as walking trips even when a car, bicycle, bus, or train is also involved. Generally, Salt Lake City has a very complete walking network and there are few places where walking facilities are not available. The City continually adds sidewalk improvements as a part of redevelopment, street reconstruction, new or upgraded traffic signals, and targeted spot improvements.

5.1.1 Linear Facilities

Pedestrians use several different types of facilities to travel in Salt Lake City, primarily sidewalks and multi-use paths. Every street in the City should be designed for pedestrians.

5.1.1.1 Multi-Use Paths

These facilities are shared by many active transportation and recreation users including pedestrians, bicyclists, and in-line skaters. The Jordan River Parkway Trail, Legacy Parkway Trail, Liberty Park Path, 9-Line Trail, and Parley's Trail are all examples of multi-use paths in Salt Lake City. This plan recommends 38.5 miles of new multi-use paths (Figure 5-2).



A family riding on the Jordan River Parkway Trail
(Photo: Suzanne Stensaas)

5.1.1.2 Neighborhood Byways

Neighborhood byways are multi-modal linear facilities on streets with low traffic volumes and speeds. Additionally, intersection improvements that allow bicyclists and pedestrians to cross large or busy streets are critical to their utility. Wayfinding signage and shared lane markings are also important components. Traffic diversion and calming measures are often used when traffic volumes or speeds are higher than desirable. This plan recommends 68 miles of neighborhood byways.



Pedestrians and bicyclists on a neighborhood byway in Long Beach (CA)

5.1.1.3 Sidewalks

Sidewalks are the most common walking facility in Salt Lake City, approximately 1,400 miles total. Some are directly adjacent to travel lanes without any buffer or barrier, while others are buffered by landscaping, parking, seating, or other physical means.

While City Ordinance requires adjacent property owners to be responsible for sidewalk maintenance, the City also provides some assistance:

- Concrete saw-cutting service to level steps created by broken or lifted sections of sidewalk
- Fixing approximately 10,000 tripping hazards by sawing off uneven sections of concrete to be level with the surrounding sidewalk

- Federal and other funding as available to replace failed sidewalk in priority and qualifying areas. Some improvements are made directly while others are made through a matching program with the adjacent resident

Many residential streets in the city are lined with large trees in the park strip, which can lift sidewalks and make them difficult to use. In these cases, the City's Urban Forestry and Engineering Divisions work with the property owner to identify a solution.

The identification of gaps in the City's sidewalk network is a very fine-grained exercise. Sidewalks

are missing on some corridors, such as Redwood Road, and in some developments, such as in the International Center. These sidewalks should be filled in as redevelopment allows. However, in the interim, the pedestrian typology in Figure 5-5 recommends that pedestrians may be accommodated in painted bike lanes, similar to pedestrians in a rural setting using paved shoulders to walk, run, or jog.

5.1.1.4 Landscaping & Street Furniture

Landscaping, street trees, and street furniture can have a profound effect on improving the pedestrian feel of a corridor. The City should include the following in appropriate streetscape designs:

- Landscaping and street trees, especially shade trees.
- Planters
- Benches, tables, and chairs

5.1.1.5 Lighting

Street lighting is often designed primarily for the safety and comfort of motorists except at intersections, where crosswalks are typically illuminated. The illumination of sidewalks and other walkways is often a separate consideration.

Pedestrian lighting typically includes shorter lights (14-18' maximum pole heights) directly above walkways and accent lighting that illuminates features on or near buildings. Pedestrian lighting increases drivers' visibility of pedestrians, promotes perceived personal security, illuminates potential hazards, and creates vibrant and inviting streetscapes. Salt Lake City should consider the addition of pedestrian-scale lighting primarily in downtown and neighborhood business districts, along multi-use paths, and in conjunction with significant street reconstructions.



Sidewalk on South Temple separated from traffic by landscaping



Sidewalk separated from traffic by trees, planters, and parking

5.1.2 Crossings and Intersections

Every intersection in Salt Lake City should be designed for pedestrian safety and comfort, with pedestrian enhancements appropriate to traffic speed, traffic volume, pedestrian crossing distance, and other similar factors. The section below, together with the following signals section, describes the primary palette of options that should be considered for crossing and intersections improvements. As streets are repaved and reconstructed, pedestrian crossing ramps are being added. When reconstruction projects allow, additional improvements should be considered as part of those projects.

5.1.2.1 Crosswalks

Crosswalks exist everywhere that sidewalks and streets intersect, whether marked or not. Marked crosswalks provide a delineated space for pedestrians and other sidewalk users to cross. Differences in striping patterns (e.g. double ladder or piano key crosswalks) and paving surfaces (e.g. raised and/or brick crosswalks) offer varying levels of visibility and delineation between pedestrians and automobiles, bicyclists, and other roadway users.

5.1.2.2 Crosswalk Flags

Salt Lake City has been providing crosswalk flags at downtown crosswalks for many years. Flags are simple, low cost, popular, and effective at improving pedestrian safety. The Adopt-a-Crosswalk program allows individuals, schools, neighborhood councils, and businesses to install crosswalk flags by sponsoring a crosswalk. The City installs the flag equipment and the sponsors maintain their flags by providing labor and minimal financial assistance.

5.1.2.3 Bulbouts

Bulbouts reduce the width of roadway crossings at intersections and mid-block crossings. They also create a visual traffic calming cue to drivers to slow for pedestrians, improve pedestrian visibility,



Salt Lake City uses double ladder crosswalks in school zones and at midblock crosswalks in the downtown Central Business District



This raised crosswalk on 2nd Ave calms speeds and elevates the crossing for better visibility



Mid-block double ladder crosswalk with crossing flags at 300 S/Regent St



Intersection bulbouts on 400 West

and protect transit passengers as they board or alight from buses or streetcars. Sufficient space for bicyclists is a necessary design consideration.

5.1.2.4 Traffic Circles & Roundabouts

Traffic circles and roundabouts allow for constant vehicular traffic flow through intersections and do provide some benefits to pedestrians and bicyclists, such as reduced traffic speeds. However, they also have drawbacks. Yielding compliance at crosswalks may be reduced if the facility is not designed properly. Also, designs often require bicyclists to merge into traffic through the roundabout, which is uncomfortable for many riders.

5.1.2.5 Median Refuge Islands

Refuge islands enable pedestrians to cross one direction of a street at a time. They are typically used in conjunction with crosswalks where traffic



Median refuge island near Bennion Elementary on 800 East

volumes or speeds are high or roads are wide. Sometimes other traffic control measures such as signals or flashing beacons are also used.

5.1.2.6 Mid-Block Crossing Prioritization Process

The City uses a process to prioritize appropriate mid-block crossing treatments. Prioritization factors include traffic volume, nearby pedestrian traffic generators, traffic speed, crash history, roadway crossing distance, and gaps in traffic. Refinements and updates to this process were completed as part of this master planning effort.

5.1.3 Other Treatments

Salt Lake City uses additional treatments to improve the pedestrian experience, calm traffic, and create streets more amenable to walking.

5.1.3.1 Curb Ramps

The City will continue to place high priority on increasing accessibility by converting step-up curbs to curb ramps. Approximately 200 accessible ramps are installed annually.

5.1.3.2 Transit Stop Amenities

Bus shelters and benches protect pedestrians from rain, snow, and the sun; increase comfort; and may encourage more people to ride transit.



Bus shelter at Ogden Intermodal Center (Photo: UTA)

“There should be better ways to cross major and busy streets, and not just for bicyclists, but also for pedestrians.”

- Comment from 2013 public survey

5.1.3.3 “LOOK” Pavement Markings

Salt Lake City installs pavement markings in the downtown area to encourage pedestrians to look both ways before entering a crosswalk.



“LOOK” pavement marking in Salt Lake City

5.2 Traffic Signal & Warning Beacon Considerations

Traffic signal standards are well established in the U.S. Salt Lake City has been in the forefront of implementing many pedestrian and bicycle related best practices including countdown timers, audible signals, HAWK signals, and other innovations.

Section 4 of the Utah Manual on Uniform Traffic Control Devices (Utah MUTCD) defines minimum requirements for signal timing, displays, pushbuttons, and other pedestrian signal considerations. The City carefully adheres to state and national standards and exceeds them in many cases. Typical concerns that pedestrians experience at signalized crossings include:

- Delays caused by long signal cycles
- Lack of understanding of WALK and flashing DON'T WALK indications
- Uncertainty about whether the button must be pressed to activate a pedestrian signal, particularly in downtown areas where signals operate differently during different times of day
- Lack of confirmation that someone has already pressed a pushbutton
- Conflicts with turning vehicles at intersections

5.2.1 Pedestrian Countdown Timers

The City installs pedestrian countdown timers at all City owned traffic signals. Many UDOT owned signals also have pedestrian countdown timers and as UDOT upgrades pedestrian facilities, new countdown timers are installed. Pedestrian countdown timers improve safety by providing information to assist pedestrians with crossing decisions. Pushbuttons with confirmation lights are also sometimes used so that people can see whether the signal has been activated.



Pedestrian countdown timer at 200 E/200 S intersection

5.2.2 Actuated & Recalled Signal Phasing

Phasing determines which traffic movements are allowed to operate simultaneously and which occur separate from one another. Timing refers to the amount of time given to particular movements during a phase.

For many years, Salt Lake City has not had pedestrian buttons in the downtown area, meaning that the pedestrian phase is recalled on every signal cycle 24 hours a day. This allows a pedestrian phase at all times without having to push a button. One negative aspect of the “no-button” approach is that signals operate in a pre-timed fashion 24 hours a day regardless of actual traffic flows and pedestrians, which leads to unnecessary stops and driver delay in the downtown area, especially late at night, early morning, and weekend periods when there is little pedestrian or vehicle traffic.

The City recently began installing pushbuttons in the downtown area when traffic signals are upgraded. However, during the day (typically 6 AM to 10 PM) most signals operate in coordination to achieve efficient flow, meaning that one or both of the principal directions are recalled automatically regardless of traffic detection and the pedestrian phase is also displayed. This is the most efficient way to operate signals when car volumes are steady and predictable (as they are on most weekdays). It is also better for pedestrians during these hours.

The downside of this method is that when traffic volumes are light and few pedestrians are present, pedestrians must push the button to activate the signal. Pedestrians who use the signals during the day and are accustomed to receiving a WALK signal automatically may not realize that they need to push a button during the off-peak hours.

5.2.3 Exclusive Pedestrian Phases & Scrambles

Exclusive pedestrian phases allow pedestrians to cross the street in both directions simultaneously. Salt Lake City operates a few traffic signals this way in locations where pedestrian volumes are high, such as the Main/South Temple, 100 S/West Temple, and 400 S/University St intersections.

“Scrambles” permit pedestrians to cross all four legs of an intersection or to cross diagonally while all motor vehicle traffic is stopped. This benefits car traffic by reducing turning conflicts and allowing cars to clear intersections more efficiently during their signal phase.

Scrambles are not widely used in the U.S., but when used they are typically found at downtown intersections with high volumes of pedestrians relative to motor vehicles. While they provide the convenience of a diagonal crossing, they have a number of disadvantages including longer pedestrian crossings times, complications to coordination with other nearby signals, and delay to pedestrians that only need to cross one leg of the intersection. Salt Lake City has not implemented any scrambles to date.



Scramble in Carlsbad (CA) that serves 8,000 pedestrians per day

5.2.4 Leading Pedestrian Intervals

Leading Pedestrian Intervals (LPI) are common in cities across the U.S. They give pedestrians a WALK indication before (typically 3-7 seconds) vehicles are given a green light. The advantage of LPI is that it puts pedestrians in the crosswalk in advance of cars and makes them more visible to turning motorists. The LPI can be omitted if no pedestrians press the pushbutton.

5.2.5 Accessibility for People with Disabilities

Accessible pedestrian features at traffic signals consist of audible and/or tactile communication to assist visually impaired persons with locating pushbuttons, identifying the appropriate button for the desired crossing, locating the curb ramp, and conveying the pedestrian signal status.

Currently, the City and UDOT install accessible signals where there is an identified need. Accessible signals may be a requirement at all new and reconstructed pedestrian signals when the Public Rights-of-Way Accessibility Guidelines (PROWAG) are adopted. The City and UDOT have installed accessible pedestrian features at many locations with known needs, such as the audible “chirp” signals in the downtown and Sugarhouse areas.

The City will consider upgrades to signals and other devices as advances in technology emerge. For example, there are now signals that verbally describe the active direction to cross at an intersection and the number of seconds in the countdown timer.

5.2.6 Mid-Block Crossings

In addition to standard pedestrian traffic signals, the following three types of mid-block pedestrian traffic control devices may be used to improve safety:

- Warning Sign with Flashing Beacons
- Pedestrian Hybrid Beacon (also known as a High Intensity Activated Crosswalk or “HAWK”)
- Toucan Signal (signalized pedestrian crossing that also allows bicyclists to cross simultaneously)

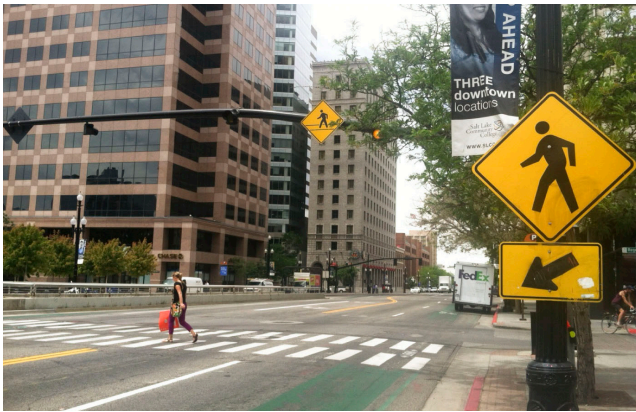
5.2.6.1 Flashing Beacons

Various types of flashers may accompany warning signs. Examples include rectangular rapid flashing beacons (RRFB), yellow ball flashers, and LED flashers outlining the signs. Although these methods differ, they share a common goal of garnering motorists’ attention with flashing beacons. Flashing beacons are typically used at marked mid-block crosswalks where extra motorist warning is desired. They are relatively inexpensive compared to higher-level mid-block signalization options like HAWKs, Toucans, and standard traffic signals.

Yellow ball flashers are often attached to overhead mast arms, whereas RRFB and LED flashers are typically used in combination with street signs. The Utah MUTCD contains the most up to date state and national standards for these devices. RRFB is currently the accepted standard for flashing beacons on signs, but LED flashers are being considered as well.



RRFB pedestrian crossing at 1100 East South Temple



Flashing yellow ball crossing at Regent St/200 South



LED flashing sign at Presidents Circle/200 S

5.2.6.2 HAWKS

HAWK signals consist of two red lenses above a single yellow lens. The beacon head is dark until a pedestrian activates it by pushbutton. After brief yellow flashing and steady yellow intervals, the signal displays a steady red indication to drivers and a WALK indication to pedestrians, allowing them to cross the road while traffic is stopped.

After the WALK phase ends, the pedestrian indication changes to a flashing upraised hand and countdown timer. During the countdown phase, the hybrid beacon displays alternating flashing red lights to drivers, indicating a STOP condition just as if a STOP sign were present. After stopping for crossing pedestrians, drivers can then proceed when pedestrians are outside of their lane and the adjoining lane(s). After



HAWK signal on 100 S between West Temple and Main St

the countdown phase ends the overhead traffic signal goes completely dark and the pedestrian signal displays a solid upraised hand.

HAWKs are much more expensive than flashing beacons, typically costing almost as much as a standard traffic signal. However, they are more effective than flashing beacons because they require vehicles to stop, helping pedestrians cross busy high-speed streets safely and comfortably while minimizing traffic flow interruptions better than a standard traffic signal.

5.2.6.3 Toucans

Toucan signals allow pedestrians and bicyclists to make mid-block crossings simultaneously (i.e. “two can cross”). These signals are commonly used where multi-use paths or neighborhood



Toucan signal in Tucson (AZ)

byways cross a road. Separate pedestrian and bicycle signal heads allow the signal to time the crossing differently depending on which button is pushed, thereby minimizing delay. These heads are displayed to pedestrians and bicyclists as they approach the signal.

Toucans are typically activated by pushbuttons but passive detection can also be used. Conventional three-section traffic signal heads are displayed to drivers. The signal rests in green until activated by a pedestrian or bicyclist. It displays a yellow signal followed by a steady red during the pedestrian/bicycle phase. Costs are similar to HAWK signals.

5.2.7 Pedestrian-Related Signal & Warning Beacon Recommendations

- In the downtown area, continue to provide an automatic walk sign at signalized intersections even when the pedestrian button is not pushed (or “recalled” signal phasing) during peak, or busy, hours; require use of the pedestrian button to obtain a walk sign during off-peak, light traffic hours. This represents the best balance between being pedestrian-friendly and creating unnecessary vehicle delays and air pollution.
- Continue installing countdown timers and latching pushbuttons with confirmation lights as new signal equipment is installed and old equipment is replaced.
- Evaluate protected bike lane impacts to pedestrian phasing and timing at specific intersections on a case-by-case basis as the City builds more of those types of facilities.
- Continue to consider exclusive pedestrian phases and scrambles in conjunction with special events, at signals with significant year-round pedestrian loads, or where they may yield signal operation benefits.
- Consider using LPIs in the downtown and other areas where pedestrian volumes are relatively high. Also consider using “No Turn on Red” blank-out signs in conjunction with LPIs.

- Consider implementing a proactive policy to identify locations where additional accessible signal features may be desirable, standardize equipment according to best practices and PROWAG guidelines, and describe conditions under which they will be installed.
- Continue installing mid-block pedestrian warning beacons and signals using the treatments most appropriate for specific sites, per the City’s current process that considers traffic speeds, volumes, number of lanes, and expected pedestrian use as major determining factors.
- Where possible, ensure that pedestrian signals on opposite legs of an intersection are both triggered by pedestrian buttons on one of the two legs. Work with UDOT to ensure application at intersections as appropriate.

5.3 Pedestrian Counts

Salt Lake City recently purchased infrared counters that can be used to count pedestrians on a regular basis. Resources to assist the City with future pedestrian counts may be found at the [National Bicycle and Pedestrian Documentation Project website](#).

5.4 Enhancing Corridors and Neighborhood Byways for Pedestrians

This plan recommends three initiatives in addition to the citywide guidance to accommodate pedestrians at every intersection and on every street. The combined goal is to create more inviting and comfortable byways for people on foot, linking neighborhoods, business areas, downtown, and parks and open space. These initiatives further enhance the existing sidewalk network and help focus recommended improvements to mid-block crossings.

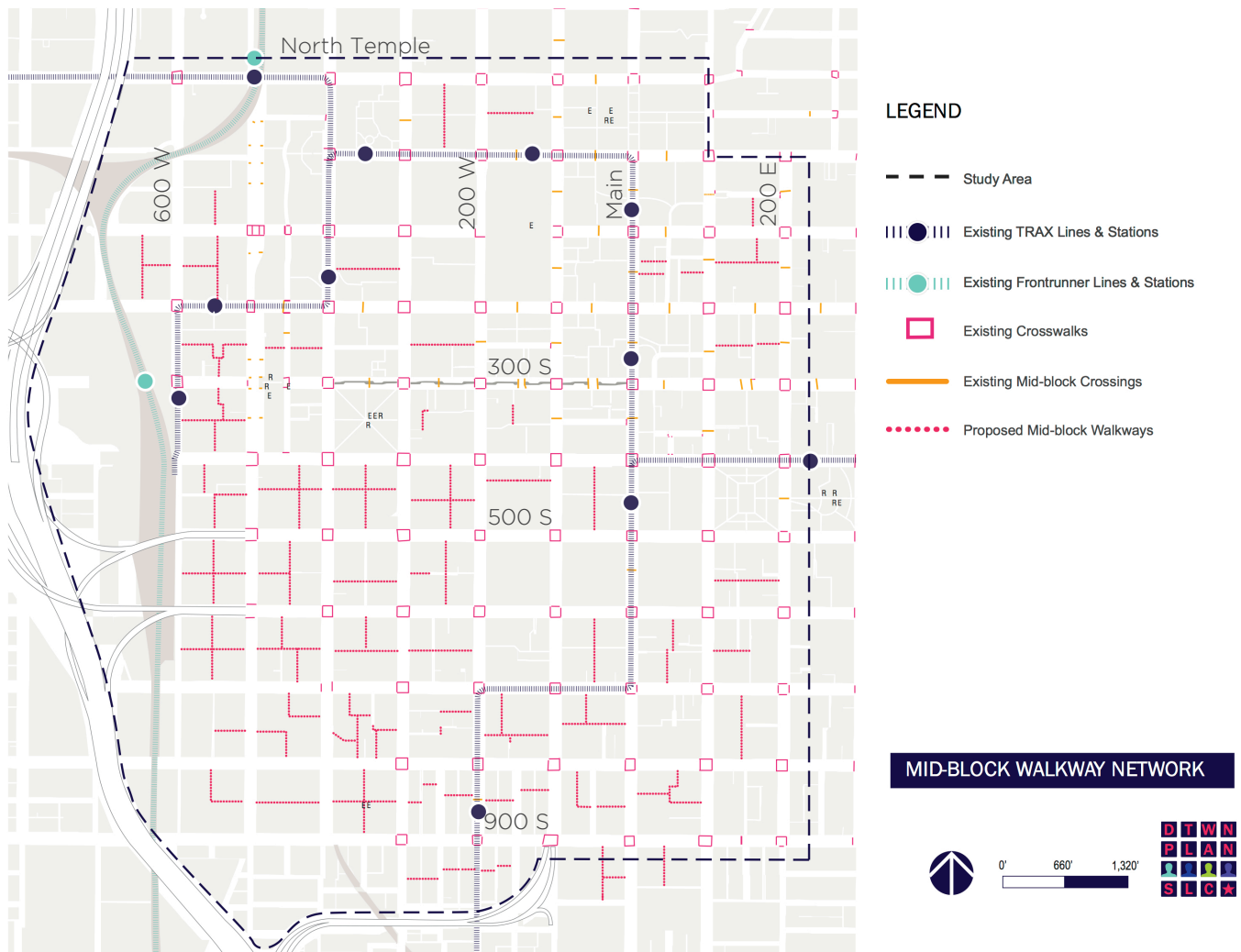


Figure 5-1 Mid-Block Walkways Map from the draft Downtown Community Master Plan (Note: The mid-block walkway network shows the potential for improved pedestrian connectivity on alleys and minor streets.)

5.4.1 Downtown Mid-Block Walkways

Within the downtown area, the mid-block walkways already in adopted master plans, as well as the additional walkways proposed in the draft Downtown Community Master Plan, serve to penetrate Salt Lake’s formidably sized blocks with human-scale corridors. These walkways create inviting spaces, convenient short cuts, and a pedestrian experience primarily away from busy automotive traffic.

Mid-block walkways included in the City’s master plans have been regulated by the zoning ordinance since 1995, so that any new development on a

parcel where the Downtown Master Plan identifies a midblock walkway is required to provide the portion that is on their property. The Downtown Community Master Plan draft proposes additional mid-block walkways, as shown in Figure 5-1.

This network and the related Mid-Block Walkway Guidelines are both recommended for shaping the future of Salt Lake’s walkable downtown.

5.4.2 Neighborhood Byways

A proposed network of “neighborhood byways” taps quiet neighborhood streets and formalizes them into transportation corridors designed to

crisscross the city and link to key destinations including neighborhood retail areas and corridors, parks, schools, and transit stations. Few changes are needed on the quiet streets themselves; the network is realized by providing for safe, often signalized crossings at the major barrier streets, and reducing traffic volumes to make walking safer and more enjoyable. “Neighborhood byways” is a term recognizing that these corridors create a network for both pedestrians and bicyclists.

5.4.3 Urban Trails

In addition to the Jordan River Trail, Salt Lake City has in recent years developed an increased focus on trails both within the City limits and in partnership with our neighboring municipalities. Several sections of the Parley’s Trail have recently been constructed spanning Salt Lake County, Salt Lake City, and City of South Salt Lake. Other urban trails in development are shown in Figure 5-2, and include:

5.4.3.1 Parley’s Trail

The trail, with recently constructed connections through Hidden Hollow and along the S-Line as the Sugar House Greenway, is heavily used as a pedestrian corridor. Extensions east are in this plan; the western connection to the Jordan River Trail is in the City of South Salt Lake.

5.4.3.2 9 Line Trail

A segment from 700 West to Redwood Road was recently constructed, with extensions east and west in the works. The TransValley Corridor study will likely incorporate this area.

5.4.3.3 Jordan & Salt Lake City Canal Trail

Also known as the McClelland Canal Trail, construction on this corridor will begin in 2015. This project has some portions that are off-street multi-use paths and some sections that are on neighborhood streets.

5.4.3.4 Folsom Trail

This proposed trail is on an abandoned rail line from 500 West, connecting downtown to the Jordan River Trail.

5.4.3.3 Antelope Island Trail

This proposed trail would connect the International Center to Antelope Island. Primarily a recreational trail, the corridor could use one of several historical access points to the Island, provided that access could be secured from several institutional property owners and with proper considerations for wildlife habitat.

5.4.3.3 Surplus Canal Trail

Adjacent to a canal, this proposed trail would tap an existing maintenance road and has the potential to connect Glendale neighborhoods to the International Center.

5.5 Pedestrian Spot Improvements

Some recommended locations for the signals and treatments discussed previously are identified in this plan as spot improvements. Spot improvements are small non-linear projects, such as intersection upgrades, crosswalks, and mid-block crossing installations, that cannot be easily represented by lines on a map. Figure 5-2 shows recommended pedestrian spot improvements associated with this plan. This map is not an exhaustive representation of pedestrian spot improvements that will be planned or implemented in Salt Lake City. As mentioned in Section 5.1.2.6, the City will use a pedestrian crossing and signalization toolbox to improve pedestrian crossings throughout the City.

Some bicycling spot and linear recommendations also benefit pedestrians. Neighborhood byways help pedestrians cross busy roadways and protected bike lanes also offer benefits as illustrated in Figure 5-6.

5.6 Pedestrian Typologies

The pedestrian typologies shown in Figures 5-3 to 5-6 are not specific corridor or site designs. Rather, they provide conceptual design information for four typical situations that the City may encounter when trying to improve pedestrian conditions. Similarly, the conceptual designs shown in Figures 5-7 and 5-8, while based on two real world corridors, are included to illustrate the type of fine-grained analysis that is needed to improve pedestrian connections along a corridor.

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INSERT Figure 5-2

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A photograph of a city street with trees and two people riding bicycles. The image is used as a background for the chapter title.

CHAPTER SIX

BICYCLING RECOMMENDATIONS

Bicyclists are much more affected by facility design, construction, and maintenance practices than motor vehicle drivers because of their exposure level. They lack the protection from weather and roadway hazards provided by an automobile's structure and safety features. By understanding their unique characteristics and needs, Salt Lake City can provide Complete Streets for bicyclists.

People who bicycle vary in their physical abilities, experience levels, and the types of bicycles that they ride. In the context of bicyclists, a Complete Street is one that is designed to comfortably accommodate the different types of people expected to ride there. Many streets such as low speed, low volume local streets may not need any special facilities to accommodate bicyclists, while others with larger volumes and higher speeds may require significant bikeway infrastructure investments.

The bicycling recommendations provided in this chapter represent a master planning level of thought and detail. Recommendations may change as individual projects are implemented.

Primary subsections of this chapter include:

- Bikeway Type Descriptions
- Evolution Toward Low-Stress Bicycling
- Bikeway Recommendations
- Interim Bypass Routes
- Bikeway Maintenance
- Traffic Signal Considerations
- Bicycle Parking and Other End-of-Trip Facilities
- Mountain Biking & BMX
- Bicycle Counts & Surveys

6.1 Bikeway Type Descriptions

Bicycle facilities can generally be grouped into two categories – conventional and low stress facilities. Salt Lake City currently has nearly every type of facility described in this chapter in its network.

The bikeway classes described in this chapter are organized first by group (conventional and low stress) and then within each group by degree of separation from motor vehicle traffic, from most separation to least separation.

6.1.1 Conventional Bike Facilities

Conventional facilities like bike lanes and shared lane markings have been standard practice in the U.S. for many years. They provide dedicated or shared space for confident bicyclists who have experience riding next to traffic.

6.1.1.1 Conventional Bike Lanes

This type of bikeway uses signage and striping to delineate roadway space for exclusive use of bicyclists. Conventional bike lanes are typically located to the right of the outside car lane. Parking may be allowed to the right of the bike lane.

6.1.1.2 Shared Lane Markings

Shared lane markings (i.e. “sharrows”) indicate a travel lane shared by bicyclists and motor vehicles. According to NACTO, shared lane markings “reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning.”

6.1.1.3 Signed Shared Roadways

This type of facility is typically used on streets with lower motor vehicle traffic volumes or speeds where bike lanes are not feasible or necessary. It’s defining characteristic is the green “Bike Route” sign used to mark the route.



Conventional bike lane on 200 S



Shared lane marking on 1700 S



Bicyclist on signed shared roadway; depending on network connectivity, a similar street could be included in a neighborhood byway

“I wish there were more protected and buffered bike lanes in Salt Lake City.”

- Comment from 2013 public survey

6.1.2 Low Stress Bike Facilities

Low stress bikeways appeal to a broader cross section of the public than conventional facilities. Their low stress nature is a result of greater separation from traffic; use of low volume, low speed streets depending on the specific facility type; and/or directional wayfinding signage that directs bicyclists to destinations and specific routes much like interstate highway signage for automobiles.

6.1.2.1 Multi-Use Paths

Multi-use paths are separated from cars by open space or barriers and are for the exclusive use of bicyclists, pedestrians, and other non-motorized users. They are frequently located along waterways, utility corridors, and other rights-of-way where interactions with cars are limited.

6.1.2.2 Protected Bike Lanes

Protected bike lanes are separated from traffic by a physical barrier of some kind and are also distinct from the sidewalk. Barriers may be in the form of planters, raised curbs, parking, bollards, or other streetscape elements. Protected bike lanes can be configured for either one-way or two-way travel.

6.1.2.3 Buffered Bike Lanes

These are similar to conventional bike lanes with the difference being a painted buffer between the bike lane and adjacent car lane. Alternatively, the buffer may also be placed between the bike lane and parked cars. Where space permits, buffers are sometimes placed on both sides of the bike lane. Buffered bike lanes differ from protected bike lanes because the buffer space is paint rather than a physical barrier.



Child riding on the Jordan River Parkway Trail
(Photo: Suzanne Stensaas)



Bicyclist on 300 E protected bike lane



People riding in a buffered bike lane on 300 E

6.1.2.4 Neighborhood Byways

Neighborhood byways, described in further detail in 5.1.1.2, are multi-modal linear facilities on streets with low traffic volumes and speeds designed for bicyclists and pedestrians of all ages and abilities.

6.2 Evolution Toward Low Stress Bicycling

Salt Lake City's established system of multi-use paths and on-street bike lanes enables a modest percentage of the population to feel comfortable traveling by bicycle. People who feel comfortable riding in mixed traffic or in bike lanes adjacent to mixed traffic are generally able to access most places in the City currently. However, a much larger segment of the public would like to ride bicycles more but are discouraged from doing so by the currently available bikeways.

Surveys both nationally and locally show that 50-60% of people say they would ride more (or start riding) if they had access to bikeways that provide more separation from traffic, lower traffic speeds, and lower traffic volumes. For this reason, identifying opportunities for more low stress bikeways was an emphasis of this master plan. Input received from the nearly 30 community event tables also indicated a strong demand for more facilities like the 300 South and 300 East protected bike lanes.

In the online survey (see Section 3.3), people were asked to rank bicycle facilities by their preference. Results reveal that even those who are currently urban bicyclists generally favor bikeways with more separation, as illustrated by Figure 6-1. Support for non-separated facilities also remains high.

Particular emphasis was placed in this master plan upon providing recommendations for a low stress bikeway network in the downtown area. Downtown Salt Lake City is a destination for jobs, residential housing, entertainment, and shopping. Many people desire to ride to these destinations but historically the downtown bikeways on City streets have not been comfortable enough to appeal to a wide cross section of the public.

Bringing more people downtown without cars benefits businesses, frees up valuable street parking, reduces car traffic, and improves air

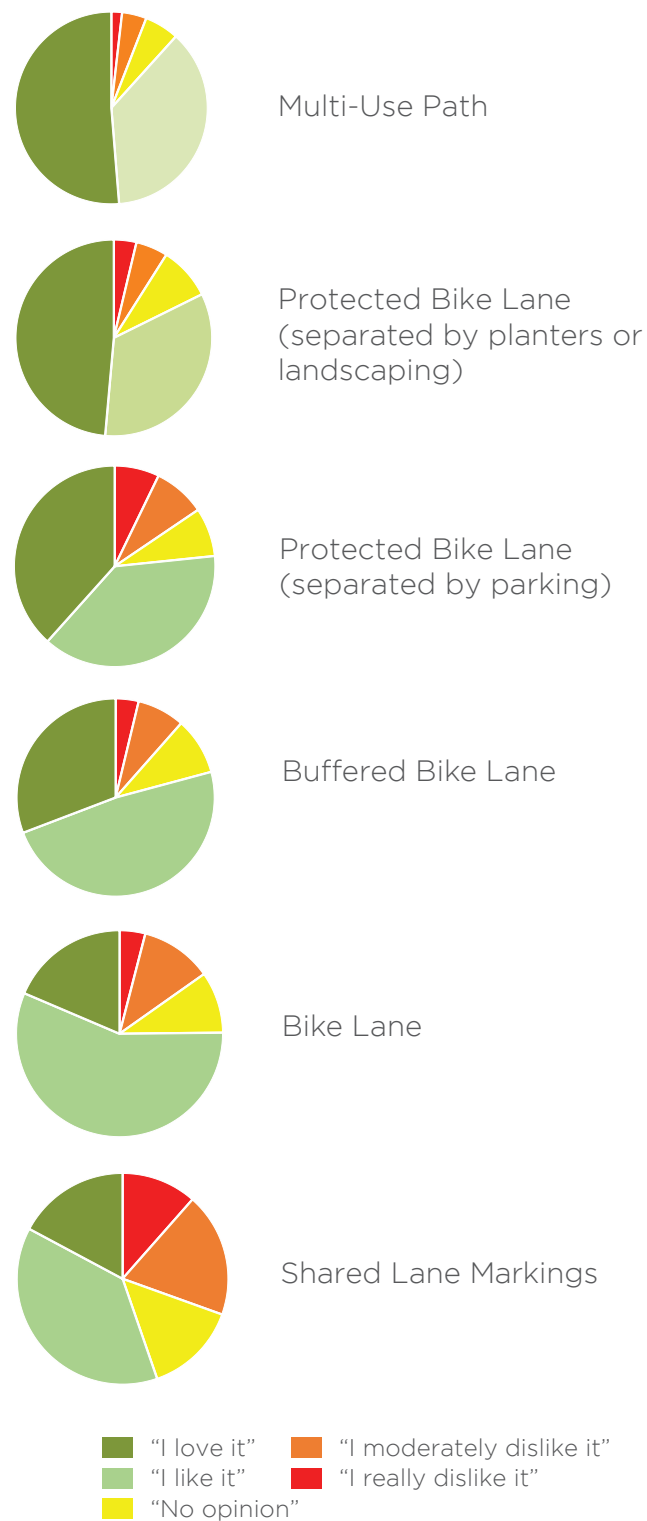


Figure 6-1 2013 Public Survey Bicycle Facilities Preferences

quality. It also supports business employment of highly educated professionals, who are often more interested in bicycling to work. Large employers, especially those in high-tech industries, are finding that this lifestyle choice is key to attracting and retaining the best employees.¹

6.3 Bikeway Recommendations

The bikeway recommendations – both low stress and conventional – presented in this section are based on public input, coordination with the Stakeholder and Steering Committees, and connectivity needs. Non-City entities such as UDOT and the University of Utah were included in the Stakeholder Committee. Additional coordination will be needed to implement facilities in corridors owned by outside agencies. Recommendations may change as individual projects are implemented.

6.3.1 General Network Maps

Figure 6-2 shows how implementation of the bikeway recommendations over the next 20 years would increase the percentage of roads that include bikeways. Approximately 85% of City arterial and collector mileage would have bikeways if all recommendations are brought to fruition.

Figures 6-3 presents the City's existing bicycling network. Figure 6-4 shows the short term recommendations (0-10 years), Figure 6-5 shows the long term recommendations (10-20 years), and Figure 6-6 shows all bicycle facility recommendations (0-20 years). Phasing recommendations are based on building a logical network as well as tapping the City's pavement maintenance process as a good opportunity to change street designs.

6.3.2 Low Stress Network Maps

Figures 6-7a and 6-7b show the low stress recommendations for the entire City and downtown, respectively.

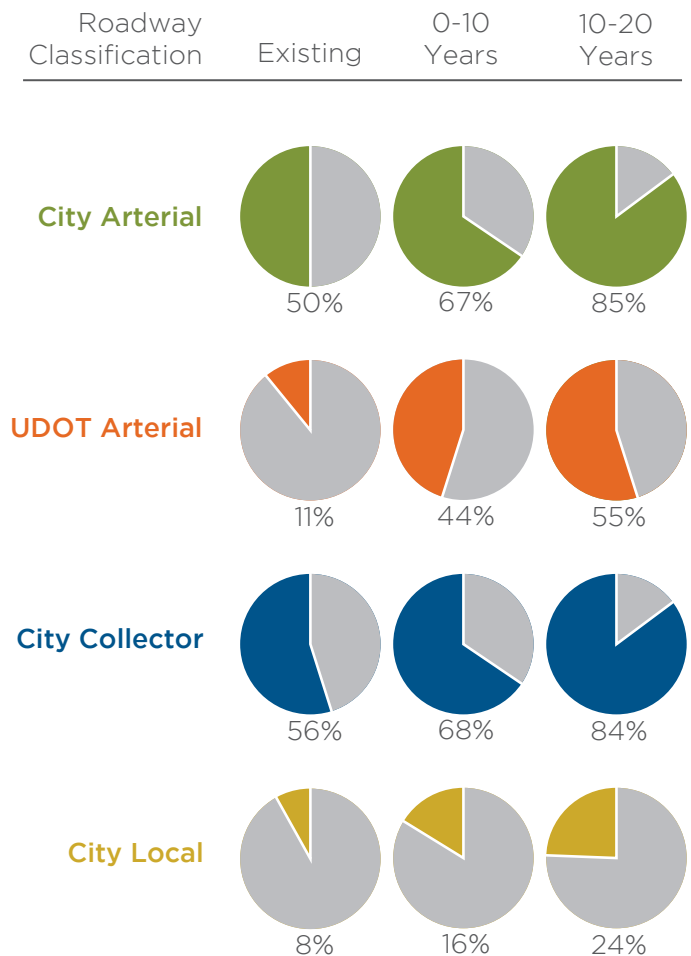


Figure 6-2 Percentage of Road Miles With Bikeways

6.3.3 Further Study

Some roads are indicated in this plan for further study, where road space is constrained by width or higher traffic volumes. Salt Lake City's intention is to accommodate walking and bicycling on these roads, but the recommended design cannot be determined without additional study including input from the public and other agency partners on the potential trade-offs. Some streets indicated for further study include UDOT arterials. As part of this plan's implementation, the city will work with UDOT to determine how to best accommodate safe and comfortable bicycle and pedestrian travel on these streets.

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INSERT FIGURE 6-3

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INSERT FIGURE 6-7a

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INSERT FIGURE 6-7b

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“Being able to more easily take my bike on TRAX trains would be awesome.”

- Comment from 2013 public survey

6.3.4 Transit Station Access

Many transit trips begin and end as walking or bicycling trips. Figure 6-8 shows the existing and recommended bikeways overlaid on the transit network within Salt Lake City limits. This figure illustrates how people in various parts of the City can access major transit stations by bicycle. Identification of needed spot improvements at transit stations will be handled as part of a separate Transit Master Plan.

6.3.5 Spot Improvements

The bicycle spot improvements presented in Figure 6-9 complement the linear bikeway recommendations. Spot improvements may consist of short gap closures, intersection upgrades, bridges, underpasses, curb cuts, or other improvements that are best represented by a dot on a map instead of a line. Maintenance items like pothole repair and minor striping changes are not included in this list because the City handles them routinely through a separate process.

Many of the spot improvements shown in Figure 6-9 also benefit pedestrians. Only spot improvements independent of linear bikeways are included in the spot improvements map. For example, intersection upgrades necessary for implementation of a particular neighborhood byway are assumed to be included in that linear project.

6.4 Interim Bypass Routes

Some bikeway implementations require difficult tradeoffs such as removal of traffic lanes or changes to on-street parking. In some cases the City may decide that the tradeoffs are not currently feasible in some segments. Interim bypass routes can be created to help bicyclists travel around the problematic areas until a more desirable, permanent solution is found. Figure 6-10 uses a challenging section of 1300 South to illustrate how this can be done.

6.5 Bikeway Maintenance

The Salt Lake City Streets Division currently sweeps roads with bike lanes on them twice per month, whereas roads without bike lanes are swept once a month. Streets are also sometimes swept by special request. Bike lanes, buffered bike lanes, and shared lane markings are plowed of snow at the same time as the streets where they are located.



Sweepers in Copenhagen are designed specifically for bicycle facilities and can sweep or clear snow (Photo: Copenhagenize)

Protected bike lanes may require greater maintenance efforts than conventional bikeways because of their separated nature. Protected bike lanes may require specialized equipment or processes, whereas conventional bikeways can usually be maintained as part of normal roadway maintenance activities. A technical memorandum discussing protected bike lane maintenance was developed as part of this project and is attached as an appendix.

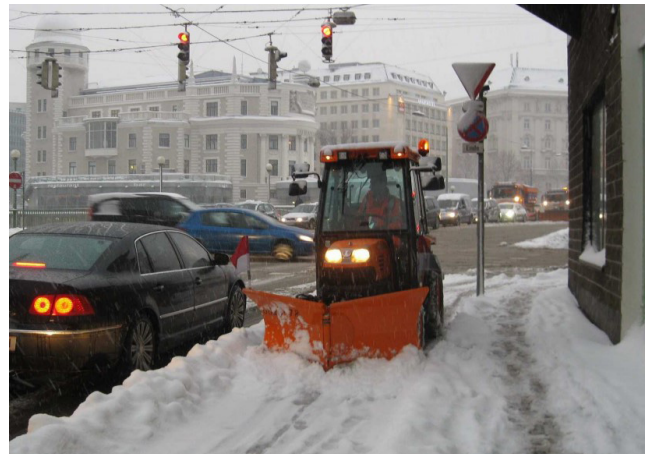
In 2014 Salt Lake City established a pilot program to declare snow alert nights to facilitate plowing on selected streets with on-street parking. Pending the results of this pilot program, additional streets may be added to the system. Bike lanes are among the considerations when selecting streets to be included.

6.5.1 Maintenance Recommendations

- Develop a bikeway maintenance plan to address priority sweeping, priority plowing, equipment needs, weed management, and other bikeway maintenance elements.

6.6 Traffic Signal Considerations

Traffic control for bicyclists is a rapidly evolving field. Many recent advances are attributable to a growing demand for protected bike lanes. Protected bike lanes are more likely to need dedicated bicycle signals than conventional bikeways because bicyclists must be re-integrated with car traffic through intersections after having been separated between them.



Small vehicle clearing a buffered bike lane in Vienna, Austria (Photo: I Bike Oulu)

INSERT FIGURE 6-8

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INSERT FIGURE 6-9

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INSERT FIGURE 6-10

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Typical concerns that bicyclists experience at signals include:

- Inability to trigger detection sensors or know if a sensor has been triggered
- Inadequate time for bicyclists to cross wide streets
- Conflicts between right turning cars and bicyclists trying to go straight
- Difficulty turning at (or crossing) intersections with unusual geometry or multiple traffic lanes
- Lack of signal coordination to facilitate steady bicycle speeds

6.6.1 Detection

Bicycle detection is used to inform signal controllers that a bicyclist is waiting to use an intersection. Detection occurs primarily through automated means (passive detection) such as in-pavement inductive loops, video, and microwave radar. In recent years bicycle detection has become more important as traffic signals are increasingly operated in an actuated or semi-actuated mode rather than in a pre-timed mode.

An actuated signal is one where operations are adjusted automatically based on what the signal is detecting. A pre-timed signal's operations are fixed and unresponsive to demand. Semi-actuated signals operate under actuated and pre-timed conditions at different times of day. Bicyclists may be “stranded” at a red light if the signal cannot detect them and no cars arrive to trigger the sensor. This scenario often leads to bicyclists running red lights.

Historically, the most common form of detection has been inductive (electrical) loops. The introduction of metal within the magnetic field triggers the traffic signal controller. Loops can be designed specifically for bicycles but the design and sensitivity must be appropriate.

In many cases, existing inductive loops installed primarily for motor vehicles may be capable of sensing a bicycle. However, bicyclists may not be aware of loop locations or want to use them if they are located in the middle of a traffic lane where bicyclists may not feel comfortable. Detection pavement markings are useful for showing bicyclists where they should place their bicycle to achieve the best likelihood of detection.

Many bicycle frames are now made with carbon fiber or other materials that are less likely to be detected by inductive loops. Other forms of detection such as video and radar are able to detect any type of bicycle regardless of material.

Salt Lake City and UDOT use radar as their standard detection technology. New or retrofitted signals in the City will now be better equipped to sense bicycles. Radar is capable of detecting both bicycles and vehicles and has software-configurable detection zones. This provides cost savings by combining vehicle and bicycle detection needs without compromising bicyclist safety or convenience.

6.6.2 Confirmation Lights

Bicycle detector confirmation lights have been used in Portland (OR) at three locations. The lights illuminate when the bicycle detector is actuated and are relatively inexpensive to purchase and



Standard loop detection pavement marking (Photo: NACTO)

install. At this time, the use of confirmation lights is experimental and there are no formal studies that indicate clear benefits to bicyclists or a reduction in red light running.

6.6.3 Bicycle Signal Heads & Phases

Bicycle signals and phasing have been used for many years in Europe but are relatively new to the U.S. More U.S. cities are installing them, particularly in conjunction with protected bike lanes where bicycles are separated from car traffic at intersections.

Bicycle signal heads are typically used at signalized intersections to give indications to bicyclists

when special traffic signal phases are in effect for them. Typical displays in the U.S. consist of three-section red-yellow-green heads with bicycle symbols on the lenses.

Supplementary signing may be required when special bicycle traffic signal phases are implemented. Of most concern is the possibility of vehicles turning right across the path of bicyclists who are proceeding straight ahead. The NACTO Urban Bikeway Design Guide recommends all-arrow displays for vehicle right turns, supplemented by an active blank-out “No-Turn-On-Red” sign.



White bicycle detector confirmation light (Photo: Jonathan Maus/BikePortland.org)



Bicycle signal head (Photo: NACTO)

Typical applications for bicycle traffic signal phases include the following:

- Where a multi-use path or neighborhood byway crosses a street, especially where the needed bicycle clearance time differs substantially from the needed pedestrian clearance time.
- To split signal phases at intersections involving protected bike lanes where a predominant bike movement conflicts with a main motor vehicle movement during the same green phase.
- At intersections where a bicycle facility transitions from a protected bike lane to a conventional bike lane if car turning movements are significant.
- At intersections with contra-flow bicycle



“No Right Turn on Red” blankout sign

movements that otherwise would have no signal indication and where a normal traffic signal head may encourage wrong-way driving by motorists.

- To give bicyclists an advanced green (like a leading pedestrian interval) or to indicate an “all-bike” phase where bicyclist turning movements are high.
- At complex intersections that may otherwise be difficult for bicyclists to navigate.

While bicycle signal phases may improve bicyclist safety, they may also increase delays to bicyclists if they are no longer permitted to move concurrently with motor vehicle traffic. Safety needs and extra delay should be weighed on a case-by-case basis. Several cities have adopted specific warrants for bicycle phases and bicycle signal heads.

6.6.4 Signal Timing

Traffic signal timing considerations for bicycles include the following:

- Ensuring adequate initial green time plus clearance time for a bicyclist to cross an intersection safely.
- Considering a “head start” phase to allow bicyclists to start their crossing of an intersection a few seconds before vehicles



Sign instructing turning motorists to yield to through bicycle traffic (Photo: NACTO)

are released in order to reduce conflicts with right-turning vehicles.

- Considering “green wave” timing of signals allowing bicyclists to move smoothly down a street without stopping at multiple red lights.

6.6.4.1 Minimum Green Time

Traffic controllers are typically programmed to provide a minimum green time when a vehicle is detected on an actuated approach and to extend the green time by two or three seconds for each additional vehicle. The minimum green time may be set as short as five seconds for lightly traveled side streets, with the objective of minimizing unnecessary delay to a heavily traveled arterial street. This situation may create a problem for bicyclists if they are attempting to cross a wide street on a green light at the same time as a single vehicle. An initial time of five seconds plus the yellow and all red time may be adequate for the single vehicle but inadequate for the bicyclist. There are three potential solutions:

- Ensure that vehicle minimum times at each intersection are also adequate for a bicyclist

to safely cross the intersection even if bicycles are not detected separately.

- Detect bicycles separately from vehicles and utilize a separate “bike minimum green”, which is a built-in feature of the controllers used in Salt Lake City (although not currently used).
- In exceptional cases of very wide streets intersecting low-traffic minor streets, provide a bicycle push button near the curb on the minor street approach so that bicyclists can call the pedestrian phase or a special bicycle phase.

Extension of green time for bicyclists arriving after the start of green is possible with certain types of detection. The detection must be capable of sensing the bicycle in motion. In the absence of a dedicated bicycle lane, detection must be capable of sensing the bicycle in any of the vehicle travel lanes.

6.6.4.2 Leading Bicycle Interval

Leading intervals for pedestrians were described previously in Chapter 5. A similar tactic can be used for bicyclists to give them a head start into the intersection in advance of cars. Leading Bicycle Intervals (LBI) improve visibility of bicyclists to right-turning vehicles. This mostly applies to protected bike lane situations where there is some form of separation between the bikeway and the space occupied by motor vehicles. LBI can be implemented very quickly and easily by programming of the controller and has minimal impact on motor vehicle delay. Turning movements that conflict with LBIs should be prohibited.

6.6.4.3 Bicycle Green Waves

Establishing green waves for bicycles is a traffic signal timing technique called “progression” that allows bicycles to proceed on a street with a minimum of stops at red lights. It normally requires designing the signal timing for the speed of bicycles instead of cars. However, in some congested urban environments, a speed of about

15 MPH has been found to be effective for both cars and bicycles. Green waves for bicycles have been implemented in European cities, particularly in Netherlands and Denmark, and on some streets in Portland and San Francisco.

Progression is much easier to achieve on one-way streets. On two-way streets establishing progression in both directions is mathematically dependent on the cycle length of the traffic signals and the spacing. In Salt Lake City, it is necessary to use relatively long cycle lengths because wide streets require long pedestrian crossing times. In addition, the presence of light rail also tends to impact cycle lengths.

Establishing a progression speed designed specifically for bicyclists also imposes the same speed for vehicles. Motorists may perceive this as adding to congestion and stops. Prioritizing one street for a bicycle green wave may interfere with signal progression on intersecting routes, particularly in Salt Lake City’s downtown grid where signals every block are the norm. Implementing a bicycle green wave could prove especially challenging where State routes must be crossed. UDOT is willing to work with the City to evaluate signal timing changes that do not place unnecessary delay within a corridor.

6.6.5 Two-Stage Left Turn Queue Boxes

Two-stage left turn queue boxes are designed to facilitate left turn maneuvers at locations where bicyclists have difficulty crossing multiple lanes of through traffic to reach a left turn lane. To make a two-stage left turn a bicyclist first proceeds straight through the intersection on the green light and stops in a bicycle box on the far side of the intersection. The bicyclist then turns 90 degrees to the left, waits for a green light in the cross street direction, and proceeds through. This combination of movements allows bicyclists to effectively make left turns without being required to merge across traffic. Care must be taken to place queue boxes in locations that do not unduly interfere with right turning motor vehicles.



Two-stage left turn queue box at 200 S/Main St

Typical two-stage queue box applications include:

- Signalized intersections with high traffic volumes and/or multiple lanes of through traffic.
- Along protected bike lanes.
- At streetcar or light rail tracks where perpendicular crossings are encouraged.
- Signalized intersections where left turns for motorists are prohibited but bicyclists may be permitted to safely and legally make a two-stage left turn.

6.6.6 Bike-Related Signal Recommendations

- Continue installing radar detection to sense bicycles at signals and use bike-specific pavement markings as needed on a case-by-case basis.
- Consider the use of confirmation lights if a suitable test site becomes apparent.
- Consider adopting specific warrants for bicycle phases and bicycle signal heads.
- Review signal timing algorithms to identify whether adjustments need to be made to provide bicyclists with safe minimum green time lengths.
- Consider using LBI and green wave timing in conjunction with protected bike lanes.
- Continue to install left turn queue boxes where appropriate.

6.7 Bicycle Parking and Other End-of-Trip Facilities

The City has several initiatives relating to end-of-trip facilities for bicyclists. These currently include:

- City-installed bike racks on the public way by business or customer request.
- Seasonally-installed bicycle corrals (April to November) converting one on-street motor vehicle parking space to parking for 10 bicycles.
- Bicycle racks and lockers/secure parking areas required in new commercial and residential buildings and significant remodels; quantities based on use. This ordinance was strengthened in 2013.
- Additional secure parking areas, showers, and bike share sponsorship are available as developer incentives while reducing the amount of motor vehicle parking.



Bike corral at Bruges Waffles and Frites on 300 S

- Bicycle valet services encouraged through the special events permitting process.
- Bicycle lockers at several transit stations; the Utah Transit Authority has recently added day-use lockers in addition to lockers to be rented annually.
- Artistic bike racks commissioned by the Salt Lake City Arts Council.

This plan recommends that the City continue these programs.

Additionally, the City and the Utah Transit Authority should develop a program to routinely add bicycle parking at transit stops. Bike SPAs (Secure Parking Areas) should be added at rail transit stops and selected larger bus stops.

The City may also wish to reevaluate whether bicycle valet services should be required for larger



Custom bike racks for the 21st & 21st Business District

events now that the program has been established for several years on an encouragement basis.

6.8 Mountain Biking & BMX

While the focus of this plan is on transportation, this plan supports the addition of recreational mountain bike trails on public lands within City limits, and recommends they be considered further as part of an update to the City's 1992 Open Space Plan or in a new recreational trails master plan. Salt Lake City has been a regional leader in developing the Bonneville Shoreline Trail and the trail is complete within the City limits.

The City has several skateboard and BMX areas in City parks. The Division of Parks & Public

Lands has recently gone through a public process to formalize the user-created I-Street jumps and create a system for bicycle terrain park partnerships with local organizations. Where appropriate to watershed concerns, this plan recommends that Parks & Public Lands continue to consider the addition of mountain bike parks, pump tracks, skateboard and BMX parks, and bike polo courts as part of neighborhood-based parks and open space planning citywide.

6.9 Bicycle Counts & Surveys

Bicycle counts demonstrate where bicycling is most popular and where certain trends (e.g. sidewalk riding, helmet use, and percentage of



Bonneville Shoreline Trail in the Wasatch foothills adjacent to Salt Lake City

female riders) are more or less prevalent. This information informs how cities plan infrastructure and implement programs. Salt Lake City has been conducting bicycle counts since 2011. The City has also used travel survey data from numerous sources to supplement the counts.

6.9.1 Data Anomalies

Situations periodically arise where it is not feasible to conduct counts at specific stations due

to construction or other factors. One method for handling years when one or more count stations are inoperable is to calculate the percent change for the valid stations and apply that percentage to the previous year total for the inoperable stations. Such extrapolations should be noted for transparency. In the following year's count this value should be replaced with an average of the two years on either side of the extrapolated year.

6.9.2 Rolling Averages

Rolling averages are a statistical method used to smooth out yearly spikes, highlight long-term trends, and make it easier to absorb isolated data anomalies. For example, a three-year rolling average for 2014 would include data from 2012, 2013, and 2014. At the time this master plan was created, Salt Lake City only had four years of bicycle count data collected. A minimum of five years is needed before it makes sense for the City to use rolling averages for trend analysis.

6.9.3 Automated Count Technologies

Salt Lake City's annual bicycle counts currently are done manually with the help of citizen volunteers following protocols established by the National Bicycle and Pedestrian Documentation Project. These manual counts are relatively inexpensive but are subject to significant variability due to small sample sizes, which makes year-to-year comparisons less statistically robust.

Manual counts may be supplemented with continuous automatic count data. Increasingly

affordable technologies include active infrared, inductive loops, and pneumatic tubes that exclude motor vehicles in mixed traffic environments. Automatic counts can greatly expand the amount of data available to the City for trend analysis.

6.9.4 Travel Surveys

Salt Lake City already uses data from various travel survey sources such as the National Household Travel Survey, American Community Survey, and Utah Travel Survey. One advantage of these surveys is their statistical significance owing to randomized and broad-reaching sample sizes.

6.9.5 Bicycle Count & Survey Recommendations

- Handle data anomalies according to the process detailed in Section 6.7.1.
- Report three-year rolling averages for bike counts instead of individual yearly totals once five years of data has been collected.
- Continue performing manual counts but supplement them with continuous automatic count data.
- Install permanent counters in important locations or rotate a limited number of automatic counters in a mobile count program.
- Continue utilizing travel surveys to provide more data points for bicycling trends.

Chapter 6 Sources

1. "Tech Companies Use Bicycling to Attract Top Talent". People for Bikes. [http://www.peopleforbikes.org/pages/tech-companies-and-bikes.](http://www.peopleforbikes.org/pages/tech-companies-and-bikes;); "Protected Bike Lanes Mean Business: How 21st Century Transportation Networks Help New Urban Economies Boom". People for Bikes and Alliance for Biking & Walking. https://www.sfbike.org/wp-content/uploads/2014/04/Protected_Bike_Lanes_Mean_Business.pdf; "Business Innovators Invest in Bicycling". League of American Bicyclists. <http://bikeleague.org/content/business-innovators-invest-bicycling>.

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CHAPTER SEVEN

PROGRAM RECOMMENDATIONS

Education, encouragement, enforcement, and promotional programs enhance the walking and bicycling experience and can be cost effective complements to infrastructure investments. These types of programs help people learn how to use Salt Lake City's roads safely, whether traveling on foot, by bicycle, or in a car.

This chapter outlines recommended program investments for Salt Lake City over the next five years. The recommendations were developed and refined through multiple rounds of review including two public open houses, an online survey, the Steering and Stakeholder Committees, and tabling at community events during Summer 2013.

The following programs and accompanying strategies will help Salt Lake City be a safer, more educated, and more equitable walking and bicycling community where people of all ages and abilities feel comfortable walking or riding a bicycle for any trip.

The first pages of this chapter summarize each program while more detail about funding, partnerships, the City's role, time commitment, reach and impact, community interest, expected outcomes, priority, and implementation phasing for each program is provided in Sections 7.4 and 7.5.

The chapter is broken down into the following five subsections:

- Multi-Modal Programs
- Pedestrian-Specific Programs
- Bicycling-Specific Programs
- Program Implementation Schedule
- Program Summary Tables

7.1 Multi-Modal Programs

Multi-modal programs benefit multiple user groups. Some are targeted towards pedestrians and bicyclists only while others may also encompass transit riders, drivers, or other groups. The programs typically have an education, encouragement, or enforcement focus.



Beginning Driver Education

Improving driver awareness of pedestrians and bicyclists and increasing knowledge of pedestrian and bicycle rights, responsibilities, and common behaviors helps to make a safer and more comfortable road environment for all users. These courses can also increase public acceptance of enforcement actions. Salt Lake City can help support the safety of all road users by supporting efforts to require pedestrian and bicycle-related training within local, private, and statewide driver education courses.



Pedestrians cross 200 S/State St as a bus passes

Target Audience: Beginning drivers

Sample Programs: [Illinois' Driver Education Video and Curriculum](#); [Wisconsin's Share & Be Aware Driver Education Program](#)



Media Campaign

Salt Lake City should partner with other groups to develop regional campaigns that address unsafe and illegal behaviors of motorists, pedestrians, and bicyclists while encouraging mutual respect among all road users and encouraging active transportation.

Target Audience: All road users; may be more specific for targeted campaigns

Sample Programs: [Bikes Belong Safety Campaign Best Practices](#); [Road Respect \(Utah\)](#); [How We Roll \(Columbus, OH\)](#); [Coexist Campaign \(San Francisco, CA\)](#); [Heads Up Boulder: Mind the Crosswalk \(Boulder, CO\)](#)



Road Respect is a statewide program that promotes cooperation and respect between all road users (Photo: UDOT)



Open Streets Event

On Saturday May 4, 2013, Salt Lake City hosted an Open Streets event to engage people in walking, bicycling, and physical activity. The event temporarily opened a route of City streets exclusively to walking, biking, and other forms of human-powered transportation, as well as supporting activities such as exercise classes, dance classes, music, food, games, and other attractions. The event took place along the iconic downtown corridor of 300 South/Broadway between the Main Library and the Intermodal Hub. The Transportation Division led route selection, permitting, traffic control, and public funding, while Bike Utah led promotion, programming, and private sponsorship. A volunteer Event Chairperson assisted with all aspects of planning, and the Salt Lake City Volunteer Coordinator led volunteer recruitment and management.



A child and his dog at the May 2013 Open Streets

Target Audience: General public

Sample Programs: [Open Streets Project/Open Streets Guide](#); [Cycloviva Tucson \(Tucson, AZ\)](#)



Police Training

Strengthening the walking and bicycling information in police education courses and training will help officers improve public safety and enforce existing laws more effectively. Police training will enhance many other educational and enforcement programs.

Target Audience: All SLCPD officers, including bike and foot patrols

Sample Programs: [Traffic Enforcement for Bicyclist Safety Training Video \(Chicago, IL\)](#)



Police education training at the Public Safety Building



Multi-Modal Crash Analysis and Reduction

A multi-modal approach to crash reduction is a comprehensive safety program that includes establishing measurable goals for reducing incidents and collisions for all modes of travel. By developing a system for routine analysis for pedestrian and bicycle-related crashes, other cities have been able to implement safety-driven, multi-modal enforcement programs along with strategic infrastructure changes.

Successful and balanced enforcement comes from a strong, communicative relationship between transportation staff and local law enforcement. The Salt Lake City Transportation Division can build on their successful partnership with the

Police Department from the bike light giveaway program. Enforcement initiatives should focus on behaviors known to be the most dangerous from both local and national data, such as motorists not yielding to pedestrians and/or bicyclists when required to do so by law and bicyclists not using lights at night.

Target Audience: All transportation mode users

Sample Programs: [NYC's Vision Zero \(New York City, NY\)](#); Targeted Multi-Modal Enforcement (Tucson, AZ); Tucson police are available to speak with other law enforcement departments to offer insight and advice



SmartTrips

This is a neighborhood-based program that encourages public and active transportation through free bike/walk/transit kits, coupons to local businesses, educational newsletters, and collaborative community events. The program seeks to educate interested people on how to find a safe route to work, to the store, to ride, walk, or take transit with their children to school, and to reach other destinations without using a car. The Salt Lake City program is modeled after one that was started in Portland (OR). Other communities that have implemented SmartTrips programs have all successfully reduced the number of vehicle trips. Between 2012 and 2014, SmartTrips in Salt Lake City engaged the East Liberty Park, Rose Park, Wasatch Hollow, Sugar House, and Fairpark neighborhoods.

Target Audience: Residents of targeted neighborhoods

Sample Programs: [SmartTrips Program \(St. Paul, MN\)](#); [SmartTrips Program \(Portland, OR\)](#)



The SmartTrips team rides the S-Line Streetcar



Traffic Citation Diversion

Other than one-time drivers education courses, there are few formal opportunities for motorists and/or bicyclists to learn the legal rights and responsibilities specific to bicycling and walking. The Salt Lake City Transportation Division can work with the Police Department and other appropriate City divisions to develop traffic citation diversion classes so that road users (pedestrians, bicyclists, and/or motorists) who commit offenses known to endanger pedestrians and bicyclists can, at the discretion of the officer, be invited to take a safety and diversion class in lieu of paying fines.

Target Audience: Road users (pedestrians, bicyclists, and/or motorists) who commit offenses known to endanger pedestrians and bicyclists



Salt Lake City police officers enforcing traffic violations near the State Capitol Building

Sample Programs: [Share the Road Safety Class \(Portland, OR\)](#); [Bicycle Diversion Course \(Pima County/City of Tucson, AZ\)](#)



Bus Driver Training

Bus driver training programs ensure that drivers know about laws related to walking and bicycling, and understand safe vehicle operation around pedestrians and bicyclists. The Salt Lake City Transportation Division should continue to encourage UTA and the Salt Lake City School District to train their bus drivers about how to safely drive near pedestrians and bicyclists.

Target Audience: UTA and School District bus drivers

Sample Programs: [Bus Operator Education \(Portland, OR\)](#); [Frequent Driver Education \(San Francisco, CA\)](#)



UTA bus driver (Photo: UTA)

7.2 Pedestrian-Specific Programs

These programs primarily benefit pedestrians and are focused on this group in particular. Summaries of the recommended pedestrian-specific programs are shown below.



Pedestrian Wayfinding

Well-designed pedestrian wayfinding is one of the most fundamental elements of a welcoming, pleasant walking environment. Wayfinding schemes should include destinations, sign types, travel time and/or distance where possible, and a plan for implementation. A cohesive and conspicuous pedestrian wayfinding network will help pedestrians identify the best routes to destinations. Efforts should begin in the



Pedestrians cross 1300 S at 600 E Liberty Park

downtown area and Sugar House where some pedestrian wayfinding is already present, with possible expansion to other areas in following years.

Target Audience: Residents and visitors

Sample Programs: [Legible London \(London, England\)](#)



Walking School Bus

The rate of children walking to school is at an all-time low and parents have become wary of allowing children to walk alone, primarily due to traffic concerns. Walking School Buses help alleviate the fear – and the time constraints for parents – associated with children walking to school. They may be stand-alone efforts or part of a broader Safe Routes to School program. Parents can take turns leading the “bus”, which follows the same route every time and picks up children from their homes or designated “bus stops” at designated times. A Walking School Bus can be as informal as a few parents alternating to walk their children to and from school, but often it is a well-organized effort led by the PTA or a local agency or organization. Some schools such as Uintah Elementary have already organized walking school buses.



Walking school bus in Columbia (MO)

Target Audience: Students and their parents

Sample Programs: [Walking School Bus Program \(Columbia, MO\)](#)



Park(ing) Day

Park(ing) Day is an annual event that happens around the world where neighborhood residents, artists, business owners, cities, counties, and others collaborate to temporarily transform parking spaces into small parklets as temporary public places for the day. Several businesses in Salt Lake City already participate in this event.

Target Audience: Neighborhood residents, business owners, shoppers

Sample Programs: [Official Park\(ing\) Day](#)



2013 Park(ing) Day at the 21st & 21st Business District
(Photo: Architectural Nexus)



Targeted Crosswalk Enforcement

Motorists who routinely fail to yield the right-of-way to pedestrians, as required by law, are unlikely to change their behavior if they perceive that there are no consequences to their actions. Hundreds of communities around the U.S. implement targeted crosswalk enforcement. In Las Vegas, for example, crossing decoys often wear seasonal costumes (such as a turkey at Thanksgiving, or a leprechaun in March) to earn greater media attention. While targeted crosswalk

enforcement often results in citations, the greater impact comes through media publicity of the event to reinforce the importance of obeying pedestrian crossing laws.

Target Audience: Drivers and bicyclists

Sample Programs: Back-to-School Crosswalk Stings (Shoreline, WA; Roseburg, OR; Plymouth, MN; and other locations)



Mid-Block Walkway Programming

An effort to reclaim and utilize mid-block walkways as public space requires a concerted effort among many stakeholders, including local government, businesses and business groups, advocacy organizations, and volunteers. These efforts increase vibrancy in hidden public spaces. Salt Lake City's Mid-Block Walkway Design Guidelines provide direction on the design and use of these spaces.

Target Audience: General public, property developers, land owners, SLC RDA

Sample Programs: [Privately Owned Public Space \(New York, NY\)](#); [Alley Network Project \(Seattle, WA\)](#); [Alley Network Project Guide](#)

7.3 Bicycling-Specific Programs

These programs support efforts to educate and encourage people who bicycle, as well as gather information to quantify bikeway use.



Annual Bicycle User Counts

Ongoing bicycle user counts provide important information used to approximate use and demand for facilities and programs. The National Bicycle and Pedestrian Documentation Project (NBPDP), a nationwide effort to provide a consistent model of data collection and ongoing data, states that “without accurate and consistent demand and usage figures, it is difficult to measure the positive benefits of investments in [bicycling], especially when compared to other transportation options such as the private automobile.” Since September 2010, Salt Lake City has utilized the NBPDP data collection model in each of its annual bicycle user counts. Implementation of automated data collection methods would augment the volunteer-based data and allow for much more trend analysis.



Bicycle count volunteers and bicyclists participate in a supplementary survey

Target Audience: Volunteers and City staff (analysts)

Sample Programs: [National Bicycle and Pedestrian Documentation Project](#)



Classroom and On-Bike Training

Bicycle safety and skills education in elementary and middle/junior high schools can be an effective way to teach youth about bicycling safety and how to ride in a predictable, safe manner. These programs educate younger students about bicycling and other non-motorized transportation options that may go a long way in affecting their decision to choose bicycling for transportation and recreation later in life.

Target Audience: Elementary and middle/junior high school students

Sample Programs: [The Florida Traffic and Bicycle Safety Education Program](#)



Bike Rodeo organized by the Salt Lake City Police Department



Bicycle Friendly Businesses and Business Areas

Bicycle Friendly Business programs raise the profile of and show support for bicycling in a community, while also promoting local businesses and building a sense of community. As of Spring 2013, Salt Lake City has six businesses registered with the League of American Bicyclists' "Bicycle Friendly Business" designation. In May 2013, the City hosted a bicycle-friendly business workshop that included participation from a group of business owners, Neighborhood Business District representatives, transportation planners, and students. The workshop presented about how Bicycle Friendly Business Districts can support both bicycling and local business.

A Bicycle Benefits program in the City encourages businesses to offer discounts to customers who arrive by bicycle. As of 2014, there were about 60 Salt Lake City businesses participating in that program.

Target Audience: Current and potential bicyclists and the business community

Sample Programs: [Bicycle Friendly Business Program \(Long Beach, CA\)](#)



Bike Map

The Salt Lake City Bikeways Map has been published and distributed periodically since the 1980s. In spring 2013, an updated map was published and free copies are available throughout the City or via online download. Public feedback during the Salt Lake City Bicycle/Pedestrian Master Plan Update planning process showed strong support for a smartphone-based SLC bike map app. Rather than creating a stand-alone app, Salt Lake City should consider submitting GIS data to online map providers in order to improve the accuracy of bike layers and promote the online map app as a free source for turn-by-turn bicycle directions. Salt Lake City should continue to produce the hardcopy and digital copy of the citywide bikeways map approximately every other year.

Target Audience: Current and potential bicyclists

Sample Programs: [Chicago \(IL\) CTA](#)



The cover of the 2013-14 Salt Lake City Bikeways Map



Monthly Social Rides

Ongoing group bike rides can target many groups of people and cover countless topics or themes. In most cases, however, the purpose is the same: to provide a safe, comfortable, and social setting for bicycling. New riders experience riding safely in a group while learning bicycling skills and rules of the road, and all riders have the opportunity to meet neighbors, share in a feeling of camaraderie, and build community.

Target Audience: Current and potential bicyclists

Sample Programs: [San Jose Bike Party \(San Jose, CA\)](#); [Kidical Mass \(Eugene, OR, and many other locations\)](#)



Family attending the Super Hero-themed SLC Bike Party ride, June 2013 (Photo: SLC Bike Party Facebook)



Recreational Bike Routes

This program seeks to develop and promote Salt Lake City's recreational bicycle facilities for residents and tourists alike, highlighting great views, enjoyable rides, and the City's unique and intimate connection to the mountains, canyons, and the Great Salt Lake. It expands on the "Cycle the City" route created by the City and Visit Salt Lake in 2012-2013. A key route to be formalized is the Great Salt Lake Marina bike route, using the Airport Bike Path and I-80 Frontage Road west of the International Center as part of a unique, low traffic experience appropriate for faster road/recreational riders. This route is important for several bike races.

Additional named routes would be created and geared toward recreational cyclists. Some routes would be either loop or out-and-back rides designed to be completed within one day, although regional opportunities may be identified to include multi-day trips. The routes would be developed with printed publications, online resources (including mobile devices), and



Great Salt Lake Marina bike route (Photo: Dave Iltis)

eventually route signs. Route signs, with the route name and identifying logo, may include simple signs to mark the route, destination wayfinding signs, and/or signs themed around hill climbs or canyon route grades. Recreational bike routes may include casual family bicycling, fast road/racing cycling, and mountain biking opportunities.

Target Audience: Residents and tourists

Sample Programs: [Explore Maine by Bike](#); [New York State Bike Routes](#); [Denmark National Cycle Routes](#)



School Bike Trains

School bike trains offer a safe, fun way to ride as a group to school and can be part of a broader Safe Routes to School program. Although the national Safe Routes to School program suggests that they are usually best suited for older elementary school children, they may be applicable for a wider age range. As children age and enter

secondary education, the need for oversight and companionship on rides to and from school may decrease.

Target Audience: Elementary school children

Sample Programs: [SRTS Guide](#); [Atlanta Walk and Roll to School Day \(Atlanta, GA\)](#)



Women's Bicycling Programs

Women are often less comfortable with bicycling (particularly in traffic) than men, and user counts in the City confirm this trend. Because many potential bicyclists are women, encouraging, educating, and enabling women to ride a bicycle more often will attract a greater percentage of that group. By partnering with local organizations and bike shops to offer women-only clinics, workshops, and rides designed to be welcoming and supportive for participants at any stage of comfort, the City can promote and encourage women to ride.

Target Audience: Women who are current or potential bicyclists

Sample Programs: [Women on Bikes Program \(Portland, OR\)](#)



Bicyclist riding in Liberty Park



Bicycle Theft Prevention

As the desirability of bicycling increases in a community, there is often a corresponding increase in bicycle theft. Salt Lake City should develop a program to address bicycle theft, including consideration of registration options, lock promotions (coupons), and additional secured bicycle parking.

Target Audience: Current and potential bicyclists

Sample Programs: [Sacramento Bait Bike Program \(Sacramento, CA\)](#); [Aspen Police Bait Bike Program \(Aspen, CO\)](#); [BART Bike Theft Prevention Program \(San Francisco Bay Area, CA\)](#)



Winter Bicycling Programs

Winter weather is a pervasive barrier to bicycling for transportation. For many people, daily transportation choices are habitual and feeling as though you cannot bike in winter makes bicycling a less viable option throughout the entire year. During cold, snowy winters, people may also be less active, so encouraging winter biking is good for a community's public health and physical activity levels. Salt Lake City can encourage bicycling year-round by linking the community to winter cycling resources and hosting classes and events like Winter Bike to Work Day, Winter Bike Fest (indoor event with clothing and equipment demonstrations), and improving maintenance of facilities during the winter.

Target Audience: Current and potential bicyclists

Sample Programs: [Bike Winter \(Chicago, IL\)](#)



Lack of encouragement, education, and/or gear deters some from riding when it is cold and wet



Bicycle Wayfinding

As the City develops a low-stress bikeway network, including neighborhood byways, it will become appropriate to sign key corridors as the preferred way to connect key destinations, such as downtown, University of Utah, key neighborhoods, and transit stations. Bicycle wayfinding should address preferred routes, distance, and expected bicycling time. Time estimates should take into account both grade and intersections. Recreational bicycle routes will include a wayfinding sign element as well; these programs are complementary.

Target Audience: Current and potential bicyclists

Sample Programs: [Design Guidelines for Bicycle Wayfinding Signage, Oakland Public Works \(Oakland, CA\)](#); [Portland Bureau of Transportation Bike Boulevard Wayfinding Signs \(Portland, OR\)](#)



Bicycle wayfinding, such as this route sign in Portland (OR), usually provides both distance and time estimates

7.4 Program Implementation Schedule

Table 7-1 shows a general schedule for implementing the recommended programs. Priorities may appropriately change in coming years but this summary provides an outlook for where the City currently intends to invest its time and resources in future programs. Some programs such as enhancements to driver education may require significant lead time even though they are deemed to be high priorities.

7.5 Program Summary Tables

Tables 7-2 and 7-3 summarize key information for each of the recommended programs. They contain brief information about cost (both in money and time), expected outcomes, and priority. The Community Interest column is reflective of the level of support received through the public process. A value of “N/A” in that column means that the program idea surfaced as part of the public feedback and was thus not part of the open house and survey materials presented to the public. The column for Priority weighs factors such as cost, potential impact, feasibility, and public preferences.

Table 7-1 Program Implementation Schedule

	2015	2016	2017	2018	2019
Multi-Modal Programs					
Multi-Modal Crash Analysis and Reduction	High	High	High	High	High
Open Streets Event	High	High	High	High	High
Police Training	Low	High	High	High	High
Media Campaign	Low	Low	High	High	High
Beginning Driver Education	Low	Low	Low	Low	High
SmartTrips	Low	Medium	Medium	Medium	Medium
Traffic Citation Diversion	Low	Low	Low	Medium	Medium
Bus Driver Training	Low	Low	Low	Low	Low
Pedestrian-Specific Programs					
Targeted Crosswalk Enforcement	Low	High	High	High	High
Pedestrian Wayfinding	Low	High	High	High	High
Mid-Block Walkway Programming	Medium	Medium	Medium	Medium	Medium
Walking School Bus	Low	Low	Low	Medium	Medium
Park(ing) Day	Low	Low	Low	Low	Low
Bicycling-Specific Programs					
Annual Bicycle User Counts	High	High	High	High	High
Classroom and On-Bike Training	High	High	High	High	High
Bike Map	High	Low	High	Low	High
Bicycle Friendly Businesses and Business Areas	Low	High	High	High	High
Recreational Bike Routes	Low	Medium	Medium	Medium	Medium
Bicycle Theft Prevention	Low	Medium	Medium	Medium	Medium
Monthly Social Rides	Low	Low	Medium	Medium	Medium
Bicycle Wayfinding	Low	Low	Medium	Medium	Medium
School Bike Trains	Low	Low	Low	Medium	Medium
Women's Bicycling Programs	Low	Low	Low	Low	Medium
Winter Bicycling Programs	Low	Low	Low	Low	Low

Priority

High

Medium

Low

INSERT TABLE 7-2 HERE

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INSERT TABLE 7-3 HERE

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Cost estimates are crucial elements of the City's ability to plan for future investments in infrastructure and supporting programs. The estimate ranges provided in this chapter should be understood as high-level planning estimates that are subject to change due to variable construction costs, changes in design standards, and other factors that can introduce price volatility. Nevertheless, the estimates give the City reasonable targets for the funding amounts that must be secured through City budget appropriations, partnering with other agencies, or grants in order to bring this plan to fruition.

Main sections of this chapter are as follows:

- Spot Improvements
- Linear Bikeways
- Implementation

CHAPTER EIGHT

COST ESTIMATES & IMPLEMENTATION

8.1 Spot Improvements

This section outlines cost ranges for the pedestrian and bicycle spot improvements outlined in Chapters 5 and 6, respectively. Some of the improvements serve both pedestrians and bicyclists, so the ranges are grouped by improvement type rather than user group.

Unlike the bikeway recommendations, the spot improvements were not divided into phases. Costs are assumed to occur over a 20-year period.

8.1.1 Capital Costs

Capital costs represent the amount of money needed to construct new improvements. Table 8-1 shows per-project spot improvement capital cost ranges. The Accelerated Repaving projects shown in Chapter 6 are not included in this table because their costs are assumed to already be included in the City's budget as part of normal paving maintenance. These projects entail the City advancing repaving on some streets to earlier years while delaying repaving on others, so there is no net cost difference.

Table 8-1 Spot Improvement Capital Cost Ranges

Improvement Type	Est. Cost Range
Enhanced Crossings	\$50,000-\$250,000
Intersections, Signals, & Signage	\$1,000-\$200,000
New Pavement & Curb Cuts	\$1,000-\$200,000
Structure Improvements	\$250,000-\$1 million
Major Structures	\$1 million-\$7 million

Table 8-2 Spot Improvement Annual Maintenance Cost Ranges

Improvement Type	Est. Cost Range
Enhanced Crossings	\$2,000-\$12,000
Intersections, Signals, & Signage	\$50-\$13,000
New Pavement & Curb Cuts	\$50-\$13,000
Structures (including major)	\$10,000-\$60,000

The values in Table 8-1 prorate pedestrian and bicycle costs in the case of projects that typically involve other work elements unrelated to walking and bicycling. For example, if bike lanes are added as part of a routine repaving project only the additional cost of bike lane striping and pavement markings are included.

In keeping with this plan's recommendations to considerably improve east-west connections across freeways and railroad tracks, Table 8-1 incorporates a major structure improvements category. This reflects the higher costs associated with longer tunnels or bridges, similar to the Parley's Trail tunnel under 1300 East or an overpass over a multi-track rail line.

8.1.2 Maintenance Costs

Maintenance costs represent the effort associated with caring for capital improvements and keeping them in good working condition. Typical examples of maintenance activities include sweeping, snow removal, landscaping (mostly for multi-use paths), and replacement of paint striping and pavement markings.

Awareness of maintenance costs and a commitment to proper upkeep are important factors to consider before investing in capital improvements. Table 8-2 shows estimated annual maintenance costs for the spot improvements.

8.2 Linear Bikeways

Linear bikeways encompass all bicycle facilities that have a beginning and ending point, whereas spot improvements represent upgrades to crossings or other locations that can better be represented on a map as a single point.

8.2.1 Capital Costs

Table 8-3 shows approximate per-mile cost ranges and assumed average values for the types of bikeways proposed in this plan. It also shows mileage ranges to reflect approximate total lengths of each bikeway type as shown in Figure 6-6.

Ranges are shown because facilities can be constructed at various levels of quality. Costs also depend heavily on local context and construction materials.

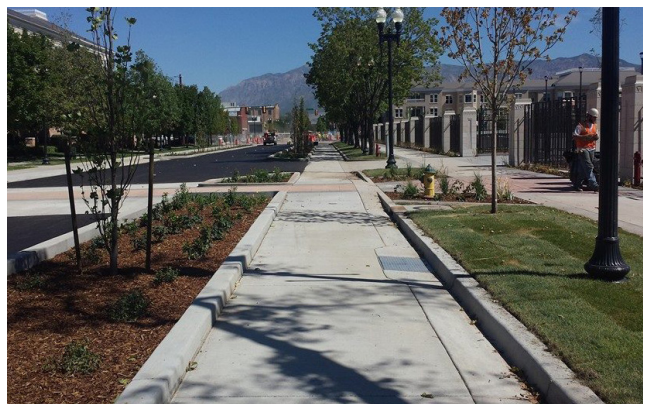
New multi-use paths may require right-of-way acquisition while other bikeway types generally do not. The cost ranges in Table 8-3 do not include right-of-way because land costs fluctuate greatly depending on location and right-of-way needs are difficult to predict at this advanced stage.

Maintenance costs should always be considered in project scoping. Projects that are constructed to lesser quality may trigger greater long-term maintenance.

The cost ranges shown in Table 8-3 represent 220 miles of bikeways at approximately \$330,000 per mile. Off-street multi-use pathways would account for roughly more than half of the total cost even though they represent only about 20% of the mileage. When multi-use pathways are taken out of the equation, the remaining on-street bikeways could be constructed for approximately \$193,000 per mile. As a comparison, the recently completed I-15 freeway reconstruction project in Utah County cost approximately \$55 million per mile. The entire spectrum of 20-year bikeway recommendations could be built for the same

Table 8-3 Per-Mile Capital Cost Estimate Ranges

Bikeway Type	Mileage Range	Cost/mi		
		Low	High	Assumed Average
Multi-Use Path	40-50	\$575,000	\$2,600,000	\$800,000
Protected Bike Lane	20-25	\$40,000	\$3,000,000	\$600,000
Buffered Bike Lane	35-45	\$17,500	\$135,000	\$25,000
Neighborhood Byway	45-55	\$200,000	\$1,300,000	\$350,000
Conventional Bike Lane	25-35	\$12,000	\$72,000	\$20,000
Shared Lane Markings	15-25	\$1,200	\$17,000	\$3,000
Signed Shared Roadway	1-5	\$4,000	\$5,200	\$4,500



Costs vary widely according to construction quality; inexpensive protected bike lane on 300 E (left) and more expensive protected bike lane on Grant Ave in Ogden (right; Photo: Ogden Bikes Facebook).

amount of money as widening 1.3 miles of freeway. All of the on-street bikeway recommendations in this plan could be built for the cost of widening 0.6 miles of freeway.

8.2.2 Maintenance Costs

Table 8-4 shows the annual estimated per-mile maintenance cost ranges. Future facility replacement (i.e. life cycle cost) is not included in the ranges. As Salt Lake City's bikeway system matures, expenditures are likely to transition gradually from an initial emphasis on capital improvements to a situation where the City constructs fewer new facilities and uses a larger share of funding to repair or replace aging facilities.

8.3 Funding Implementation

There are multiple ways funding can be secured for the implementation of bicycle and pedestrian related infrastructure projects in Salt Lake City. Internally administered City funding sources may include the Capital Improvement Project (CIP), Redevelopment Agency (RDA), and Community Development Block Grant (CDBG) programs.

Local, state, and federal funding is also available through programs administered by Salt Lake County, State of Utah Department of Natural Resources (DNR), Wasatch Front Regional

Council (WFRC), and UDOT. Some common funding programs administered by these agencies include the Regional Bikeway Commuter Grant Program, Recreational Trails Program, Transportation Alternatives Program, Congestion Mitigation Air Quality Program, and the Safe Sidewalk Program.

City staff will need to remain vigilant in keeping up with the latest bicycle and pedestrian related program developments because local, state, and federal funding programs often change from year to year. Common methods for doing so include maintaining close relationships with local, state, and federal agencies, membership in related professional organizations, and attendance at local or national bicycle and pedestrian design and planning conferences or webinars.

8.4 Performance Measures

As Salt Lake City implements the recommendations of this plan, some key indicators should be used to measure success and track progress. While the city already informally monitors many of the metrics below, the plan now recommends that formal annual analysis and associated reporting be conducted on a series of indicators. Indicators will seek to monitor key outcomes related to participation and safety and may include:

Table 8-4 Per-Mile Annual Maintenance Cost Estimate Ranges

Bikeway Type	Mileage Range	Cost/mi		
		Low	High	Assumed Average
Multi-Use Path	40-50	\$3,000	\$8,500	\$5,000
Protected Bike Lane	20-25	\$1,200	\$2,500	\$2,000
Buffered Bike Lane	35-45	\$5,000	\$12,000	\$7,000
Neighborhood Byway	45-55	\$2,000	\$8,000	\$3,000
Conventional Bike Lane	25-35	\$2,000	\$5,000	\$3,000
Shared Lane Markings	15-25	\$1,000	\$2,500	\$1,500
Signed Shared Roadway	1-5	--	\$500	\$250

- **Participation data** - commuting and trip reporting as available through the American Community Survey (annual, U.S. Census Bureau); Utah Household Travel Survey (10 years); and local counts including the City's annual bike count and any counts available through automated counters.
- **Reported crashes** - both pedestrian- and bicycle-involved crashes, with special attention to patterns in severe or fatal crashes. Crashes should be indexed compared to participation rates in walking and bicycling. While not all crashes are reported, police reports represent the most accurate records of crashes currently available.
- **Bicycle theft**, indexed compared to participation in bicycling, based on police reports. As not all bicycle thefts are reported, this metric may experience data irregularities if, for example, the City actively encourages bicyclists to report bike theft more than has occurred in the past.

By way of measuring the City's work, the following outputs could be tracked:

- **Implementation of facilities** - including pedestrian safety signals/improvements and miles of trails, bike lanes, protected bike lanes, and neighborhood byways. Landmark additions such as bridges and underpasses should be highlighted as significant investments beyond the corridor or spot improvement approach.
- **Implementation of programs** - tracking measures may be appropriate for specific programs that are implemented.
- **Infractions related to walking/biking safety concerns** - tracked by tickets issued for violations such as speeding, failure to yield to pedestrians in crosswalks, red-light running, bicycle-related tickets, and walking-related tickets.