

Lindon Bicycle and Pedestrian Master Plan

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introduction

Bicycling and walking are increasingly recognized as an important component of the transportation system. The Lindon Bicycle and Pedestrian Master Plan (the Plan) sets forth a vision and goals and policies for walking and bicycling in Lindon:

“Lindon will encourage a community that values healthy mobility options and a high quality of life through the promotion of a safe and well-connected bicycling and pedestrian network.”

The Plan serves as a guide for elected officials, City staff, and Lindon residents to implement infrastructure necessary to achieve the Plan’s vision. The Lindon Bicycle and Pedestrian Master Plan does this by proposing a system of bikeways, sidewalks, and trails connecting neighborhoods to key activity centers throughout the City, developing support facilities, and by identifying recommendations for monitoring the implementation of the Plan.

Bicycle and Pedestrian Master Plan Overview

This is Lindon’s first ever Bicycle and Pedestrian Master Plan. Previously, all bicycle planning and policy was contained within the City’s General Plan or in the Trails Master Plan.

Lindon has developed a handful of designated bicycle and pedestrian facilities over the years and has a robust sidewalk system already in place. The development of the Plan comes as part of an effort by the City to address local and regional desires to enhance the viability of active transportation as mode of transportations, enhance the local quality of life, and reduce transportation system impacts on local communities.



Bicyclist on 200 South

The goals, policies, and recommendations in this Plan are the outcome of a public outreach effort by the Project Team. Between October 2013 and December 2014, the City and consultant team accepted public input to the Plan at two public events and through an on-line survey. Additionally, a public website and Facebook broadcasted the latest news related to the Plan.

Making the Case for Investment

Walking and bicycling are effective ways for people to improve their health and wellbeing. But the benefits of active transportation go beyond the health of the individual. A growing body of research shows that active

transportation can also benefit the environment and improve the transportation network. The addition of active transportation infrastructure can even boost economic viability in the places where it is located. A short summary of research regarding the benefits of active transportation infrastructure is provided below.

Air Quality

- Research indicates that transportation accounts for roughly 28 percent of the United States' total greenhouse gas (GHG) emissions¹. Of commuting modes, automobiles have the largest impact on air quality². Bicycling and walking have a negligible GHG impact (outside of the production needed in the manufacturing of the bicycle).
- The Rails To Trails Conservancy estimates that bicycling and pedestrian travel can offset between 3 percent and 8 percent of GHG emissions in the United States caused by surface transportation³.
- Many state applications for Congestion Mitigation and Air Quality Improvement Program (CMAQ), a federal funding program, ask applicants to estimate the congestion and GHG reduction potential of their bicycle and pedestrian projects. A federal review of CMAQ bicycle and pedestrian projects found CO₂ reductions of up to 38.4 kg emissions reductions each day⁴.

MAKING THE CASE

According to research conducted in the Portland area, every 1% increase in miles traveled by active transportation instead of by car reduces regional greenhouse gas emissions by 0.4%.

Reduced VMT

- Many trips regularly done by car can be done by bicycle. The national average trip length is 2.25 miles for a one-way bicycling trip. Half of all trips taken in the United States are three miles or less, with 40 percent under two miles. However, 90 percent of trips fewer than three miles are taken by car⁵.
- A study in King County, Seattle, WA found that a 5 percent increase in walkability of a community reduced vehicle miles traveled per capita by 6.5 percent and increased time spent in physically active travel by 32.1 percent⁶.

Mode Share Shift

- Each additional mile of bicycle lane per square mile is correlated with an approximate one percent increase in the share of bike-to-work trips⁷.

¹ Moving Cooler Steering Committee. *Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions*. Prepared by Cambridge Systematics, Inc. July 2009.

² Urban Transportation Caucus. *Urban Transportation Report Card*. August 2007. Accessed online June 2013: http://www.transalt.org/files/newsroom/reports/Urban_Transpo_Report_Card.pdf

³ Oregon Metro. *The Case for Active Transportation*. Spring 2009. Accessed online June 2013: http://library.oregonmetro.gov/files//case_for_at.pdf

⁴ Ibid.

⁵ America Bikes and the League of American Bicyclists. *National Household Travel Survey – Short Trips Analysis*. Accessed online June 2013: <http://www.bikeleague.org/content/national-household-travel-survey-short-trips-analysis>

⁶ Frank, L. D., J. F. Sallis, T. L. Conway, J. E. Chapman, B. E. Saelens and W. Bachman (2006). "Many Pathways from Land Use to Health: Associations between Neighborhood Walkability and Active Transportation, Body Mass Index, and Air Quality." *Journal of the American Planning Association* 72(1): 75-87

- Cities with higher levels of bicycle infrastructure (lanes and paths) also saw higher levels of bicycle commuting⁸.
- The construction of a bicycle and pedestrian bridge in Charleston, South Carolina led to more cycling throughout the City. A survey conducted on trail use showed that 67 percent of users claimed their physical activity had increased since the path opened⁹.

Health Benefits

- Communities with higher rates of bicycling and walking have lower obesity rates than communities with lower levels of active transportation¹⁰.
- Researchers from Harvard University found that bicycling for as little as five minutes each day can prevent weight gain for middle aged women¹¹.
- The National Institutes of Health have shown that people are more likely to consistently ride a bicycle or walk than to maintain a gym-based exercise program¹².
- Commuters using active transportation modes are happier with their commutes¹³.
- People who use active transportation to commute report fewer days of work missed due to illness than those with non-active commutes¹⁴.
- A study by the National Institutes of Health determined that physically active employees incurred approximately \$250 less in health care costs annually compared to sedentary employees¹⁵.

MAKING THE CASE

An analysis of Portland, Oregon's bicycle infrastructure on health savings shows that completion of their 2030 Plan would help the City save \$800 Million due to fuel cost savings, health care savings, and the value of reduced mortality.

Transportation Safety

- There is safety in numbers. The walking/bicycling crash risk decreases as walking/bicycling rates increase¹⁶.
- The National Institutes of Health found that for every doubling of the number of cyclists, the number of fatalities increases by 25 percent, thus reducing the overall risk of cycling by 37 percent¹⁷.

⁷ Dill, Jennifer and Carr, Theresa. "Bicycle Commuting and Facilities in Major U.S. Cities: If you build them they will come – another look." Accessed online June 2013: http://www.des.ucdavis.edu/faculty/handy/ESP178/Dill_bike_facilities.pdf.

⁸ Dill, Jennifer and Theresa Carr. (2003). *Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them They Will Come – Another Look* Transportation Review Board 2003 Annual Meeting. http://www.des.ucdavis.edu/faculty/handy/ESP178/Dill_bike_facilities.pdf

⁹ "Wonder's Way Bike Pedestrian Pathway on the Arthur Ravenel, Jr. Bridge: A Successful Model for Facilitating Active Living in Lowcountry South Carolina" (http://media.charleston.net/2009/pdf/crbpathstudy_032609.pdf).

¹⁰ "Walking and Cycling to Health: A Comparison of Recent Evidence from City, State, and International Studies" (<http://www.cfah.org/hbns/archives/viewSupportDoc.cfm?supportingDocID=943>).

¹¹ "Bicycle Riding, Walking, and Weight Gain in Premenopausal Women" (<http://archinte.ama-assn.org/cgi/reprint/170/12/1050>).

¹² "Randomised controlled trials of physical activity promotion in free living populations: a review" (<http://www.ncbi.nlm.nih.gov/pubmed/7499985>).

¹³ "Like commuting? Workers' perceptions of their daily commute" (<http://www.statcan.gc.ca/pub/11-008-x/2006004/pdf/9516-eng.pdf>).

¹⁴ "Physical activity, absenteeism and productivity: an Evidence Review" (<http://www.tfl.gov.uk/assets/downloads/businessandpartners/Physical-activityabsenteeism-and-productivity-evidence-review.pdf>).

¹⁵ "Relationship of body mass index and physical activity to health care costs among employees" (<http://www.ncbi.nlm.nih.gov/pubmed/15167389>).

¹⁶ Source: "Safety in numbers: more walkers and bicyclists, safer walking and bicycling" (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1731007/pdf/v009p00205.pdf>).

- The presence of bike lanes have been shown to reduce the overall crash rate by 18 percent compared to streets without any bicycle facility¹⁸.

Economic Benefits

- The combined potential value of bicycling in Wisconsin totals nearly \$2 billion yearly¹⁹.
- It's been estimated that the entire bikeway network of Portland, Oregon was built for less than the cost of constructing one mile of urban freeway²⁰.
- There is a 12.5 percent increase in productivity of employees who exercise as compared to those who do not exercise²¹.
- A survey of residents along bicycle boulevards indicated that the majority of respondents felt that bicycle boulevards have had a positive impact on home values, quality of life and sense of community, along with reducing noise, improving air quality, and providing convenience for bicyclists. Additionally, 42 percent of respondents said living on a bicycle boulevard makes them more likely to bike²².
- Installation of bike lanes and bike racks can have a positive influence on the local economy. Fort Worth, Texas spent \$12,000 to purchase 80 bike racks and \$160,000 on local road diets in one district in town. As a result, local restaurants experienced a 200 percent increase in business²³.

Impacts on Home Values

- The walkability of an area can directly impact home values. Homes with above average levels of walkability are worth \$4,000 to \$34,000 more than homes with average levels of walkability in the areas studied. Typically, a one point increase in Walk Score was associated with between a \$500 and \$3,000 increase in home value²⁴.
- The Urban Land Institute compared four new pedestrian communities to determine the effect of walkability on home prices. They determined that homebuyers were willing to pay \$20,000 more for homes in walkable areas compared to similar homes in surrounding areas²⁵.

MAKING THE CASE

Bike lanes reduced the risk of fatalities in pedestrian-involved crashes by 40%.
(Source: The New York City Pedestrian Safety Study and Action Plan)

¹⁷ Source: "An expert judgment model applied to estimating the safety effect of a bicycle facility" (<http://www.ncbi.nlm.nih.gov/pubmed/10868762>).

¹⁸ "Adult Bicyclists in the United States: Characteristics and Riding Experience in 1996" (<http://www.enhancements.org/download/trb/1636-001.PDF>).

¹⁹ Gabrow, Maggie, Micah Hahn, Melissa Whited. (2010). *Valuing Bicycling's Economic and Health Impacts in Wisconsin*. The Nelson Institute for Environmental Studies and the The Center for Sustainability and the Global Environment. University of Wisconsin-Madison. Prepared for Representative Spencer Black.

²⁰ <http://www.politifact.com/oregon/statements/2011/mar/19/samadams/portland-mayor-sam-adams-says-portlands-spent-its/>

²¹ Campbell, Richard and Wittgens, Margaret. (2004). *The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling*. Prepared for Better Environmentally Sound Transportation.

²² VanZerr, Mariah. (2009). *Resident Perceptions of Bicycle Boulevards: A Portland, Oregon Case Study*. Submitted to the Transportation Research Board for the 89th Annual Meeting.

²³ Ely Blue's Bikenomics series: <http://grist.org/biking/2011-04-11-the-economic-case-for-on-street-bike-parking/>

²⁴ CEOs for Cities. *Walking the Walk*. August 2009. Accessed online June 2013: http://blog.walkscore.com/wp-content/uploads/2009/08/WalkingTheWalk_CEOsforCities.pdf

²⁵ Eppli, Mark J. and Charles C. Tu. *Valuing the new Urbanism, The Impact of the New Urbanism of Prices of Single-Family Homes*. Urban Land Institute, 1999.

- For developers, walkability translates into direct economic benefits. In Washington, buildings in neighborhoods with good walkability command an average of \$8.88/sq. ft. per year more in office rents and \$6.92/sq. ft. per year higher in retail rents, and generate 80 percent more in retail sales as compared to places with fair walkability, holding household income levels constant. Housing prices and property values are also increased in areas with higher walkability – a place with good walkability, on average, commands \$301.76 per month more in residential rent and has for-sale residential property values of \$81.54/sq. ft. more relative to places with fair walkability, holding household income levels constant²⁶.
- Adjacency to trails can also have a positive effect on property values. For instance, according to the Rails to Trails Conservancy, lots adjacent to Wisconsin’s Mountain Bay Trail sold for 9 percent more than similar properties not adjacent to the trail²⁷.
- In Apex, North Carolina, houses adjacent to a regional greenway sold for \$5,000 more than houses in the same subdivision that were not on the greenway²⁸.

Job Creation

- A national study of employment impacts following the installation of bicycle and pedestrian infrastructure estimated that each \$1 million in bicycle-related projects creates 11.4 jobs from direct, indirect and induced construction spending. Likewise, pedestrian-only projects create about 10 jobs and multi-use path projects create 9.6 jobs per \$1 million of project cost. Projects that combine pedestrian and bicycle facilities with other road improvements create 7.8 jobs per \$1 million. In contrast, road-only projects generated 7.75 jobs per \$1 million. Spillover (indirect) employment adds an additional 3 jobs per \$1 million²⁹.
- In Colorado, the bicycling industry has created 513 manufacturing jobs and 700 full-time equivalent retail jobs³⁰.
- Similar results have been shown in Wisconsin, where the bicycling industry (consisting of manufacturing, distribution, retail, and other services) contributes \$556 million and 3,418 jobs to the Wisconsin economy³¹.
- Portland’s bicycle industry has also contributed significantly to the local economy. In 2008, revenues in the bicycle-related economic sector were found to be nearly \$90 million³².

²⁶ *Leinberger, Christopher B. and Mariela Alfonzo. (2012). Walk this Way: The Economic Promise of Walkable Places in Metropolitan Washington, D.C. The Metropolitan Policy Program at the Brookings Institute.*

²⁷ Rails to Trails Conservancy. [Economic Benefits of Trails and Greenways](#). Washington, DC.

²⁸ *Ibid.*

²⁹ *Garrett-Peltier, Heidi (2011). Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts. Political Economy Research Institute. University of Massachusetts, Amherst. <http://www.peri.umass.edu/236/hash/64a34bab6a183a2fc06fdc212875a3ad/publication/467/>*

³⁰ “Economic Impact of Bicycling in Colorado” (<http://atfiles.org/files/pdf/CObikeEcon.pdf>).

³¹ Source: “The Economic Impact of Bicycling in Wisconsin” (<http://www.dot.wisconsin.gov/business/econdev/docs/impact-bicycling.pdf>).

³² “The Value of the Bicycle-Related Industry in Portland”

(http://www.altaplanning.com/App_Content/files/fp_docs/2008%20Portland%20Bicycle-Related%20Economy%20Report.pdf).

chapter two

goals, objectives, and policies

The Steering Committee developed the purpose, goals and objectives for the Lindon Bicycle and Pedestrian Master Plan. These principles provide a guiding document for Lindon in creating, maintaining, and promoting pedestrian and bicycle infrastructure and programs both now and in the future.

Vision

The vision statement guides Lindon's direction for bicycle and pedestrian facilities, and provides clear direction for the project. To ensure consistency with neighboring communities, the Steering Committee reviewed language from previously developed local bicycle and pedestrian master plans, including the American Fork Bicycle and Pedestrian Master Plan (2013), the Lehi Bicycle and Pedestrian Master Plan, the Pleasant Grove Master Plan (2013), and the Orem Bicycle and Pedestrian Master Plan (2010), as well as national examples from Anchorage, Alaska; Davis, California; Minneapolis, Minnesota; and Portland, Oregon. The vision statement of the Lindon Bicycle and Pedestrian Plan is:

"Lindon will encourage a community that values healthy mobility options and a high quality of life through the promotion of a safe and well-connected bicycling and pedestrian network."

Goals and Objectives

Goal 1: Create a complete bicycle and pedestrian network to increase bicycle and pedestrian mode share

Objective 1a: Provide a continuous system of bike lanes, sidewalks, crosswalks, shared paths, and other bicycle and pedestrian facilities throughout Lindon and to neighboring cities that is safe and attractive to all users.

Objective 1b: Encourage and facilitate bicycling and walking as important modes of personal transportation and recreation.

Goal 2: Foster a culture of bicycle and pedestrian plan adoption and implementation

Objective 2a: Adopt the Lindon Bicycle and Pedestrian Master Plan.

Objective 2b: Utilize the master plan Steering Committee throughout project implementation to ensure citywide support and harmony with other department plans, policies, and goals.

Objective 2c: Engage with elected officials, community members, advocacy groups, and other stakeholders at major milestones of bicycle and pedestrian master plan implementation.

Objective 2d: Create a sustainable, dedicated source of bicycle and pedestrian funding within the annual city budget.

Objective 2e: Require private development projects to finance and install bicycle facilities, sidewalks, and multi-use trails as appropriate and where recommended in the master plan as part of on-site improvements and off-site mitigation measures.

Objective 2f: Monitor, measure, and evaluate the implementation of the Lindon Bicycle and Pedestrian Master Plan.

Goal 3: Implement comprehensive education programs

Objective 3a: Educate the general public on bicycle and walking safety issues and encourage non-motorized transportation with programs that target pedestrians, bicyclists and motorists.

Objective 3b: Support Safe Routes to School and other efforts, including educational and incentive programs to encourage more students to bicycle or walk to school, through a partnership with the school districts and other interested parties.

Objective 3c: Install signage along local and regional bikeways to assist with way-finding and to increase awareness of bicyclists.

Objective 3d: Encourage employers to provide incentives and support facilities for employees that commute by bicycling and walking.

Objective 3e: Promote bicycling and walking through City-sponsored events.

Objective 3f: Engage with the Utah Department of Transportation for educational and promotional opportunities as part of the Road Respect program.

Goal 4: Improve safety and enforcement on Lindon streets, paths, and bikeways

Objective 4a: Focus on enforcement initiatives pertaining to bicycle theft and the rules of the road.

Objective 4b: Increase the proportion of cyclists who feel safe cycling in town.

Objective 4c: Ensure that all bicycle or pedestrian collisions are accurately recorded into a collision database for future analysis and monitoring.

Objective 4d: Reduce crashes involving bicyclists, pedestrians, and motor vehicles. Data collected in Objective 4c should be used to inform these statistics.

Goal 5: Maintenance: Keep non-motorized facilities clean, safe, and accessible

Objective 5a: Incorporate bicycle and pedestrian network repair and maintenance needs into roadway maintenance routines as appropriate, paying particular attention to sweeping and pothole repair on priority bicycle facilities.

Objective 5b: Address bicyclist and pedestrian safety during construction and maintenance activities.

Objective 5c: Provide a simple way for citizens to report maintenance issues that impact bicyclist and pedestrian safety and for the City to respond appropriately.

Objective 5d: Develop and update actual maintenance costs for existing and proposed bicycle and pedestrian facilities to help budget for its future network.

Objective 5e: Coordinate with Utah County on their Adopt-a-Trail program for shared use paths.

existing conditions

Study Area Context

Lindon is situated in north-central Utah County, neighboring American Fork to the west, Pleasant Grove to the north, and Orem and Vineyard to the south. On the east, Lindon is constrained by the foothills to the Wasatch Mountains and on the west, Lindon is constrained by Utah Lake. The Lindon General Plan outlines a population growth from 10,070 in 2010 to 13,100 in 2020, although the Mountainland Association of Governments (MAG) projects only 11,753 by 2020. Total build-out of the city is projected to be between 15,000 and 17,000 residents according to the General Plan.

The average high temperature for Lindon in January is 39°F and the average low is 27°F, with 1.74 inches of precipitation. In July, the average high temperature is 91°F and the average low temperature is 60°, with 0.82 inches of precipitation.

The topography of Lindon is relatively flat throughout most of the city; however, elevation differences increase east/west towards the foothills. There is relatively little elevation change between the northern section and southern section of the city.

The roadway network has an underlying quarter-mile grid system; the large blocks of the grid system have been filled in with cul-de-sacs, large lots, or undeveloped land. Only a handful of streets traverse the entire city in the north/south direction: I-15, Geneva Road, State Street, 200 East, and 400 East. In the east/west direction, only 200 South provides a continuous connection throughout the city; other major east/west streets include 400 North and Center Street. Much of the land uses that support employment and commerce are located along State Street, Geneva Road, or the industrialized western portion of the city. The major roads of State Street (32,000 vehicles per day) and Geneva Road (17,000 vehicles per day) are important for regional vehicle mobility. These routes are also very important for cycling mobility, as they provide continuous routes throughout Utah County. State Street currently has bicycle lanes on either side through Lindon.



Existing Planning Document Review

The following relevant existing planning documents were reviewed to gain an understanding of existing conditions of bicycle and pedestrian facilities in Lindon:

- Lindon City General Plan (2011)
- Lindon City General Plan Survey (2010)
- Lindon Parks, Trails, and Recreation Master Plan (2008)
- Lindon City Municipal Code
- 2040 Metropolitan Transportation Plan
- Utah Collaborative Active Transportation Study (UCATS)
- Utah Department of Transportation's Bicycle Corridor Priority Routes Project
- Pleasant Grove Bicycle and Pedestrian Master Plan
- American Fork Bicycle and Pedestrian Master Plan
- Orem Bicycle and Pedestrian Master Plan

Lindon City General Plan

The Lindon City General Plan (2011) set forth a vision for the city. There were ten objectives to the Plan, with the goal most directly related to the Bicycle and Pedestrian Master Plan being:

- Maintain the quality of existing and future neighborhoods and land use areas within the City through preservation of animal rights, community beautification, **improved parks & trails**, and other pursuits relating to provident living, recognizing all segments of our community.

Streets and Transportation

The General Plan identifies bicycle routes that should be preserved and encouraged.

- The City should provide for **safe and convenient bicycle, pedestrian, and equestrian movement** on designated sidewalks, trails, and striped roadside shoulders.
- Future studies for **increased bicycle use and bike route designations** should be conducted with specific implementation plans and policies adopted by the City.
- In areas with high pedestrian use or where safety is a significant concern (e.g., by schools) the City may **promote sidewalks or trails** beyond that provided by new development. Pedestrian signals shall be provided only at vehicular signal locations. Crosswalks are generally restricted to intersections.

Land Use

Key planning guidelines that incorporate consideration of bicycle and pedestrian facilities include:

- An **interconnecting trail system** which is accessible to the public should be provided between city facilities, pedestrian centers, commercial areas, recreational areas, natural areas, and drainage ways.
- Commercial and industrial uses should be **highly accessible**, and developed compatibly with the uses and character of surrounding districts.

- Land use patterns should be encouraged that provide adequate off-street parking, reduce travel distances for employment and essential services, limit pollution, **allow for alternative modes of transportation**, and conserve energy.
- **Beautification efforts** (decorative street lighting, tree and planter installations, etc.) should be encouraged as part of new developments and as part of city redevelopment efforts of existing public properties and streetscapes.

Parks and Trails

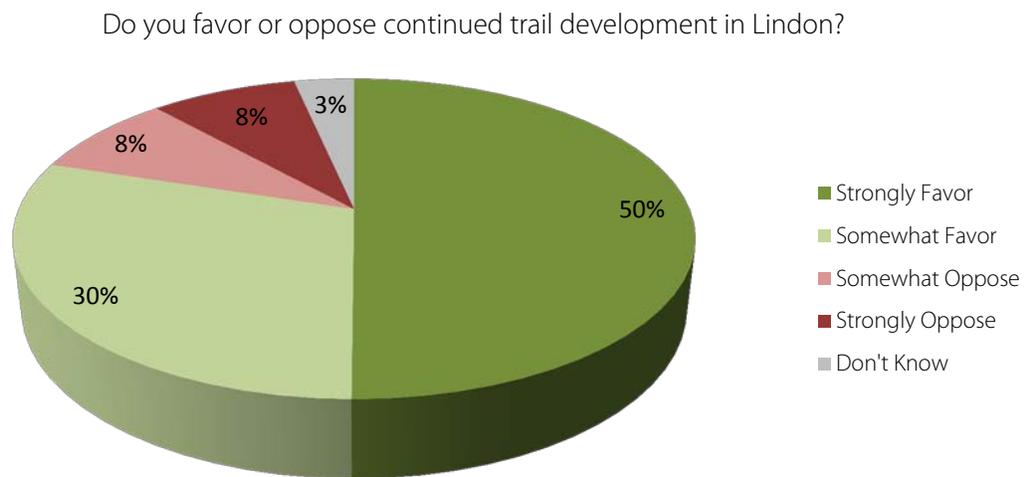
Community parks, neighborhood parks, and trail head facilities are essential to Lindon City. Community parks should be located to promote accessibility from the entire community and trail head facilities should provide parking and amenities such as benches, location markers, drinking fountains, and/or restrooms.

- Linear parks/**trails should be maintained and expanded** along streams, creeks, easements, and rights-of-way, i.e. Hollow Water Source, Proctor Drainage Ditch, Battle Creek and Grove Creek Drainages, Salt Lake Aqueduct, USBR Aqueducts, North Union Canal, Murdock Canal, etc.
- As development is proposed, staff will evaluate the need for **supplementary trails** to provide access to recreational amenities and the major trail network.
- When roadway width allows, **striping can designate a pedestrian / bike lane** along the side of the road.

2010 General Plan and Recreation Survey

As part of the Lindon General Plan update in 2011, a survey was distributed to the Lindon community between July and December 2010 to obtain public opinion regarding important community issues that should be covered in the updated Lindon General Plan. Findings pertaining to bicycle and pedestrian improvements are listed below:

- When asked if continued trail development in Lindon was favored or opposed, responses showed the following level of support:



2040 Metropolitan Transportation Plan

The Metropolitan Transportation Plan notes that “as Utah Valley continues to grow and urbanize so does the need for multi-use paths, neighborhood connections, on-street bike lanes, sidewalks and pedestrian friendly development increases.” Planned trails in Lindon include Geneva Road, Murdock Canal (complete), 800 West (partially complete), Utah Lake Trail, and completion of the Lindon Heritage Trail (partially complete). Bike routes were planned on State Street (complete).

UDOT Plans

Utah Collaborative Active Transportation Study (UCATS)

The Utah Collaborative Active Transportation Study was a joint planning effort between UDOT and UTA to identify a regional bicycle network throughout the Wasatch Front. In Lindon, UCATS identified State Street as a high priority project. Recently, State Street has been restriped to include bicycle lanes through Lindon. The UCATS effort also provided data for this project such as existing facilities and potential demand locations. Potential demand locations were based on a number of factors including housing and employment densities, demographic information, and important destinations. In Lindon, the areas of highest demand are located along State Street, as this is the main commercial corridor, and near schools.

Utah Department of Transportation’s Bicycle Corridor Priority Routes Project

In 2008, to address the increased bicycle facilities demand statewide, UDOT formed a planning team to prepare a statewide bicycle corridor priority routes analysis. As part of this analysis, an existing conditions inventory was undertaken to identify current route conditions for cycling. Within Lindon, 835 East, 400 West, and 1200 East were identified as “very good;” 400 North, 200 South, State Street, 400 East, and 140 North were identified as “good;” Geneva Road was identified as “Fair;” and no roads were identified as “poor.” Geneva Road was identified as a possibility for widening of shoulders or restriping. Bicycle lanes on Geneva Road are desired, but a wide shoulder would be acceptable.

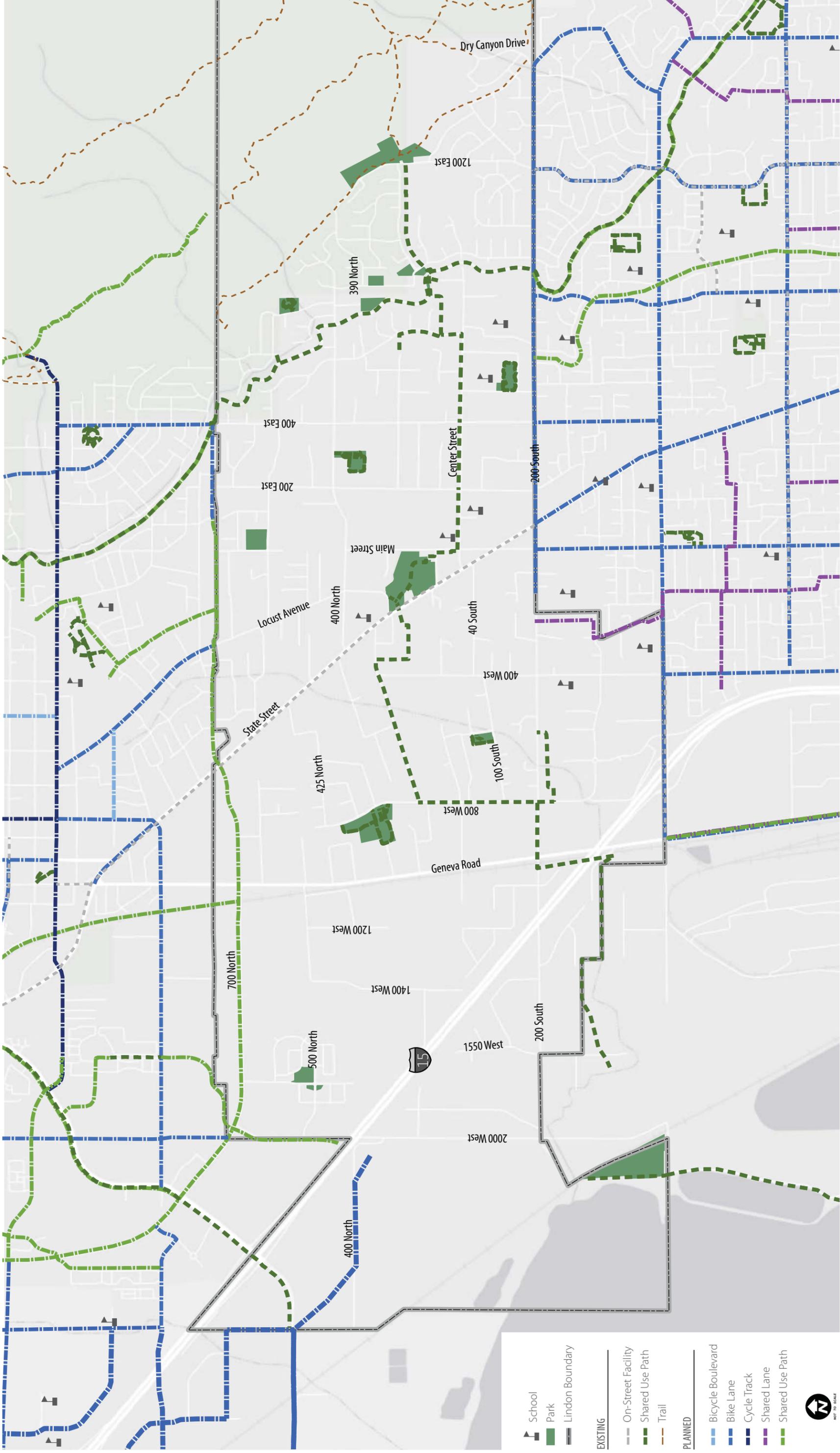
Adjacent Community Plans

Lindon is bordered on the north by Pleasant Grove and American Fork and on the south by Orem and Vineyard. All bordering cities except Vineyard have completed a bicycle and pedestrian master plan since 2010. Proposed facilities from these plans are shown on Figure 1 and provide an excellent backbone to complete a connection network throughout Utah County.

Existing and Planned Bicycle and Pedestrian Facilities

Bicycle Facilities

The Murdock Canal Trail, the Lindon Heritage Trail, and the bicycle lanes on State Street are the only bicycle facilities in Lindon. Figure 1 shows existing and planned bicycle facilities for Lindon and neighboring communities. This map is based on the most recent bicycle plans available from Lindon planning documents, data collected as part of the Utah Collaborative Active Transportation Study, and neighboring communities’ bicycle master plans.



Existing and Planned Bicycle Facilities figure 1

Murdock Canal Trail

The Murdock Canal Trail is a north-south mixed-use trail along the Murdock Canal. The trail opened in the spring of 2013 and connects Provo Canyon to the Point of the Mountain. The Murdock Canal Trail is consistently considered to be one of the premier assets to Lindon. There are approximately 215, 700 users per year on the Lindon portion of the Murdock Canal Trail. July is the most popular month, with approximately 21,200 users. In the winter months, the Murdock Canal Trail still sees 3,200 to 8,000 users per month.



Murdock Canal Trail Crossing and Wayfinding



Lindon Heritage Trail

The Lindon Heritage Trail is an east-west mixed-use pathway connecting the foothills to the western portion of the City. The trail has recently been extended west of Geneva Road with plans to connect the trail to the Lakeshore Trail. The Lindon Heritage Trail provides the only grade-separated crossing of State Street in Lindon.

State Street Bicycle Lanes



Lindon Heritage Trail



State Street was improved in 2013 to include striped bicycle lanes in both directions through Lindon. The bicycle lanes on State Street are the only bicycle lanes currently in Lindon.

Pedestrian Facilities

Lindon has a diverse range of land uses, ranging from Heavy Industrial to Residential High Density. Each of these land uses has different associations and requirements regarding sidewalk connectivity. In order to examine sidewalk connectivity in an appropriate context, sidewalk connectivity along major roads, by the different land types, and near schools was surveyed. Figure 2 shows existing pedestrian facilities.

Land Uses

Sidewalk connectivity has a higher positive impact on areas that are more likely to see frequent pedestrian uses; it would be more beneficial in a neighborhood than next to a factory. To incorporate this into the recommendations, general sidewalk connectivity was examined in relation to city zoning.

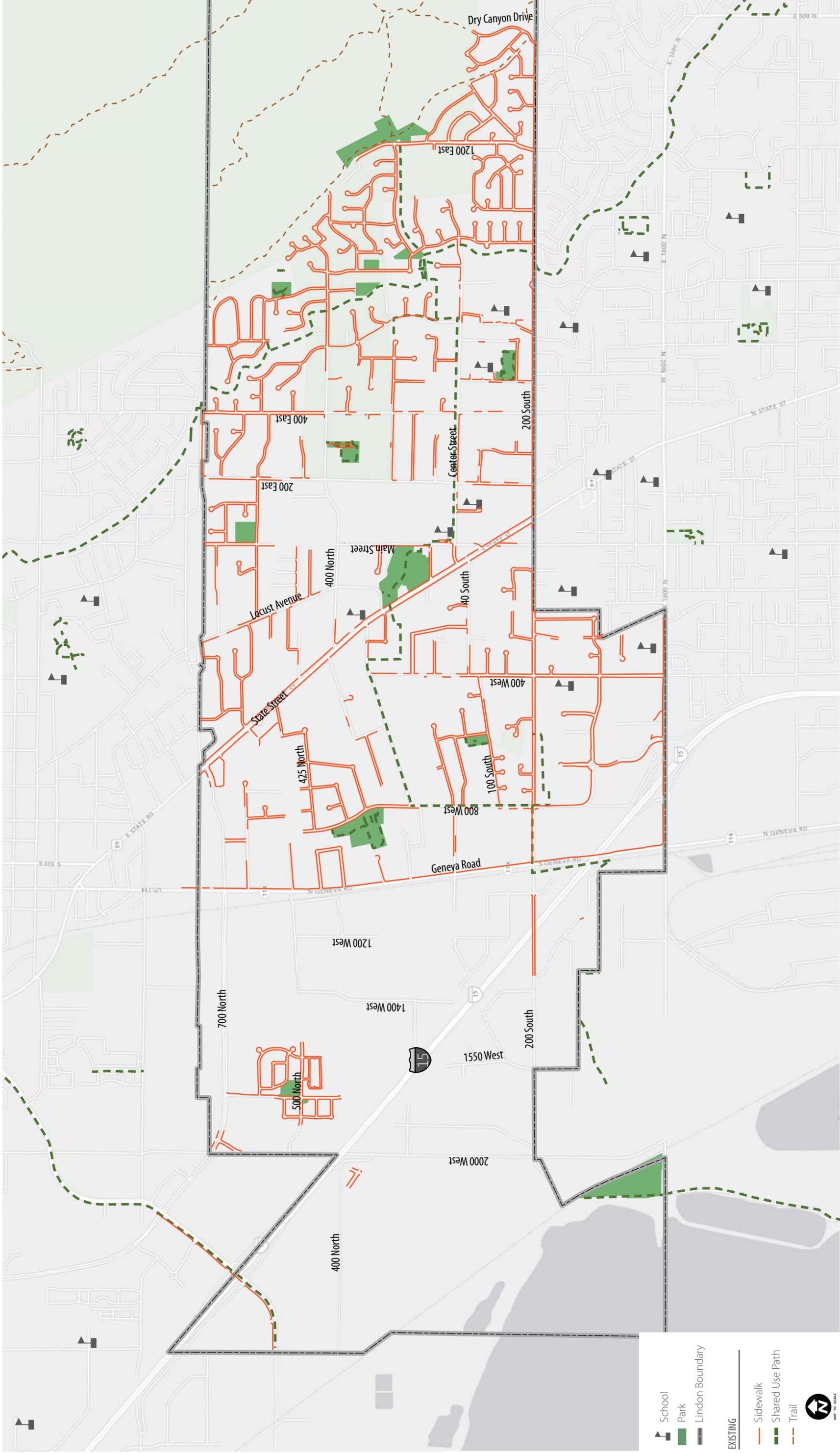
- The high-density residential zoned area of Lindon (northwest part of the city) has excellent connectivity, meaning all roads have sidewalks on both sides of the street
- The low-density residential zoned area of Lindon (far eastern part of the city) has excellent connectivity
- The very-low-density residential zoned areas of Lindon (directly east and west of State Street) have poor to fair connectivity, meaning little to no sidewalks exist or some sidewalks exist but major roads have either no sidewalks or large gaps
- The general commercial zoned area of Lindon (surrounding State Street) has good connectivity, meaning most roads have sidewalks on both sides of the street, but some gaps may be present
- The light and heavy industrial zoned areas of Lindon (west part of the city) have poor connectivity

Major Streets

- 400 North (Major Collector), from State Street to Canal Drive, is severely lacking sidewalk connectivity. Only about 8% of possible sidewalk exists (both sides of the street).
- 400 East (Major Collector) has large gaps in sidewalk connectivity.
- Center Street (Local) has a separated bicycle and pedestrian facility as the Lindon Heritage Trail parallels the street.
- 200 South (Major Collector) has sidewalk facilities for the majority of the roadway.
- Geneva Road (Other Principal Arterial) has a sidewalk on the east side of the street, with the exception of a few small gaps.



Pedestrian Crossing Sign and Flags



Existing Pedestrian Facilities
figure 2

Schools

Elementary

- Lindon Elementary School (50 North Main Street) is bordered to the southeast by the Lindon Heritage Trail. The sidewalk connection to State Street is broken by a parking lot and the road to the west, Main Street, does not have a sidewalk on the eastern edge.
- Rocky Mountain Elementary School (55 South 500 East) has a sidewalk on 500 East on the eastern edge and very intermittent sidewalks on the western side. 150 South and 200 South have sidewalks on both sides.



Full bike racks at the Aquatics Center

Junior High

- Oak Canyon Junior High (111 South 725 East) has sidewalks on the eastern edge and very intermittent sidewalks on the western side of 725 East. Center Street has the Lindon Heritage Trail and occasional sidewalks on the southern side. 200 South has sidewalks on both sides of the street.

Charter Schools

- Karl G. Maeser Preparatory Academy (320 South 600 West) has sidewalks on both of the roads adjacent to the property, 400 West and 1600 North.
- Timpanogos Academy (55 South 100 East) has sidewalks on both sides of 100 East and the Lindon Heritage Trail and occasional sidewalks on the southern side of Center Street.

Barriers and Safety

Barriers

Several roadways in Lindon are barriers to bicycle and pedestrian travel. Multiple linear constraints within Lindon limit bicycle and pedestrian travel. Physical barriers to travel are:

- I-15 can only be crossed at Pleasant Grove Boulevard, 2000 West, 200 South, Geneva Road, and 600 South.
- State Street only has four signalized intersections and no mid-block pedestrian crosswalks.
- Geneva Road only has three signalized intersections and no mid-block pedestrian crosswalks.
- The Murdock Canal can only be crossed at 400 North, Lindon Heritage Trail Crossing, Center Street, and 200 South. Public comment received indicated site distance issues at trail crossings at 400 North and 800 North.
- The two major east-west facilities, 200 South and 700 North, are high-traffic roadways that are intimidating to cyclists and pedestrians.

Bike lanes were recently striped on State Street, although no bike lanes exist on Geneva Road.

Safety

In 2013, the Utah Department of Transportation mapped locations of bicycling collisions over five years, between 2006 and 2011. Although most collisions occurred at spot locations (one collision at location), there were two small cluster areas, as shown in Map 2. The locations of bicycle collisions are:

- State Street between 600 North and 200 North (Cluster – five collisions)
- 200 South / 2000 West (Spot)
- 200 South / Geneva Road (Spot)
- 200 South / State Street (Cluster – four collisions)
- 200 South / Murdock Canal Trail Crossing (Spot)
- 200 South / 1200 East (Spot)

Map 2. Bicycle Collision Data Heat Map (Source: BioWest)



Public Input

Public input about safety issues and barriers was received from the Steering Committee, at the public open house in February 2014, and through an on-line survey. The public had the opportunity to provide input on safety issues through written comment and through mapping annotations.

Specific safety issues that were identified via public input are:

- Pedestrian and bicycle safety issues at 400 South / Lindon Parkway
- School pedestrian crossing missing on 200 South
- Low visibility at Murdock Canal Trail crossings, such as 400 North and 800 North
- Geneva Road immediately before passing under I-15
- The hill on 400 North is dangerous because the roadway is narrow and steep and cars often block the shoulder
- Locust Avenue has gaps in paved shoulder and sidewalk

- Sidewalk improvements needed along 200 South
- Tight and narrow shoulders along Center Street

Specific barriers to cycling that were identified via public input are:

- Walls between businesses prevent bicycling off-street
- Inadequate signage along the Lindon Heritage Trail makes it easy to get off trail
- Safe connections with Orem and to Fronrunner

Figure 3 shows a combined map of barriers, crash locations, and public-identified safety issues and barriers.

Amenities

Bicycle and pedestrian amenities were divided into six categories:

- **Bicycle Fixtures:** These fixtures provide convenience and safety for bicyclists including bicycle racks, lockers, and repair stations.
- **Pedestrian Fixtures:** These fixtures encourage mobility on foot for residents of all ages and abilities by providing convenience including benches, seating, and drinking fountains.
- **Recreational Opportunities:** These facilities provide opportunities for a wide variety of passive and active recreation.
- **Safety Features:** These features intend to encourage active transportation use by all members of the community by creating safer conditions day and night for users of all ages and abilities.
- **Signage and Wayfinding:** These fixtures assist cyclists and pedestrians with wayfinding and orientation in Lindon and Utah County.
- **General Fixtures:** These fixtures promote mobility by pedestrians and cyclists by encouraging convenience and cleanliness.



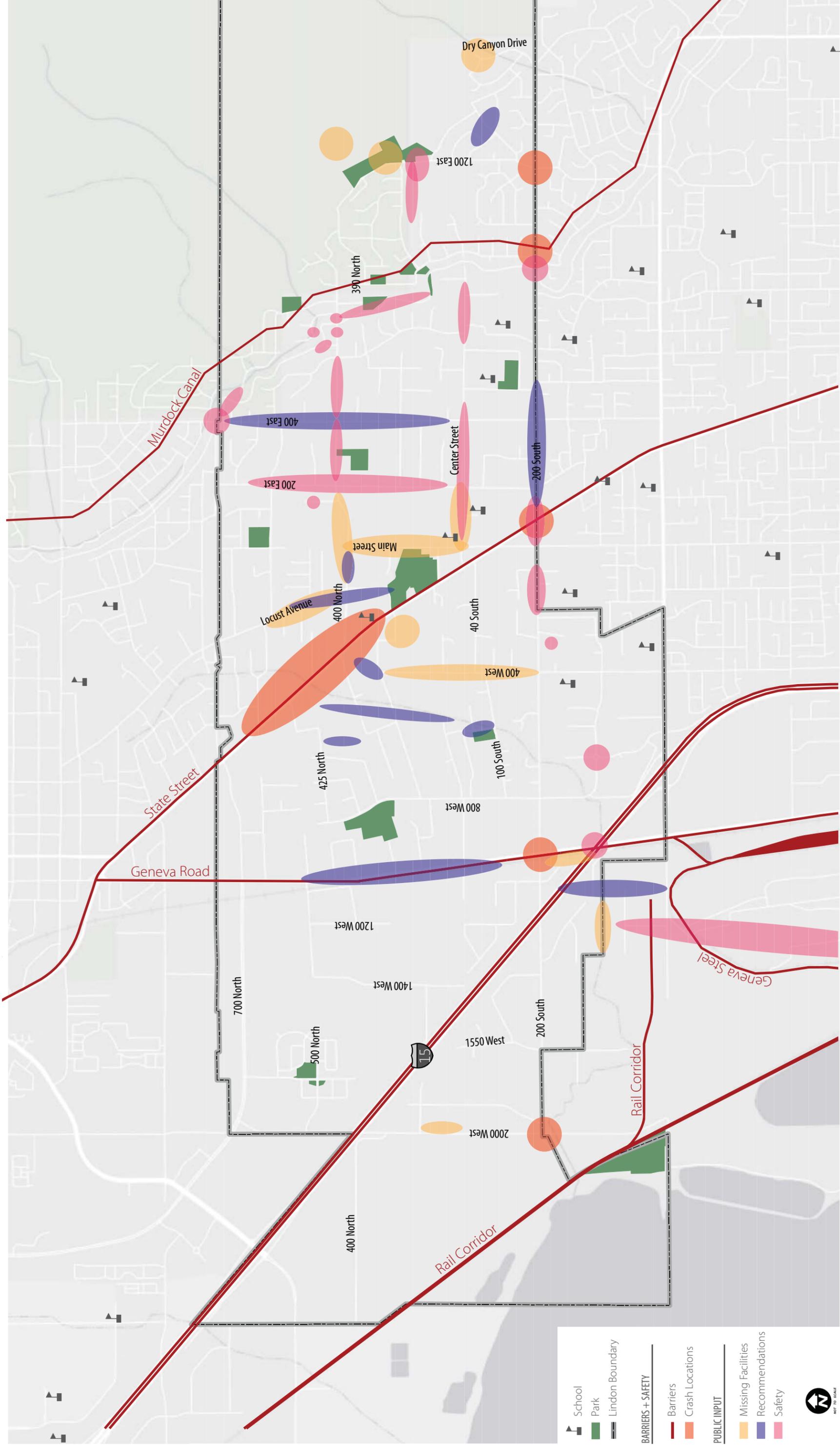
Existing water fountain

The locations of these facilities within Lindon are shown in Figure 4. As shown, most of these facilities are at parks, trailheads, or along trails.

Transit

Lindon is currently served by bus transit along State Street. The nearest FrontRunner stations are located in American Fork, approximately three miles northwest of Lindon, and in Orem, approximately three miles south of Lindon. Neither station has safe, accessible bicycle routes for the greater population. To access the American Fork commuter rail station without using the diverging diamond I-15 interchange at Pioneer Crossing, one must bike through the industrialized areas of west Lindon and have a good sense of direction, as most of the connecting roadways are in less developed areas with no wayfinding. To access the Orem commuter rail station from Lindon requires biking on or along Geneva Road.

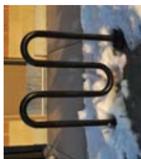
In the long term, Lindon is planning for transit facilities near the intersection of 700 North and Geneva Road and near the intersection of State Street and 400 North. However, there are no projects scheduled in this area in the near term.





BICYCLE FIXTURES

These fixtures provide convenience and safety for bicyclists including bike racks, lockers and repair stations.



Bike rack at Lindon View Park



Bench at Citizenship Park



Drinking fountain at Pioneer Park



Murdoch Canal Trail



Playground equipment at Hollow Park



Utah Lake recreation opportunities



Wayfinding sign



Lindon City identifications sign



Historical signage



SAFETY FEATURES

These features intend to encourage active transportation use by all members of the community by creating safer conditions day and night for users of all ages and abilities.



Crosswalk flags along Lindon Heritage Trail



Lighting bollard at Pioneer Park



GENERAL FIXTURES

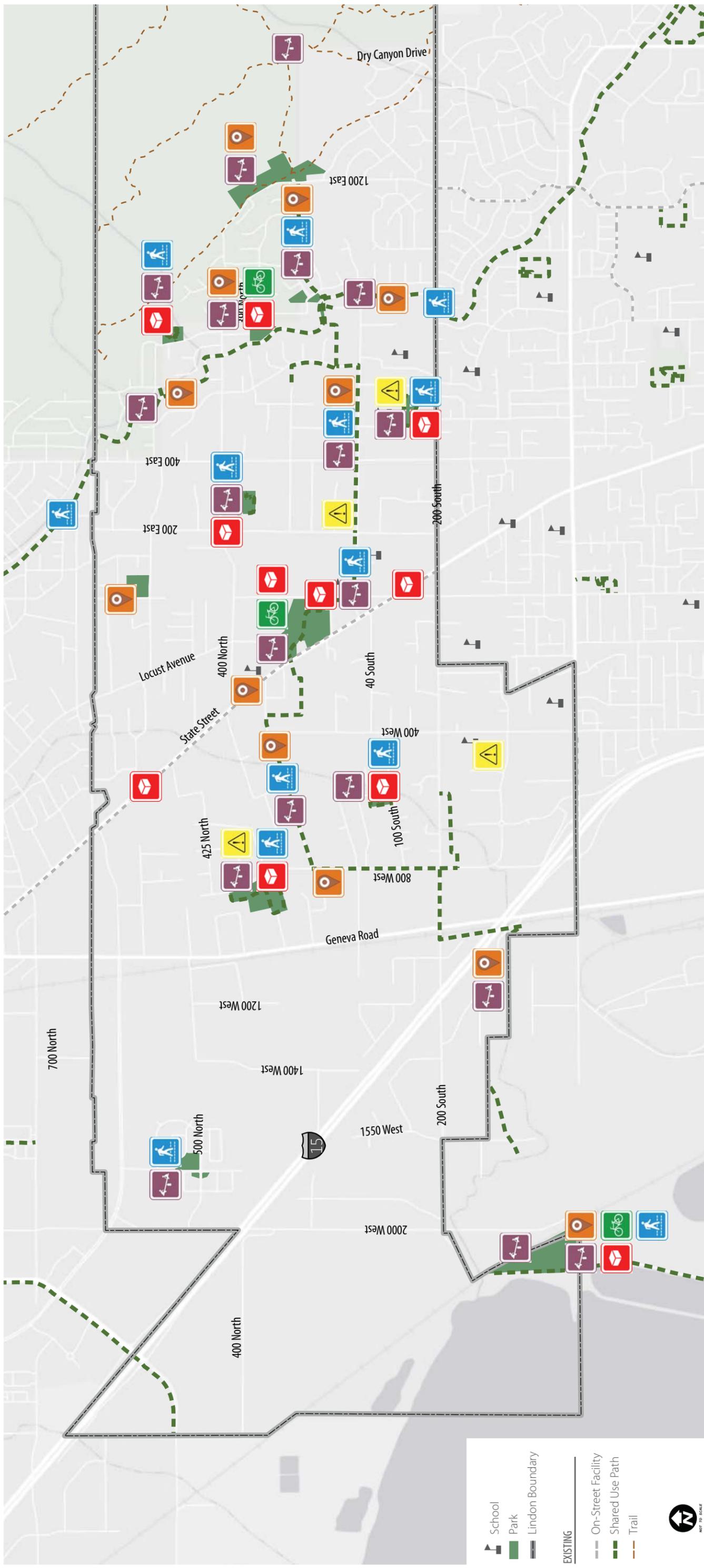
These fixtures promote mobility by pedestrians and cyclists by encouraging convenience and cleanliness.



Trash receptacle at Lindon View Park



Canopy with seating along Murdoch Canal Trail



chapter four

public outreach and input

Public outreach is a key component of any master planning effort. The objective of this outreach was to reach a broad, diverse public in which to discuss ideas for an improved bicycling and pedestrian environment in Lindon. Public outreach was conducted in a variety of ways including a project website, needs and attitudes survey, and public open houses. Field trips for the Steering Committee to Salt Lake City, Utah and Boulder, Colorado helped educate the team on facility types and implementation.

Needs and Attitudes Survey

An online needs and attitudes survey was included as part of the public outreach component of the plan. The survey was open to the public between January 16 and March 31, 2014. A total of 491 people responded, including 270 men and 221 women. Almost three-quarters of survey respondents lived in Lindon, while close to 40% worked in Lindon. Responses came from all age groups, with the highest reporting ages being 26-44 years of age.

Walking

In the survey, respondents were asked to share the reasons for walking in town. The most common reasons for walking were exercise and fitness, while the least common reasons were traveling to work or to school. Parks, swimming pools, and recreation areas were identified by 68% of people as somewhere they would like get to by walking. Multi-use paths (67%) and community facilities (40%) were other common destinations for pedestrians.

Respondents were also asked to share the reasons for not walking more, which are shown in Table 1. The most common response for reasons not to walk or walk more frequently were that destinations are too far away (53%). Also important to note is that a lack of sidewalks or paths, or their conditions, (40%) deterred walking trips. It may be inferred from these results that an increase in infrastructure supporting walking could encourage Lindon residents to walk more often.

Only 2% of respondents said that they walk in the winter. For those that did not walk year-round, 90% stated that it was because of temperature or weather, 30% said that road or sidewalk maintenance was a hindrance, and 8% cited traffic as the reason.

TABLE 1 REASONS FOR NOT WALKING

Reason Given	% of Sample
Destinations are too far away	53
Lack of sidewalks, or paths are in poor conditions	40
Not enough time to walk	35
Weather concerns	35

Source: Needs and Attitudes Survey, 2014.

Bicycling

The gender demographics of the question asking respondents to self-select “what type of bicyclist [they considered themselves]” sheds additional light on how males and females perceive bicycling. Males tended to be stronger, more fearless, and more confident when riding a bike without separation, facilities, or in inclement weather. On the other hand, females tended to be interested in bicycling but concerned about safety, comfort, and the need for separation from traffic. Of the four types of bicyclists, people in Lindon identified themselves as:

- 14% are strong and fearless (this group of respondents was 94% male)
- 45% are enthused and confident (this group of respondents was 59% male)
- 34% are interested but concerned (this group of respondents was 63% female)
- 7% answered “no way, no how” (this group of respondents was 55% female)

Survey respondents were also asked the reasons for bicycling. The most common reasons chosen were exercise, fitness, recreation, and fun, while the least common reasons were traveling to and from church, running errands, or traveling to work or school. Most trips (56%) are 1 to 6 miles one-way, on average. Strong and fearless bicyclists typically ride farther, while interested but concerned bicyclists ride shorter distances.

People also indicated where they would like to arrive by bike, as shown in Table 2.

TABLE 2 BICYCLE DESTINATION

Destination	% of Sample
Paved off-street multi-use paths	71
Park, swimming pool, recreation area	63
Work	45
Community facilities	39
Neighborhood stores	38

Source: Needs and Attitudes Survey, 2014.

Respondents were also asked to share the reasons for not biking more. The most common response for reasons not to bike was weather concerns (48%). Only 1% of respondents said that they ride a bike in the winter; three-quarters of respondents cited temperature, weather, snow, and ice as the reasons they did not ride year round. Also important to note is that a lack of bicycle lanes or paths (45%) deterred bicycling trips. It may be inferred

from these results that an increase in infrastructure supporting bicycling could encourage Lindon residents to bike more often. Too many cars, or motorists driving too fast (41%) was also a key reason people did not bike.

Following a trend that has appeared in other Utah communities, respondents (even the strong and fearless bicyclists) ranked more protected bike facilities as the most preferred option, and the least protected as the least preferred option. Average ratings (on a scale of 1 to 5, 5 being the highest) are in parentheses:

1. Off-street paved multi-use paths (4.55)
2. Cycle tracks (3.55)
3. Buffered bike lanes (3.13)
4. On-street conventional bike lanes (2.65)
5. Bicycle boulevards (2.43)
6. Shared roadways (1.77)

Specific Locations

The favorite places to walk and bike in Lindon, according to the survey, are the Murdock Canal Trail and the Lindon Heritage Trail. Reasons included no vehicles, safety, smoothness, and maintenance. This mirrors the preference of off-street paved multi-use paths as the most preferred facility type.

Respondents listed their most difficult places to walk or bike in Lindon and the reasons behind their choices. State Street was identified as the most difficult place for active transportation because of traffic, right-turning traffic, noise, safety concerns, and concerns at crossings. 200 South was also identified due to it being busy, wide, having spotty sidewalks, traffic, and no bike lane. People cited poor pavement conditions, fast traffic, and trucks as reasons why Geneva Road was not bicycle- or pedestrian-friendly. 400 East and 400 North rounded out the top five most difficult places to walk or bike because of their lack of sidewalks and no bike lane on 400 North.

Top Takeaways

Utilitarian bicycling and walking are the least common type of usage by respondents to the Lindon survey. This is an opportunity for future growth in bicycling and walking. Responses show that very few people bike to work but about 45% of those who took the survey say that they would like to bike to work if it were easier or safer, which is a very large difference between current practice and stated desire.

For the most part, respondents (particularly women) want facilities that provide separation from traffic, like multi use paths and cycle tracks. People who took the survey (as well as those who attended the project open house) really enjoy the multi-use path backbone that Lindon already boasts and want more access to it. Alternative low stress facilities, like bike boulevards, may have received lower average ratings due to the fact that they are a new concept to Utah and people are not familiar with them already.

The most difficult places to walk and bike in Lindon share the following traits: lack of sidewalks and/or lack of bike lanes, and high traffic volumes and speeds. These concerns will need to be addressed in order to encourage these people to feel comfortable and use these types of roads and facilities.

Public Open Houses

There were two open houses held for the Master Plan. The purpose of the first open house was to get approval for vision, goals, and objectives by the community; to identify bicycle and pedestrian issues and potential alternatives; to identify key destinations; and to understand facility types that the community would use. The purpose of the second open house was to present the recommendations of the plan and obtain feedback for prioritizing the recommendations. Public open houses were advertised through the Lindon email list-serv; city newsletter; flyers; website; Facebook; and directly contacting interested parties, including schools.

First Open House

The first open house was held at the Lindon Community Center on February 12, 2014 and had 28 attendees who signed in. Two large maps were provided to allow attendees to document locations of needed improvements. A visual preference survey of potential amenities was used to identify what types of amenities attendees would like to see in Lindon. Comments could also be provided via written comments or via the on-line survey, which was available at the open house.



Mapping Comments from the first open house

Written Comments

Several written comments were received. These comments are listed below.

- Lights out at Pioneer Park.
- Keep the sidewalks straight! Not curvy or wandering like a drunken sailor.
- Bike lanes should go through intersection.
- As a bicyclist, I usually don't like bike lanes. I just want to be as far to the right as possible. The best thing the City can do to help cyclists is to make good roads with wide shoulders (e.g., 1200 North in Orem).
- Walls between businesses prevent biking off-street. Example – Utah-Idaho Map Supply.
- Dangerous Rail Spur: Geneva southbound immediately before passing under I-15. There are no options for safely crossing the spur. To cross perpendicularly, a cyclist is forced into the traffic lane. Sections of Geneva (including this section) have no shoulder. Geneva is a great north/south option for cyclists but can be quite dangerous in spots. Separated bikeway?

Map Comments

Comments received through the mapping exercise are summarized below.

- Murdock Canal Trail
 - Sight issues and blind spots at trail crossings
 - A fence blocks view from trail at 400 North
 - Improve Murdock Canal Trail road crossings
 - Install mirrors at Murdock Canal Trail road crossings

- 400 North is narrow and steep and cars often block the shoulder. The north downhill side is especially dangerous.
- Improve connections with the unpaved foothill trails
- Improve bike/ped signage along Lindon Heritage Trail - it is easy to get off main path
- Create a bike connection to the indoor soccer field
- Potential connection between 10 North and State Street to the north via canal
- Create a separated bikeway on Geneva Road
- Create a bike park in Lindon
- Locust Avenue needs consistent paved shoulder and sidewalks and should be improved for bicyclists and pedestrians
- Parking concerns/issues along Center Street
- 400 East has nice shoulders and parking
- Upper Lindon Heritage trail needs repair
- Have a trail connection to Vineyard
- Improve the citywide connection to Lindon Heritage Trail
- Concerned with the loss of gravel shoulders and unpaved areas for equestrian use
- Sidewalk improvements needed along 200 South
- Tight and narrow shoulders on Center St. (uphill from Lindon Heritage Trail)
- Trash and debris on upper section of Lindon Heritage Trail
- Put a water fountain in at Dry Canyon Trailhead
- Improve connections with Orem
- A streetlight is needed on 200 South and 280 West
- Create a safe route to Frontrunner
- Spray for puncture vine/goat heads along trails

Amenities Comments

Amenities Group 1 – Signage & Wayfinding

- **System Map:** The consensus for preferred signage was for the system-type map as found in Lindon View Park. This type of signage lends a comprehensive overview of park and trail systems and highlights points of interests of the area. It both directs and informs the user.
- **Direction and Wayfinding:** This was the most popular selection at Open House # 1, and it was requested that distance and time be included with the destinations.
- **Interpretive:** This signage option was the least favored for future signage priorities. It is assumed this is because Lindon currently has signage along the Heritage Trail and at other historical locations describing landmarks within the city.

Amenities Group 2 – Bicycle Fixtures

- **Bike Rack:** The preferred bicycle amenity was bike racks. Currently, many parks and other public facilities are without bike racks. In some instances bike racks may exist and should be considered for expansion.
- **Bike Lockers:** These were not favored in the survey.
- **Bike Repair Station:** These were not favored in the survey.

Amenities Group 3 – Pedestrian Fixtures

- **Benches:** Styles and materials vary; from wood to metal to concrete, this amenity was chosen for its potential to highlight its designated context within Lindon and provide rest and respite from physical activities.
- **Drinking Fountain(s):** Provides utility for users of all ages and abilities, and was the top response at Open House # 1.
- **Picnic Tables:** These were not favored in the survey.

Amenities Group 4 – Safety Features

- **Overhead Street Lighting:** This was overwhelmingly chosen as the priority as a safety feature.
- **Bollards:** These were not favored in the survey.
- **Emergency Call Box:** It was felt that this amenity would not be required as cell phones are widely used among Lindon City residents.

Amenity Group 5 – Recreation Opportunities

- **Bike Park:** The city currently has a wealth of parks and open spaces, but they tend to provide similar offerings such as turf grass, picnic seating, and playground equipment. A bike park was highly valued as a potential destination and specialization within Lindon’s recreational offerings.
- **Pocket Parks:** While this amenity was highly requested by members of the Steering Committee, the public at-large did not feel the same level of interest in developing more of pocket parks as neighborhood amenities.
- **Demonstrative Art Works:** These were not favored in the survey.

Amenity Group 6 – General Fixtures

- **Pedestrian Canopy Amenity:** The consensus was in support of more pedestrian shelters throughout the community – at parks and along important thoroughfares.
- **Trash Receptacle Amenity:** This was not a priority as existing facilities meet the current demand.
- **Ornamental Vegetation:** This was not the majority choice for a general fixture.

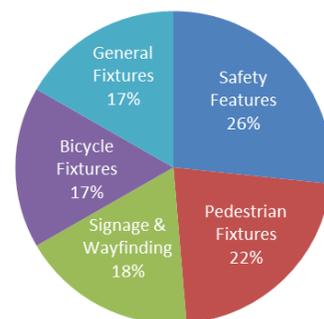
Second Open House

The second open house was held at the Lindon Community Center on September 30, 2014 and had 21 attendees who signed in. This open house focused on preferences for prioritization of the proposed system and amenities. The proposed system was displayed and voting exercises conducted. Cross-sections and visualizations of the proposed treatments were also displayed. Comments could also be provided via written comments.

Amenities Implementation Priorities Results

The chart at right depicts the results from a survey conducted at public open house # 2. The survey sought the desires from open house attendees regarding their priorities for implementation of the amenities master plan. 10 attendees completed the survey. Implementation of safety features was the top priority, with pedestrian fixtures as a close second priority for implementation. General fixtures, bicycle fixtures and signage and wayfinding each received approximately the same number of votes for implementation priority.

AMENITIES IMPLEMENTATION PRIORITIES RESULTS



Additional Comments

The following written comments were received:

- I have renamed “Heritage Trail” to “Horse Plop Trail.” I would propose a community plan for neighborhoods to have a general “clean-the-trail” program so those who walk along the trail can have a cleaner path to travel. If each neighborhood along the trail(s) could police their trail areas each day (?), we could keep it clean and safe.
- I have biked many times with my children from 700 North Locust Avenue to the Lindon Elementary school. From my experience, I would recommend:
 - Buffered bike lane all along Locust Avenue, south of 400 North, and all the way to the park.
 - High visibility sign on 400 North for pedestrians/bikes crossing (Locust Avenue).Just for your information, I have found several people traveling at greater speeds on the road from the park to 400 North (becomes Locust Avenue)...perhaps bypassing the 400 North light on State Street. There is a blind spot as you go up/down the hill near the park.

Field Tour to Salt Lake City, Utah

On April 23, 2014, members of the Steering Committee participated in a field tour of bicycle and pedestrian facilities in Salt Lake City. The purpose of this trip was to educate decision makers on the different bicycle treatment types and supporting systems. This field trip included a tour of bicycle signals, buffered bike lanes, bike share, protected bike lanes, green shared lanes, bike turn boxes, bike parking, and lighted pedestrian signage, as well as meetings with Salt Lake City transportation planners, who provided insights into implementation and public feedback.



Bicycle Light on the Salt Lake City Field Tour

Field Trip to Boulder, Colorado

On Tuesday, September 9th, nine Steering Committee members and one City Council member traveled to Boulder to meet with Boulder planning staff and experience a world-class bicycling city. A walking tour of downtown Boulder exposed the group to a variety of pedestrian improvements such as the Pearl Street Pedestrian Mall, enhanced pedestrian crossings, the Boulder Creek Path, raised right turn by-passes, countdown pedestrian signals, rectangular rapid flash beacons, high visibility crosswalks, and streetscape elements. A bicycle tour of Boulder was conducted by City of Boulder and Go-Boulder staff member Chris Hagelin. Chris explained how Boulder as a city has taken a holistic approach to planning, implementing, encouraging, and promoting facilities for bicycling and walking. Group members learned about the tax structure, enforcement procedures, economic incentives, and planning and zoning enforcement that have all led to a highly functioning, world-class system.

A week after the tour, the group sat down together in a Steering Committee meeting to discuss their impressions and highlights. Some of the key takeaways, impressions, and highlights of the tour according to the Steering Committee were:

- Level and diversity of funding was very impressive

- Open space preservation create a dense, livable place
- The original bicycle and pedestrian plan vision supports the City's work
- Their foresight years ago has taken them very far
- Sheer volume of bicyclists and pedestrians (even for a Tuesday morning)
- Lindon and Boulder have different land uses and densities
- Riding and walking feels very safe
- Bicycling and walking incorporated into every part of city life
- Comfortable and accessible for all ages and abilities
- Abundant bike parking anticipates the need and promotes it further
- Willingness to experiment to find the best options
- Staff dedicated to bicycling and walking are important
- Encouraging young users to ride, walk, and use transit by providing options
- Maintenance is very equitable; plowing and sweeping for all modes
- Amenities like signs, benches, lighting, etc., aren't overlooked there
- Comprehensiveness of their planning is very impressive

proposed system & project prioritization

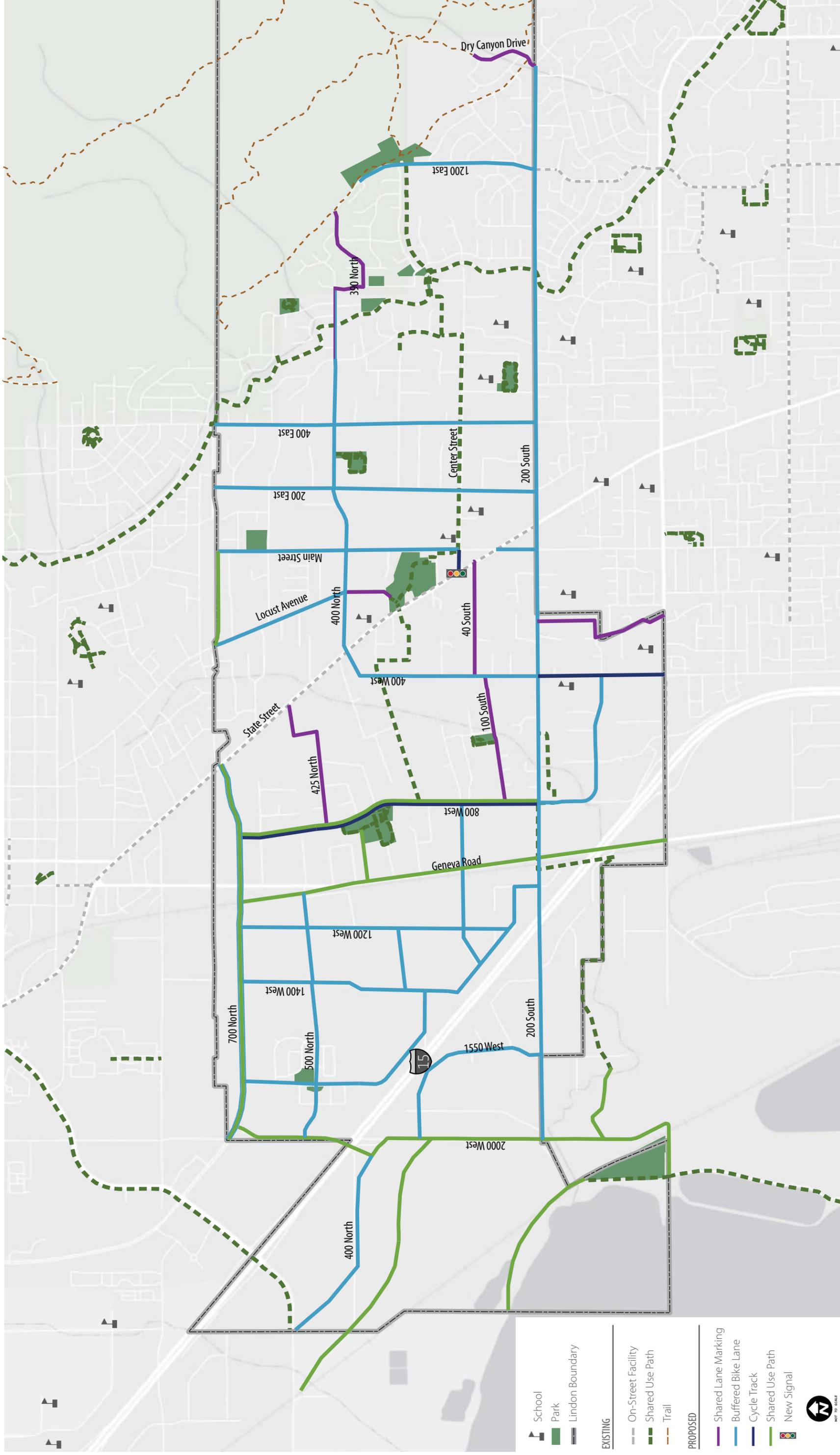
The proposed bicycle and pedestrian network is designed to fulfill the vision for walking and bicycling in Lindon. While all streets should be designed to safely accommodate all who use them, the proposed active transportation network consists of pedestrian improvements at a number of locations and bicycling facilities that are designed to be the primary system for active transportation within, to, and from Lindon. The proposed system was the result of an existing conditions evaluation, discussions with the Steering Committee, input from the public and engineering judgment. The proposed system was prioritized through a set of evaluation criteria that included public feedback.

The pedestrian-oriented improvements and the proposed bikeway network are the primary tools that allow Lindon to focus and prioritize implementation efforts where they will provide the greatest community benefit. Combined, these two networks form the citywide active transportation network. Once completed, the active transportation network will provide safer and more direct travel paths throughout Lindon for those who prefer to walk or bike.

Bicycle Facilities

The proposed bikeway network consists of routes that are designed to be the primary system for bicyclists traveling around and through Lindon. Streets or corridors selected for inclusion in the network are targeted for specific improvements in this Plan, such as the installation of bicycling lanes and off-street paths. By law, unless explicitly prohibited, bicyclists are allowed on all streets and roads regardless of whether the streets and roads are a part of the bikeway network.

Figure 5 illustrates the Existing and Proposed Bikeway Network. The proposed system includes a total of approximately 56 miles of new bikeway facilities in addition to the 21 miles currently in place. Table 5 shows the number of proposed miles for each bikeway classification.



Existing and Proposed Bicycle Facilities figure 5

TABLE 3 LENGTH OF BICYCLING NETWORK

Bikeway Classification	Existing	Proposed
Shared-Use Bicycling and Walking Path	21.0 miles	9.1 miles
Cycle Track	--	2.4 miles
Buffered Bicycle Lane	--	38.1 miles
Shared Roadway (Sharrow)	--	6.5 miles
Total	21.0 miles	56.1 miles

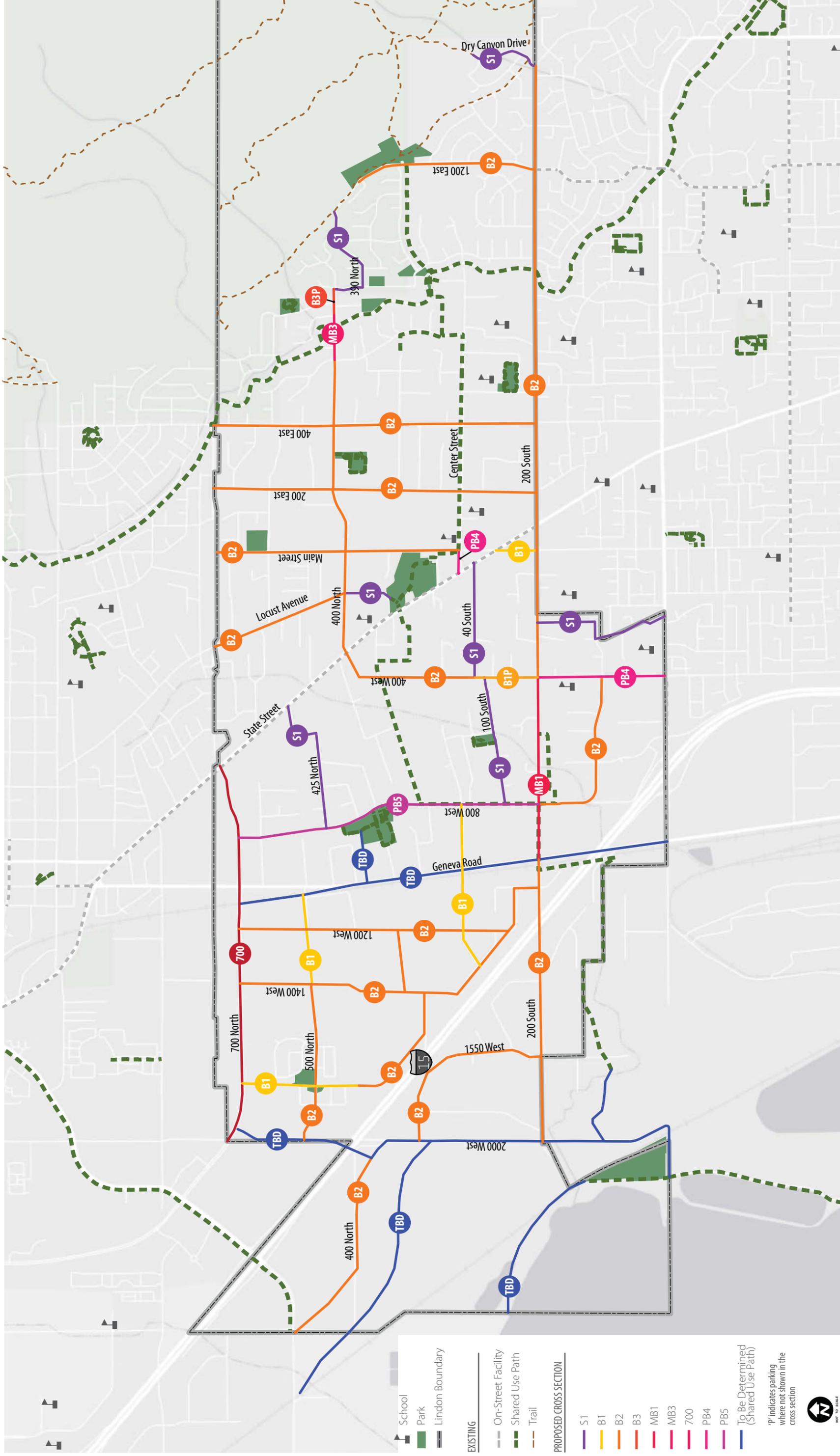
Bicycle Network Design Methodology

The proposed system was developed according to the following methodology:

1. The project team referred to the following vision statement when developing the bicycle network: ***“Lindon will encourage a community that values healthy mobility options and a high quality of life through the promotion of a safe and well-connected bicycling and pedestrian network.”***
2. The existing conditions map was overlaid with identified corridors from the input gathered from the Steering Committee and the public.
3. These corridors were combined with access to destinations such as schools, parks, and commercial areas to create a preliminary bicycle network. Residents should be able to walk or bike from home to both local and regional destinations.
4. The preliminary bicycle network was checked against existing and proposed networks in adjacent communities to ensure regional connectivity. The system should provide access to regional bikeways, regional trails, and routes in adjacent communities.
5. The preliminary bicycle network was reviewed to ensure adequate spacing of facilities, closure of gaps within the network, and addressing of safety concerns. The system should provide safe and equitable access from all areas of the City to both commute and recreation destinations, and should be designed for people of all levels of ability.
6. Initial bicycle facility types and cross-sections were created based on the cross-section standard drawings, functional classification, field work, and discussions with the City.
7. The complete bicycle network was reviewed with the Steering Committee and checked to ensure connectivity within Lindon and to adjacent communities, appropriateness, and completeness.

Proposed Facility Types & Cross-sections

The proposed Lindon bicycle network is composed of shared roadways, buffered bicycle lanes, cycle tracks, and shared pathways, as shown in Figure 5. Cross-sections were determined for each of these facility types, with the exception of shared pathways, which will need to be designed on a project-by-project basis. Cross-sections by locations are shown in Figure 6. Appendix A shows all proposed cross-sections, as well as potential future cross-sections.

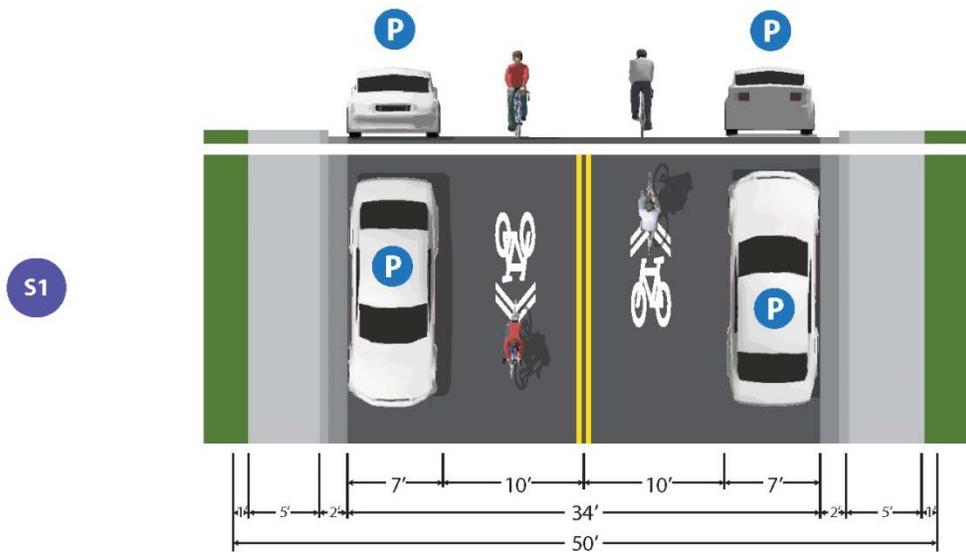


Proposed Bicycle Facilities by Cross Section figure 6

Shared Roadways

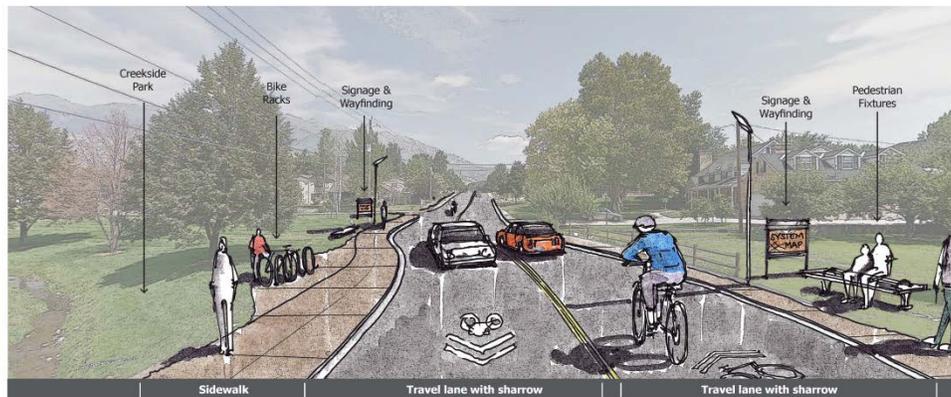
Shared roadways, or sharrows, provide a right-of-way designated by pavement markings for shared use with motor vehicles and are used where traffic volumes and speeds are relatively low or where it is not possible to install higher-level bikeways like bike lanes. Typically, sharrows should be not installed if the speed limit is greater than 35 mph. Sharrows can be used on roadways with on-street parking and multiple lanes of traffic.

The next step in a shared roadway is a bicycle boulevard. A bicycle boulevard is a special type of shared route on a local or collector street that encourage through travel by bicyclists, but discourages motor vehicle through traffic. Typically, bicycle boulevards are on low-volume streets adjacent to higher volume arterials where bicycles have priority and have a relatively stop-free, low-conflict route to their destinations. Traffic calming treatments such as traffic circles, chokers, and medians are often used on bicycling boulevards to calm traffic. Bicycle Boulevards should be considered as the shared roadway network is implemented.



50' STREET CROSS SECTION

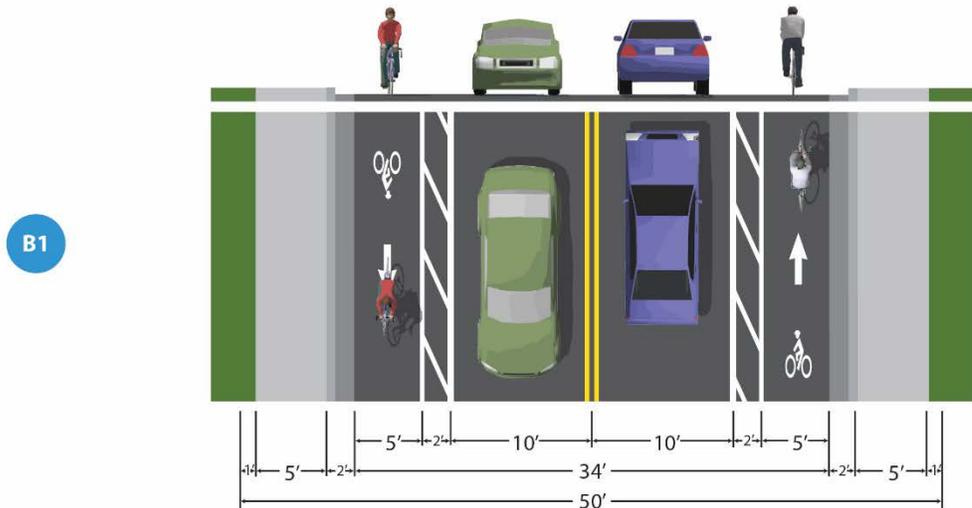
*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.



Rendering of 100 South Shared Roadway (at Creekside Park)

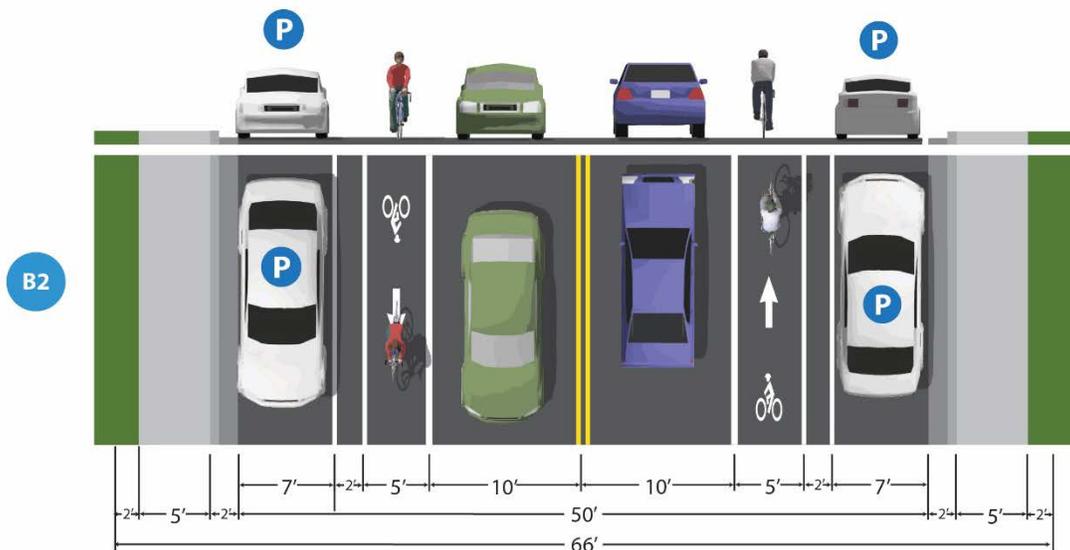
Bicycle Lanes and Buffered Bicycle Lanes

Bike lanes provide a restricted right-of-way and are designated for the use of bicycles with a striped lane and signage on a street or highway. They can increase bicyclists' safety and comfort by providing a visual separation between modes. Bicycle lanes are generally five to six feet wide. Buffered bike lanes are bike lanes that provide a greater level of separation from vehicular traffic and/or parked vehicles by creating a buffer adjacent to the bicycle lanes through striping.



50' STREET CROSS SECTION
BUFFERED BIKE LANES

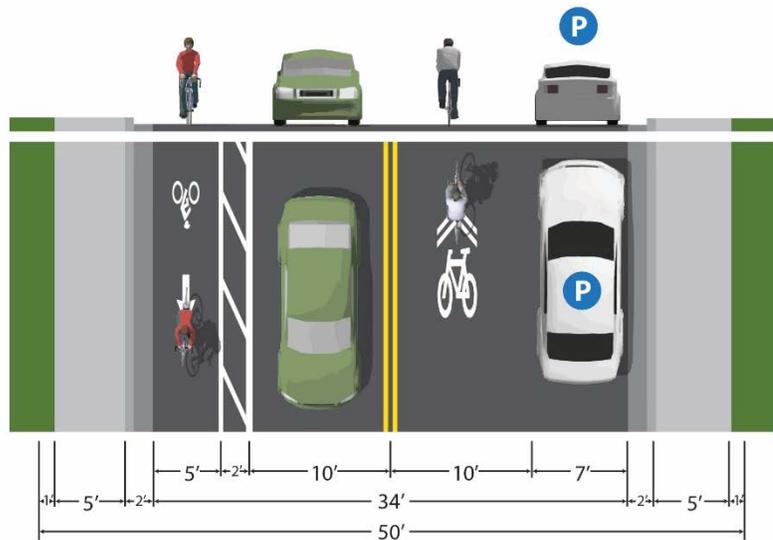
*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.



66' STREET CROSS SECTION
BUFFERED BIKE LANES

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

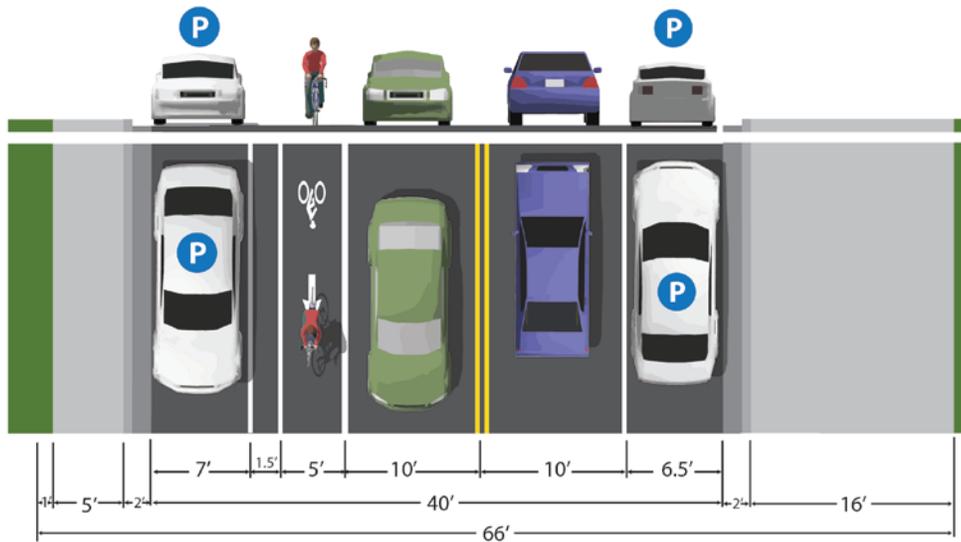
B3



50' STREET CROSS SECTION
 UPHILL BUFFERED BIKE LANE
 DOWNHILL MARKED SHARED LANE

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

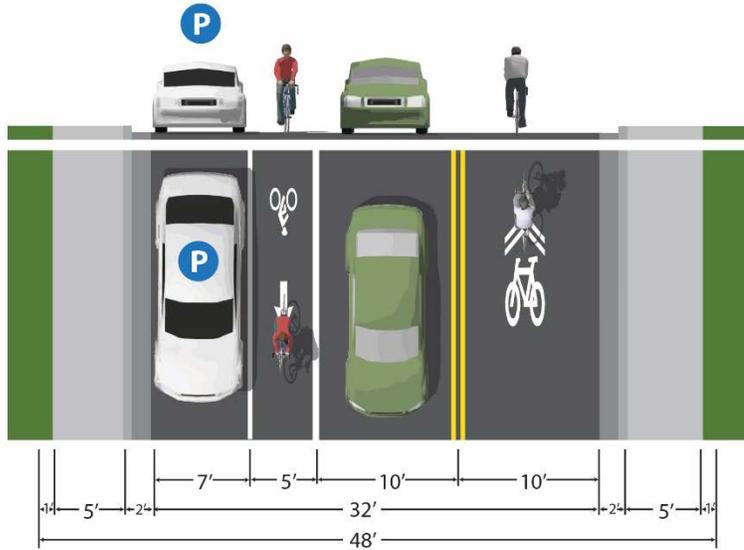
MB1



66' STREET CROSS SECTION
 BUFFERED BIKE LANES WITH LINDON HERITAGE TRAIL

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

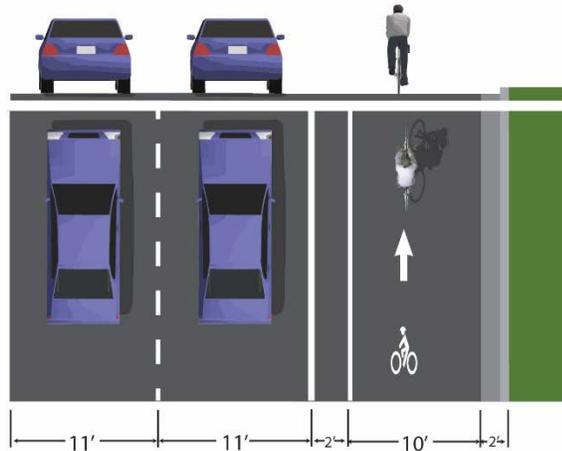
MB3



50' STREET CROSS SECTION
UPHILL BIKE LANE
DOWNHILL MARKED SHARED LANE

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

700



700 NORTH ONE-WAY CROSS SECTION
BUFFERED BIKE LANES

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

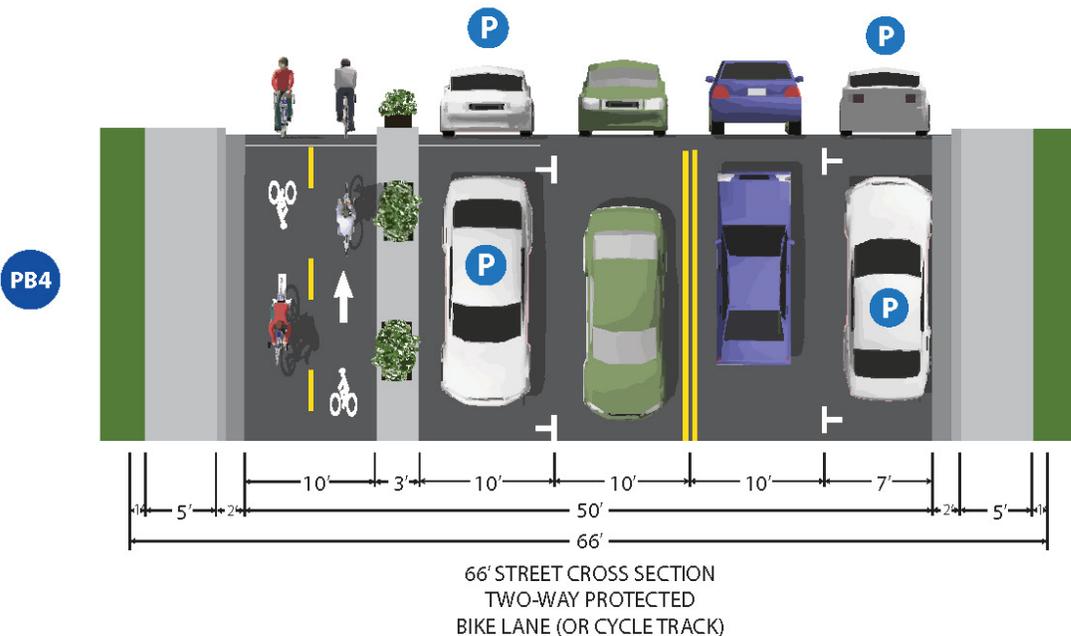
*700 North is proposed as bike lanes in the interim until a shared use path can be constructed.

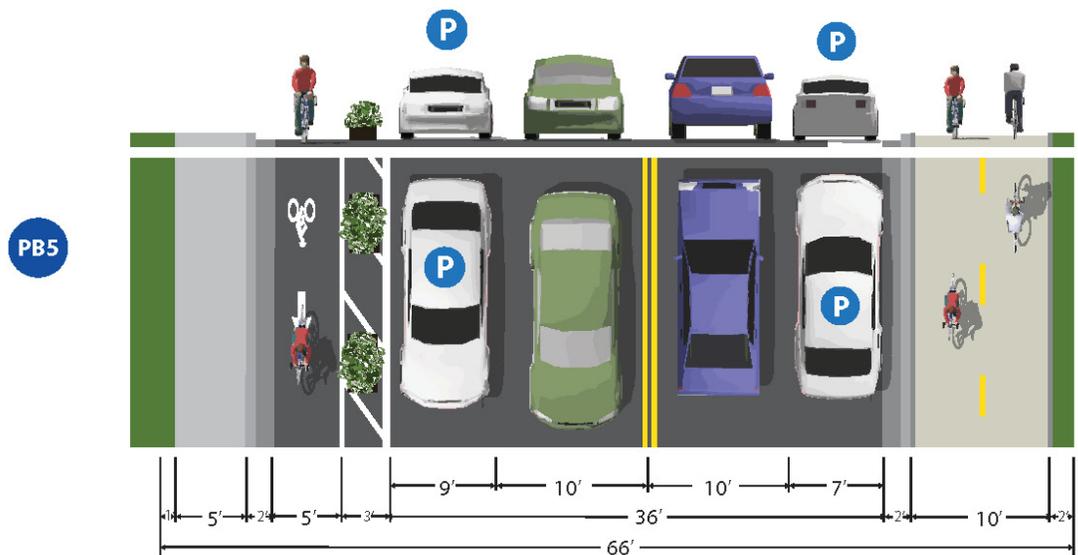


Rendering of Main Street Bike Lanes (at Lindon City Park)

Cycle Tracks

Cycle tracks are separated bikeways adjacent to roadways. They are located within the street right-of-way but are physically separated from auto traffic using curbs, planters, flexible posts, or similar barriers. Pedestrian cross-flow is permitted but vehicular crossings are minimized. Intersection treatments are a very important part of cycle track design and must be designed to ensure safe transition for the bicyclist. Cycle tracks may be one-way, resembling a bike lane, or two-way. Because of these considerations, cycle tracks may require special treatment, such as bicycle signal phases, at intersections. The NACTO Urban Bikeway Design Guide also provides extensive guidance for these facilities.





66' STREET CROSS SECTION
TWO-WAY SIDEPATH
ON 800 WEST (PHASE II)

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.



Rendering of 400 West Cycle Track

Shared Use Pathways

These provide a desirable facility, particularly for novice riders, recreational trips, and cyclists of all skill levels preferring separation from traffic. Shared use paths generally provide new travel opportunities. Shared pathways are paved facilities built in or adjacent to non-roadway rights-of-way such as streams, canals, railroads, and utility corridors. They are completely separated from roads by a buffer (five feet or more) or barriers. Shared pathways provide a completely separated right-of-way for exclusive use of bicycles and pedestrians with cross-traffic minimized to avoid conflicts. However, they are the most expensive bikeway type. The cross-sections for shared pathways are presented as "TBD" (to be determined) as shared pathway cross-sections will determine on available right-of-way and context of environment. For the Geneva Road shared use pathway, it will be integral to provide safe crossings where the path crosses railroad tracks.

Bicycle Project Prioritization

The proposed roadway network was broken into separate projects so that projects could be prioritized and completed incrementally as funds are made available.

Project Evaluation Criteria and Utilization

Prioritization criteria were developed based upon the goals of this plan. The table below lists the criteria and a description of how the criteria were measured. Appendix B contains final scoring results.

TABLE 4 BICYCLE PRIORITIZATION CRITERIA

Criteria	Description	Metric
Public Support	Based on public meeting	Score based on public meeting voting
Serves Key Destinations	Serves public facilities, commercial destinations, trail, and future transit hubs	Score based on how many destinations are within 0.5 miles
Proximity to Schools	Near a school or designated safe route to school	Score based on proximity to a school
Enhances Connectivity/Closes a Gap	Makes a connection that will immediately extend the bicycle network	Score based on whether connects to an existing facility
Connection to Adjacent Communities	Connects to existing or planned facilities in adjacent communities	Score based on whether a connection to an adjacent community was made
Improves Safety Concern	Improves safety issues identified through public process, crash locations from UCATS, or known barriers	Score based on whether a safety concern was met
Construction Feasibility	Based on obstacles such as impacts to right-of-way, on-street parking, etc.	Scored based on relative magnitude of combined obstacles
Cost/Maintenance	Based on cost of implementation and maintenance	Score based on a relative high/medium/low
Ability to Construct as Part of Another Project	Proposed roadway is a near-future rehabilitation project	Score based on whether roadway is on rehabilitation project map

The tables below are organized into: high, medium, and low priority project lists. Projects are listed in descending order with the highest scoring project appearing at the top of the list and the lowest scoring project on the bottom, however this list is non-binding and projects may be implemented out of order. Implementation is expected to occur on an incremental basis as funds become available. As the roadway resurfacing, utility work, and new road projects are put into construction, the City should use these opportunities to implement network segments that require “sign and paint only.” These features can be implemented relatively rapidly at low cost and greatly expand the network, which would both facilitate and encourage increased cycling in the City. Figure 7 shows bicycle projects by priority.

TABLE 5 HIGH PRIORITY BICYCLE PROJECTS

Bikeway	Type	From	To	Length
400 West	Buffered Bike Lane	North end of roadway	200 South	0.6 miles
400 West	Cycle Track	200 South	Southern City Limit	0.5 miles
240 West	Shared Roadway	200 South	Southern City Limit	0.4 miles
Locust Avenue	Buffered Bike Lane	Northern City Limit	400 North	0.6 miles
135 West	Shared Roadway	400 North	State Street	0.2 miles
Main Street	Buffered Bike Lane	Northern City Limit	Center Street	1.0 miles
200 East	Buffered Bike Lane	Northern City Limit	Southern City Limit	1.3 miles
400 East	Buffered Bike Lane	Northern City Limit	Southern City Limit	1.3 miles
1200 East	Buffered Bike Lane	Foothills	Southern City Limit	0.7 miles
400 North	Buffered Bike Lane	State Street	600 East	1.2 miles
400 North	Bike Lane/Shared Roadway	600 East	835 East	0.3 miles
Center Street	Cycle Track	State Street	Main Street	0.1 miles
40 South	Shared Roadway	400 West	State Street	0.5 miles
200 South	Buffered Bike Lane	2000 West	Geneva Road	1.1 miles
200 South ¹	Buffered Bike Lane	800 West	Dry Canyon Drive	2.9 miles

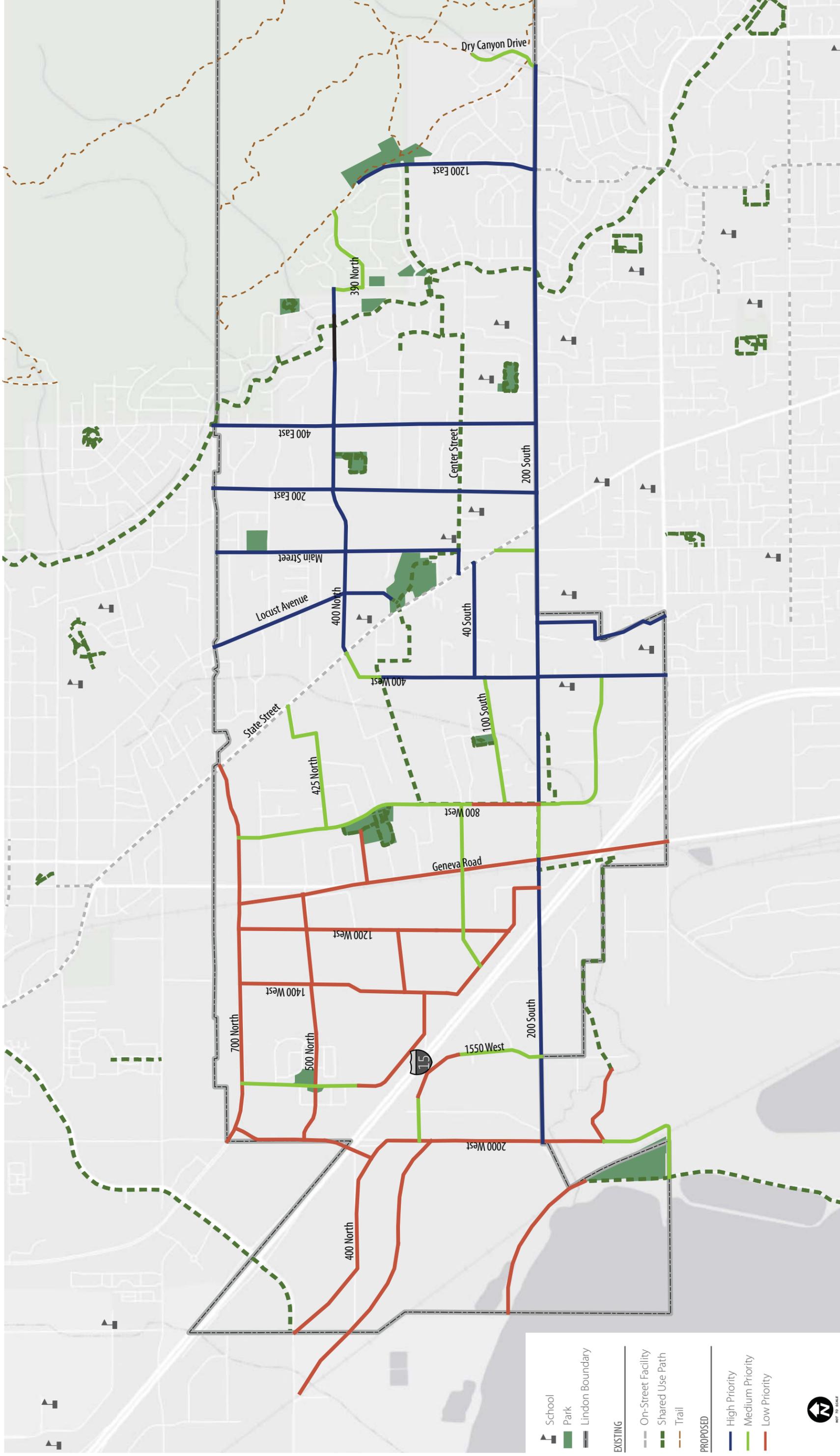
1. At the 200 South and State Street intersection, it is recommended that bike lanes be stripped with dotted lines and chevrons through the intersection for added visibility and safety.

TABLE 6 MEDIUM PRIORITY BICYCLE PROJECTS

Bikeway	Type	From	To	Length
Heritage to Shoreline Trail Connection	Shared Use Path	Shoreline Trail	Lindon Heritage Trail/2000 West	0.5 miles
1550 West	Buffered Bike Lane	North end of roadway	200 South	0.3 miles
1700 West	Buffered Bike Lane	700 North	South end of roadway	0.5 miles
800 West Extension	Cycle Track/Shared Use Path	700 North	425 North	0.3 miles
800 West	Cycle Track/Shared Use Path	425 North	20 South	0.6 miles
Main Street	Buffered Bike Lane	State Street	Southern City Limit	0.2 miles
Dry Canyon Drive	Shared Roadway	Foothills	200 South	0.3 miles
425 North	Shared Roadway	800 West	State Street	0.6 miles
400 West Extension	Buffered Bike Lane	400 West	State Street	0.2 miles
390 North	Shared Roadway	400 North	Foothills	0.5 miles
200 North	Buffered Bike Lane	2000 West	East end of roadway	0.2 miles
Center Street	Buffered Bike Lane	1400 West	800 West	0.7 miles
100 South	Shared Roadway	800 West	400 West	0.5 miles
200 South	Buffered Bike Lane	Geneva Road	800 West	0.2 miles
400 South	Buffered Bike Lane	200 South	400 West	0.7 miles

TABLE 7 LOW PRIORITY BICYCLE PROJECTS

Bikeway	Type	From	To	Length
2000 West	Shared Use Path	700 North	Lindon Heritage Trail	1.5 miles
1400 West Extension	Buffered Bike Lane	700 North	500 North	0.3 miles
1400 West	Buffered Bike Lane	500 North	South end of roadway	0.5 miles
1200 West Extension	Buffered Bike Lane	700 North	Anderson Lane	0.3 miles
1200 West	Buffered Bike Lane	Anderson Lane	135 South	0.8 miles
Geneva Road	Shared Use Path	700 North	Southern City Limit	0.7 miles
800 West	Cycle Track/Shared Use Path	20 South	200 South	0.3 miles
700 North	Shared Use Path	Western City Limit	State Street	1.5 miles
500 North	Buffered Bike Lane	2000 West	Geneva Road	1.0 miles
400 North	Buffered Bike Lane	Western City Limit	2000 West	0.8 miles
Geneva/Park Connection	Shared Use Path	Geneva Road	Pheasant Brook Park	0.2 miles
1700 West Extension	Buffered Bike Lanes	1700 West	1400 West	0.5 miles
Vineyard Connector	Shared Use Path	Western City Limit	2000 West	1.2 miles
200 North Extension	Buffered Bike Lanes	200 North	1550 West	0.2 miles
180 North	Buffered Bike Lanes	1400 West	1200 West	0.2 miles
Western Coil Road	Buffered Bike Lanes	1400 West	1200 West	0.4 miles
135 South	Buffered Bike Lanes	1200 West	200 South	0.3 miles
Lakeshore Connection	Shared Use Path	Western City Limit	Lakeshore Trail	0.6 miles
Lindon Heritage Trail Connection	Shared Use Path	2000 West	Lindon Heritage Trail	0.3 miles



- School
 - Park
 - Linton Boundary
- EXISTING**
- On-Street Facility
 - Shared Use Path
 - Trail
- PROPOSED**
- High Priority
 - Medium Priority
 - Low Priority



Pedestrian Facilities

The provision of basic pedestrian infrastructure, such as sidewalks, is essential to creating a comfortable walking environment. It is also critical to provide sidewalks to serve those who cannot drive or bike, for whatever reason. This sidewalk prioritization guides the City's efforts towards the areas where there is likely to be the most walking activity using available citywide data. By constructing sidewalks in these areas first, the City provides a greater immediate benefit to pedestrians.

Width Recommendations

A 5' width is recommended as the baseline sidewalk standard. In areas with heavy pedestrian activity, sidewalks over 5' may be preferred to accommodate pedestrians both walking side-by-side and passing one another. In residential areas, 5' sidewalks are generally sufficient. In some instances it may be allowable to have spot locations of sidewalk with narrower widths than 5', but these locations should be minimized or avoided altogether. The Americans with Disabilities Act requires that public rights-of-way maintain a minimum width of at least 4', which should be clear of obstructions such as vegetation, signs or utility poles.

Methodology

The proposed system was developed according to the following methodology:

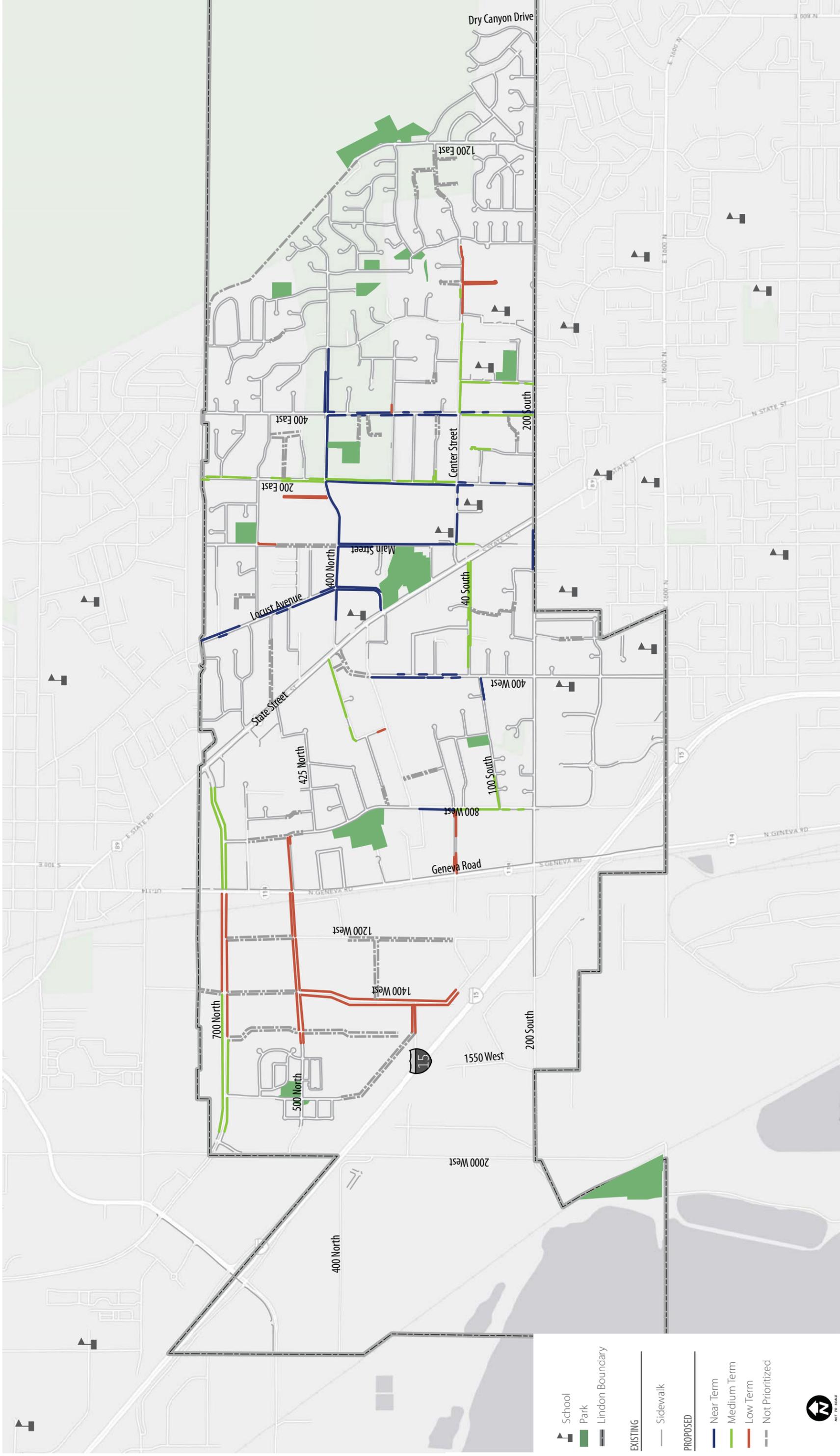
1. The project team referred to the following vision statement when developing the pedestrian network: ***"Lindon will encourage a community that values healthy mobility options and a high quality of life through the promotion of a safe and well-connected bicycling and pedestrian network."***
2. Gaps in the sidewalk network were identified through existing geospatial sidewalk data.
3. Corridors for prioritization were selected based on the input gathered from the Steering Committee and the public and corridors with access to destinations such as schools, parks, trails, and commercial areas. Residents should be able to walk from home to both local and regional destinations.
4. The preliminary pedestrian network was reviewed to ensure closure of gaps within the network, addressing of safety concerns, and access to schools. The system should provide safe and equitable access from all areas of the City to both commute and recreation destinations.
5. The pedestrian network was reviewed with the Steering Committee and checked to ensure connectivity within Lindon.
6. Roadways that would be constructed in association with a developer were not prioritized.

Prioritize Sidewalks Gaps in the Network

The proposed roadway network was broken into separate projects so that projects could be prioritized and completed incrementally as funds are made available.

Project Evaluation Criteria and Utilization

Prioritization criteria were developed based upon the goals of this plan. The proposed Lindon pedestrian network is shown in Figure 8. The table below lists the criteria and a description of how the criteria were measured.



Proposed Pedestrian Facilities by Phase
figure 8

TABLE 8 PEDESTRIAN PRIORITIZATION CRITERIA

Criteria	Description	Metric
Public Support	Based on public meeting	Score based on public meeting ranking
Location on Major Roadway	Location on roadway with high traffic volumes, number of lanes, or speed	Score based on whether gap is located along major roadway
Proximity to Schools	Near a school or designated safe route to school	Score based on proximity to a school or designation
Proximity to Park	Near a park or recreation facility	Score based on proximity to a park
Proximity to Commercial Area	Within or near a commercial area	Score based on commercial area
Closure of Gap	Connection between two existing sidewalks on same side of street	Score based on whether a gap was closed
Construction Feasibility	Based on obstacles such as impacts to right-of-way, on-street parking, and power pole relocation	Scored based on relative magnitude of combined obstacles

The tables below are organized into: near, medium, and long term improvements project lists. Projects are listed in descending order with the highest scoring project appearing at the top of the list and the lowest scoring project on the bottom, however this list is non-binding and projects may be implemented out of order. Implementation is expected to occur on an incremental basis as funds become available.

TABLE 9 NEAR TERM PEDESTRIAN PROJECTS

Roadway	From	To	Distance
800 West	100 North	Center Street	0.13 miles
400 West	Lakeview Road	40 South	0.57 miles
Locust Avenue/135 West	Northern City Limit	State Street	0.98 miles
Main Street	400 North	Center Street	0.57 miles
200 East (west side only)	400 North	Center Street	0.49 miles
200 East	Center Street	200 South	0.19 miles
400 East	400 North	Center Street	0.61 miles
400 East (east side only)	Center Street	200 South	0.19 miles
400 North	State Street	600 East	1.15 miles
Center Street	Main Street	200 East	0.17 miles
100 South	450 West	400 West	0.08 miles
200 South	70 West	State Street	0.15 miles

TABLE 10 MEDIUM TERM PEDESTRIAN PROJECTS

Roadway	From	To	Distance
800 West	Center Street	200 South	0.18 miles
Main Street	Center Street	State Street	0.07 miles
200 East	Northern City Limit	400 North	0.47 miles
200 East (east side only)	400 North	Center Street	0.04 miles
300 East	50 South	100 South	0.09 miles
400 East (west side only)	Center Street	200 South	0.27 miles
500 East	Center Street	200 South	0.20 miles
700 North (north side only)	Western City Limit	1400 West	0.53 miles
700 North (south side only)	Western City Limit	1500 West	0.33 miles
700 North	Geneva Road	785 West	0.77 miles
Gillman Lane	Gillman Lane	State Street	0.29 miles
60 North	200 East	Approx. 0.04 miles east of 200 East	0.06 miles
Center Street	400 East	700 East	0.32 miles
Center Street	800 East	850 East	0.03 miles
40 South	400 West	State Street	0.94 miles
100 South	800 West	680 West	0.13 miles

TABLE 11 LONG TERM PEDESTRIAN PROJECTS

Roadway	From	To	Distance
400 West	500 North	Western Coil Road	1.97 miles
Gillman Lane	Gillman Lane	Lakeview Road	0.03 miles
Main Street	600 North	550 North	0.07 miles
150 East	Northern end of roadway	400 North	0.33 miles
800 East	Center Street	Southern end of roadway	0.43 miles
700 North (south side of roadway)	1500 West	1400 West	0.16 miles
700 North	1400 West	Geneva Road	0.77 miles
500 North	1500 West	Geneva Road	1.08 miles
500 North	Geneva Road	800 West	0.23 miles
200 North	400 East	425 East	0.03 miles
180 North	1700 West	1400 West	0.99 miles
10 North	Geneva Road	800 West	0.26 miles
Center Street	725 East	850 East	0.25 miles

Bicycle Parking

Bicycle parking generation recommendations were created based on the City’s existing code and can be adopted as an ordinance. Incorporating such requirements into municipal code is one way to increase the supply of bicycle parking in Lindon. Bicycle parking should be required for all uses to encourage the use of bicycles by providing safe, convenient, and readily accessible places to park. The same land use codes that the City currently uses for automobile parking were used to provide short- and long-term parking generation requirements and recommendations. Short-term parking is most appropriate when the parking duration will be less than two hours. Short-term bicycle parking should consist of a bicycle rack or racks and is meant to accommodate visitors, customers, messengers, and others expected to park not more than two hours. If longer than two hours, long-term parking is recommended. Each long-term bicycle parking space should consist of a locker or a rack located within a locked enclosure, such as a secure room or controlled access area, providing protection for each bicycle from theft, vandalism, and weather. Long-term bicycle parking is meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours. Appendix C contains the proposed code language. Figure and table references in the code reference the City ordinances and not this document.



Source: BikePortland.org

Pedestrian and Bicycle Amenities

Pedestrian and bicycle networks can be supported through amenities such as lighting, trash cans, water fountains, and benches. Figure 4 depicts existing conditions of amenities in Lindon City. To better discern and understand public perception and potential use of streetscape amenities throughout Lindon, a visual presentation and tally sheet were produced for the Steering Committee and the public at open houses. Each participant at the meetings was issued a tally sheet containing a collection of potential amenity images. In progression and order of amenity type, the members were shown a grouping of amenities and then asked to select their favorite and least favorite in accordance to their likes/dislikes, as well as their knowledge of Lindon's current system needs. The results of both groups were overall quite consistent, and the results are summarized in the following section.

Amenities Groups

Amenities Group 1 – Signage & Wayfinding

System Map: Both groups indicated strong desire for the system map type sign as found in Lindon View Park. This type of signage lends a comprehensive overview of park and trail systems and highlights points of interests of the area. It both directs and informs the user.

Direction and Wayfinding: This was the most popular selection at Open House # 1, although it received fewer votes from the Steering Committee. It was also requested that distance and time be included with the destinations.

Interpretive: this signage option was least favored. It is assumed this is because Lindon currently has signage along the Heritage Trail and at other historical locations describing City landmarks.



Amenities Group 2 – Bicycle Fixtures

Bike Rack: The overwhelming preferred bicycle amenity was bike racks. They provide safe, secure places to lock bicycles, such as a shopping center near a transportation facility. Currently many parks and other public facilities are without bike racks. In some instances bike racks may exist and should be considered for expansion.

Bike Lockers: These provide secure storage options and were also considered but not favored in the survey results.

Bike Repair Station: Though this amenity affords a convenient means for bike users to fix and repair most bicycle issues on site, it was not deemed a necessary inclusion to the selections.

Amenities Group 3 – Pedestrian Fixtures

Benches: Styles and materials vary; from wood to metal to concrete, this amenity was chosen for its potential to highlight its designated context within Lindon and provide rest and respite from physical activities.



Drinking Fountain(s): Provides utility for users of all ages and abilities, and was the top response at Open House # 1.

Picnic Tables: These provide opportunities for dining, relaxing, and conversing but not required at present due to existing inventory within Lindon.

Amenities Group 4 – Safety Features

Overhead Street Lighting: This is a critical safety component to ensure pedestrian safety and was overwhelmingly chosen as the priority as a safety feature.



Bollards: This amenity did not summon the enthusiasm as a principle choice for safety enhancement.

Emergency Call Box: It was felt that this amenity would not be required as cell phone use is nearly ubiquitous among Lindon City residents.

Amenities Group 5 – General Fixtures

Pedestrian Canopy: The consensus was in support of more pedestrian shelters throughout the community – at parks, trails and along important thoroughfares.



Trash Receptacle: A highly valued amenity, however, not the priority as existing facilities meet the current demand.

Ornamental Vegetation: Although valued by some, it was not the majority choice for a general fixture.

Amenities Group 6 – Recreation Opportunities

Bike Park: The City currently has a wealth of parks and open spaces, but they tend to provide similar offerings such as turf grass, picnic seating and playground equipment. A bike park was highly valued as a potential destination and specialization within Lindon's recreational offerings.



Pocket Parks: While this amenity was highly requested by members of the Steering Committee, the public at-large did not feel the same level of interest in developing more of pocket parks as neighborhood amenities.



Demonstrative Art Works: This amenity was not highly warranted for impending use.

Amenity Recommendations

The amenity recommendations are based upon survey results and discussion with the Steering Committee.

Amenities Group 1: Signage & Wayfinding

Amenities in this grouping are generally co-located together, with the goal of assisting system users with finding key destinations in Lindon City.

- Way-finding Amenity – Placed at key intersections to guide users.
- Signage – Placed at key destinations to identify location to users

Amenities Group 2: Bicycle Fixtures

Amenities in this group should be placed strategically to improve the use of the system for bicyclists.

- Bike Rack Amenity – Provide safe secure place to lock bicycles at key destinations. Destinations may include parks, shopping centers, and City facilities.

Amenities Group 3: Pedestrian Fixtures

Pedestrian fixtures are typically placed strategically to improve the use of the system for pedestrians. These often may be placed at or near a key destination. These may also be located at key intersections/nodes where long distances may exist to nearest destination.

- Bench/Seating Amenity – Provide location for users to stop/rest along system transportation facilities, sometimes used in conjunction with a canopy.
- Drinking Fountains – Provide hydration opportunities for users along system transportation facilities, or destinations, where other sources do not exist.

Amenities Group 4: Safety Features

Safety features are suggested uniformly across the system as safety is a primary consideration for the entire system.

- Overhead Street Lighting Amenity – Increase safety and security at locations along system transportation facilities (primarily along streets or other primary facilities) where automobile oriented lighting isn't sufficient. These often may include key intersections or specifically where users might stop.
- Bollards – Increase safety and security at locations along system transportation facilities where supplemental lighting is needed. These may include parks or other highly used routes approaching a busy destination where extra lighting may prevent conflicts between different modes of transportation. Bollards are typically 24"-48" tall, and are used to provide human-scale lighting for pedestrians and cyclists without unnecessary light trespass of taller fixtures.

Amenities Group 5: General Fixtures

- Pedestrian Canopy Amenity – Placed at key locations where users might stop to rest or may require protection from inclement weather. These may be used in conjunction with pocket parks and benches.
- Trash Receptacle Amenity – Provide location for trash to be deposited where other trash facilities are not likely.

Amenities Group 6: Recreation Opportunities

The desire for a bike park was frequently mentioned by the public at-large at public Open House # 1. Although Lindon City currently does not have a bike park, Pleasant Grove has plans for a bike park on their eastern City boundary. The intended site is located very near to the Murdock Canal Trail and would only be approximately 2.5 miles from the northern boundary of Lindon City, thus providing reasonable access for those who desire to utilize this facility in the future. If Lindon City determines that a bike park would be a desired facility by members of the community, further discussions should take place regarding maintenance, scope and location.

One potential location could be on the City-owned property adjacent to Utah Lake along Vineyard Road. This would co-locate the bike park with other recreational activities encouraging its use by building a critical mass of outdoor, active recreation opportunities. It also provides access to Lindon residents on the west side of the City, who may not want to travel to Pleasant Grove to access a bike park facility. Additional potential locations could be explored on the east side of town near Dry Canyon or Sumac Hollow.

Prospective Amenity Locations

The Steering Committee and the public at-large both supported adding more amenities for bicyclists and pedestrians throughout Lindon. Existing amenity locations have been shown and detailed on the Amenity Existing Conditions map and will help guide future amenity locations within Lindon City.

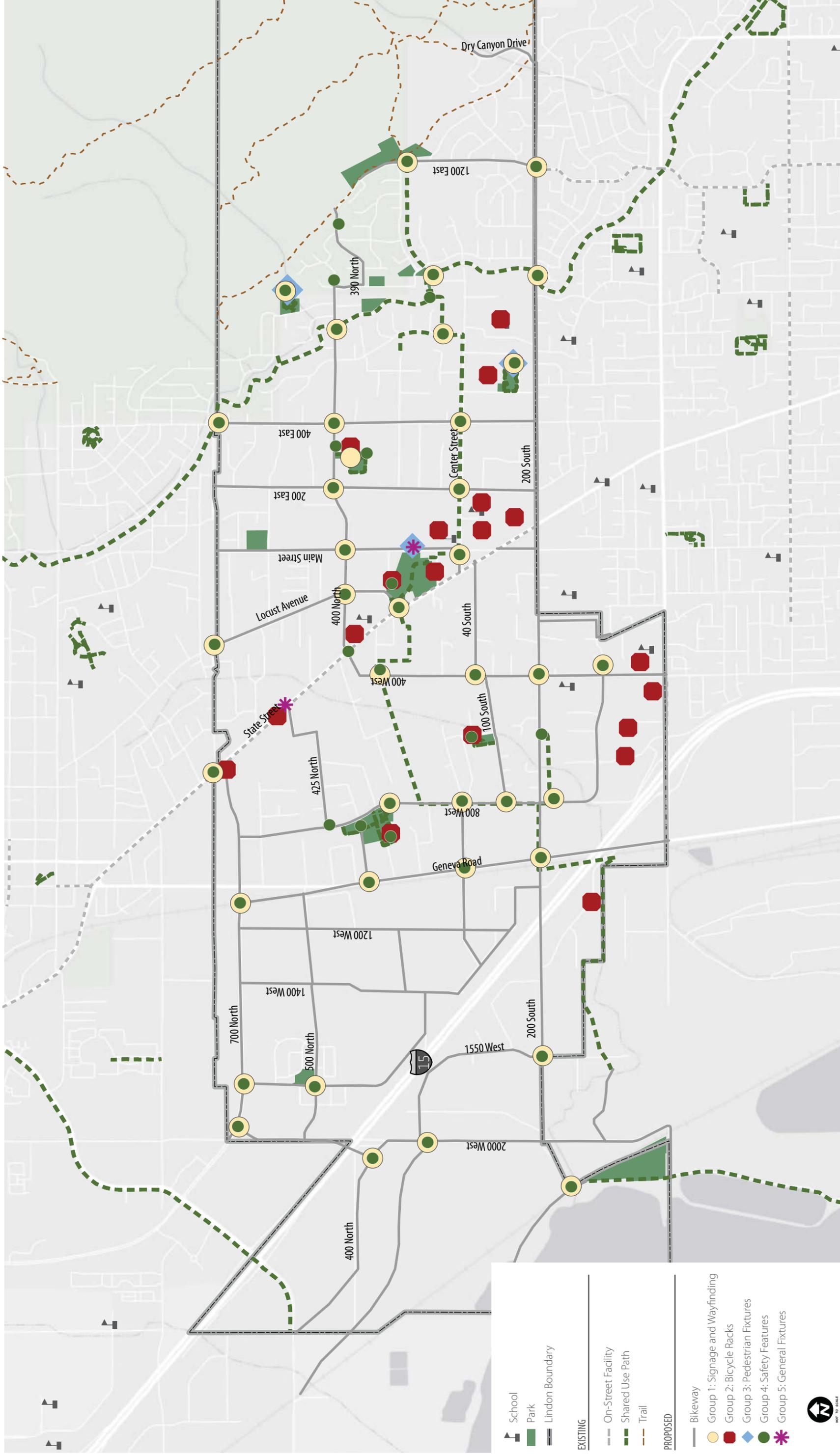
Potential recommendations for future amenity locations may include, but are not limited to:

- At public facilities such as parks, public schools, and community resources where amenities are currently lacking based on existing conditions survey;
- Future/planned facilities which will require amenities for safety and convenience;
- Existing facilities which anticipate an increased number of potential users;
- Specific locations mentioned by members of the public including Lindon Community Center, Dry Canyon Trailhead and Geneva Resort / Lindon Boat Harbor.

It should be noted that not all amenity types are recommended at each location where amenities will be added. Selections have been made within context of the user, location and proximity and need of the amenity.

Figure 9 indicates the general location in the City where specific amenity groups are recommended. The map indicates a different symbol for each amenity group type, located in a manner to best afford Lindon City a reasonable allotment of amenities within the city-wide active transportation system. In many instances on the recommended amenity locations, multiple types are recommended thus symbols are overlapping. In some cases amenities suggested are near shopping centers or other destinations. The exact location of a bike rack, for example, might be within a parking area owned by a private business. The City should coordinate with the business to find an appropriate mechanism for adding the amenity recommended. A high percentage of the amenities will be located on highly-used routes, to be of most value to the highest number of users. The criteria used to generally select the locations are as follows:

- Proximity to existing and/or proposed bicycle facilities
- Potential number of users along a facility
- Adjacency to multiple facilities (primarily intersections)
- Proximity to adjacent destinations



Proposed Amenities
figure 9

Not all amenity types are recommended at each location where amenities should be added. A detailed list of locations is shown in Table 12. Some locations are specific destinations, while others are general corridors. Lindon City may determine exact location, frequency, etc. for the amenities based on their vision and desires for their community as well as limiting factors such as budget and schedule.

TABLE 12 AMENITIES LOCATIONS TABLE

Amenities Location Table	Group 1: Signage & Wayfinding		Group 2: Bicycle Fixtures	Group 3: Pedestrian Fixtures		Group 4: Safety Features		Group 5: General Fixtures		Group 6: Recreation Opportunities
	System Map	Wayfinding	Bike Racks	Benches	Drinking Fountains	Lighting	Bollards	Canopy	Trash Receptacle	Bike Park
Vineyard Connector	X	X				X				
Geneva Road	X	X		X		X				
Locust Avenue	X	X		X		X				
Main Street	X	X	X	X		X	X	X	X	
State Street	X	X	X			X		X	X	
2000 West	X	X				X				
1700 West	X	X				X				
1550 West	X	X				X				
800 West	X	X				X				
400 West	X	X	X			X				
200 East	X	X				X				
400 East	X	X				X				
700 East	X	X				X				
1200 East	X	X				X				
Geneva Park Connection	X	X				X				
Center Street	X	X	X			X				
Vineyard Road/600 South/Lindon Marina										X*
700 North	X	X				X				
500 North	X	X				X				
425 North			X			X				

TABLE 12 AMENITIES LOCATIONS TABLE

Amenities Location Table	Group 1: Signage & Wayfinding		Group 2: Bicycle Fixtures	Group 3: Pedestrian Fixtures		Group 4: Safety Features		Group 5: General Fixtures		Group 6: Recreation Opportunities
	System Map	Wayfinding	Bike Racks	Benches	Drinking Fountains	Lighting	Bollards	Canopy	Trash Receptacle	Bike Park
400 North	X	X				X				
390 North						X				
40 South	X	X	X			X				
100 South			X			X				
200 South	X	X		X		X				
400 South	X	X	X			X				
Pheasant Brook Park	X		X	X	X	X	X			
Creekside Park	X		X			X				
Lindon City Park	X		X							
Pioneer Park	X		X		X					
Citizenship Park	X				X	X		X		
Park Hollow	X	X	X							
Community Center			X							
Lindon Aquatics Center	X		X							
Heritage Trail		X	X	X	X		X			

* Potential location only, discussed further in text.

funding and implementation

Implementation of the proposed bicycle and pedestrian system will require funding from local, regional, state, and federal sources and coordination with multiple agencies. To facilitate funding efforts, this section presents conceptual cost estimates for the proposed system along with a brief description of past expenditures for bicycle and pedestrian facilities. The conclusion of this section provides a brief overview of overall funding and implementation strategies.

As infrastructure projects come under construction, the City should use opportunities such as roadway repaving or utility work to implement network segments that require limited changes or consist of “sign and paint only.” These features can be implemented relatively rapidly at low cost and greatly expand the network, which would both facilitate and encourage increased cycling in the City. This approach allows the City to implement more of the plan at a quicker pace, with the intent of effectively providing alternative mobility choices.

Bikeway Costs

Planning-level cost estimates for high-priority facilities listed in the plan were developed for each of the identified categories:

- Shared Lane Markings (Sharrow)
- Bike Lane/Sharrow
- Buffered Bike Lane
- Cycle Track

Each high-priority proposed facility was assigned to one of the categories, and a per-mile construction cost for each category was developed. These estimates include the following assumed additional factors:

- Design/Engineering 15%
- Mobilization 5%
- Construction Management 10%
- Contingency 25%

For purposes of this Plan, conceptual costs for the proposed system were based on the following assumptions:

Shared Lane Markings (Sharrow): This category assumes signage and shared-use pavement markings (“sharrows”) along the length of the route at intervals of 200 feet in each direction and at intersections. This assumes that the roadway does not require rehabilitation or maintenance. The assumed unit cost is **\$10,560 per mile**.

Bike Lane/Sharrows: This category assumes that there is sufficient curb-to-curb width to install the bike lane and bike stencils, but that modifications to existing striping would be necessary to make room. It assumes that the road is in good condition and doesn't require maintenance or rehabilitation as part of the striping project. The cost is **\$54,800 per mile.**

Buffered Bike Lane (Striping Only): This category assumes that adequate space exists along the roadway to simply add bike lane striping and markings without modifying the roadway further. It assumes that the striping will be completed as part of a scheduled resurfacing or widening project and therefore does not include cost to remove existing striping. No modifications to intersection signal equipment are assumed. The cost is **\$29,600 per mile.**

Buffered Bike Lane (Restriping): This category assumes that there is sufficient curb-to-curb width to install the bike lane, but that modifications to existing striping would be necessary to make room. This includes removal of existing striping and installation of new striping. No modifications to intersection signal equipment are assumed. The cost is **\$116,700 per mile.** For 1200 East, there is only a double stripe in the center and no edge striping, so the cost would be **\$86,700 per mile.**

Cycle Track: This category assumes that adequate space exists along the roadway to simply add striping and markings. It assumes a new centerline, cycle track centerline, two edge lines to separate bicycles and traffic, bike stencils at driveways and on both ends, and soft hit posts every 15 feet. The cost is **\$89,814 per mile.**

Table 13 summarizes the total conceptual costs of the entire proposed network. Construction of the high-priority system would require approximately \$825,900. Note that some cost estimates for facility types are higher or lower than a direct multiplication of the unit cost and mileage. Some of the proposed facilities include other design elements that change the cost from a direct multiplication of unit cost and mileage.

TABLE 13 HIGH PRIORITY BICYCLE PROJECT COST

Bikeway	Type	From	To	Length	Cost
400 West	Buffered Bike Lane (Restriping)	North end of roadway	200 South	0.6 miles	\$73,000
400 West	Cycle Track	200 South	Southern City Limit	0.5 miles	\$45,100
240 West	Shared Lane Markings	200 South	Southern City Limit	0.4 miles	\$3,800
Locust Avenue	Buffered Bike Lane (Striping)	Northern City Limit	400 North	0.6 miles	\$16,500
135 West	Shared Lane Markings	400 North	State Street	0.2 miles	\$2,000
Main Street	Buffered Bike Lane (Striping)	Northern City Limit	Center Street	1.0 miles	\$28,200
200 East	Buffered Bike Lane (Striping)	Northern City Limit	Southern City Limit	1.3 miles	\$37,800
400 East	Buffered Bike Lane (Striping)	Northern City Limit	Southern City Limit	1.3 miles	\$37,600
1200 East	Buffered Bike Lane (Restriping)	Foothills	Southern City Limit	0.7 miles	\$62,200
400 North	Buffered Bike Lane (Striping)	State Street	600 East	1.2 miles	\$34,900
400 North	Bike Lane/Sharrows	600 East	835 East	0.3 miles	\$15,500
Center Street	Cycle Track	State Street	Main Street	0.1 miles	\$8,300

TABLE 13 HIGH PRIORITY BICYCLE PROJECT COST

Bikeway	Type	From	To	Length	Cost
40 South	Shared Lane Markings	400 West	State Street	0.5 miles	\$4,900
200 South	Buffered Bike Lane (Restriping)	2000 West	Geneva Road	1.1 miles	\$131,300
200 South	Buffered Bike Lane (Restriping)	800 West	Dry Canyon Drive	2.9 miles	\$342,600

Sidewalk Costs

Table 14 provides a cost summary for the construction of high-priority sidewalk connections in Lindon. These estimates are based on \$80 per linear foot for a 5-foot sidewalk and curb and gutter and an approximate 25 percent increase to account for engineering, construction management, and inspection, and 25 percent increase for contingency costs, bringing the total to \$120 per linear foot. Construction of the proposed near-term pedestrian improvements would require approximately \$3,345,500. The City will develop more detailed estimates following the preliminary engineering stage as individual projects advance towards implementation.

TABLE 14 NEAR TERM PEDESTRIAN PROJECT COST

Roadway	From	To	Distance	Cost
800 West	100 North	Center Street	0.13 miles	\$82,400
400 West	Lakeview Road	40 South	0.57 miles	\$361,200
Locust Avenue	Northern City Limit	State Street	0.98 miles	\$621,000
Main Street	400 North	Center Street	0.57 miles	\$361,200
200 East (west side only)	400 North	Center Street	0.49 miles	\$310,500
200 East	Center Street	200 South	0.19 miles	\$120,400
400 East	400 North	Center Street	0.61 miles	\$386,500
400 East (east side only)	Center Street	200 South	0.19 miles	\$120,400
400 North	State Street	600 East	1.15 miles	\$728,700
Center Street	Main Street	200 East	0.17 miles	\$107,800
100 South	450 West	400 West	0.08 miles	\$ 50,700
200 South	70 West	State Street	0.15 miles	\$95,100

Funding Sources

Many funding sources are potentially available at the federal, state, regional, county, and local levels for Lindon to implement the projects in the Bicycle and Pedestrian Master Plan. The majority of public funds for bicycle and pedestrian projects are derived through a core group of federal and state programs. Federal funds from the Surface Transportation Program (STP), Transportation Alternatives (TA), and Congestion Mitigation Air Quality (CMAQ) programs are allocated to UDOT and Mountainland Association of Governments and distributed by those agencies at their discretion. Other programs such as the TIGER (Transportation Investments Generating Economic Recovery) grants can be used for “shovel ready” projects that meet federal transportation goals. County or City funds may also be used to construct bicycle and pedestrian facilities.

Table 15 provides a list of funding sources that may be applicable to projects identified in this plan. Most of these sources are highly competitive and require the preparation of applications. For multi-agency projects, applications may be more successful if prepared jointly with other local and regional agencies.

The City should also take advantage of private contributions, if appropriate, in developing the proposed system. This could include a variety of resources, such as volunteer labor during construction, right-of-way donations, or monetary donations towards specific improvements.

TABLE 15 FUNDING OPPORTUNITIES

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Municipal Funds				
Bond Financing	Varies	Varies	Varies	Bonds can be approved by voters to fund a range of projects. A local successful precedent is the 2012 Parks and Trails Bond in Salt Lake County, which authorized \$47 million in bond funds to complete the Jordan River Parkway, the Parley's Trail, and acquire land for and construct new parks throughout the County.
Sales Tax	Varies	Varies	Varies	It is possible to pass a specified sales tax that could be used to fund active transportation improvements. Precedents include the San Diego region, which approves a half-cent sales tax in 2008 to generate funds for highway, transit, and local road (including bicycle and pedestrian) projects; and the Great Rivers Greenway in the St Louis area, where voters passed a proposition in 2000 to create a 0.1% sales tax for parks, open space and trails.

TABLE 15 FUNDING OPPORTUNITIES

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Special Assessment or Taxing Districts	Varies	Varies	Local Government	Local municipalities can establish special assessment districts for infrastructure improvements. For example, Urbandale, Iowa established a special assessment program in 1996 for building sidewalks in existing developments where they were missing. Exception clauses allowed residents to apply for hardship status, or to allow residents to petition for sidewalks on only one side of the street rather than both.
Parking Fees	Varies	Varies	Local Government	Some cities have instituted parking fees to pay for infrastructure improvements. Pasadena, CA installed paid parking meters to gather revenue to maintain streets, alleys, and sidewalks in Old Pasadena, and also to provide new signs, lighting, pedestrian-friendly alleys, and other aesthetic improvements.
Development Impact Fees	Varies	Varies	Local Government	Development impact fees are one-time charges collected from developers for financing new infrastructure construction and operations and can help fund bicycle and pedestrian improvements. Impact fees are assessed through an city's impact fee program
New Construction	Varies	Varies	Local Government	Future road widening and construction projects are methods of providing bike lanes. To ensure that roadway construction projects provide bike lanes and walkways where needed, it is important that the review process includes a designated bicycle and pedestrian coordinator. Planned roadway improvements in Lindon should provide bikeways in the City.
State Funds				
ADA Ramps	ADA-related improvements	For missing ADA ramps on State routes only	UDOT	Applications are submitted to the Region Coordinator. Missing ramps can be found in the UDOT database from a recent survey of ramps. (http://udot.utah.gov/main/uconowner.gf?n=13652716548952568)
Safe Sidewalks Program	Sidewalks	Sidewalks on State routes only	UDOT	Applications are submitted to the Region Safe Sidewalk Program coordinator and require scope and cost estimate. Local jurisdiction must agree to maintenance and the sidewalk must be built within one year of money allocation. (http://www.udot.utah.gov/main/uconowner.gf?n=104675223364328443)

TABLE 15 FUNDING OPPORTUNITIES

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Community Development Block Grants-State Administered Program	Street improvements	Best if benefits low- or moderate-income populations. Part of a Consolidated Plan.	HUD, State, and Local Government	The Grantee for these grants cannot be a principal city of a metropolitan statistical area, a city with more than 50,000, or a county with a population with more than 200,000. Applications are submitted to the State. (https://www.hudexchange.info/cdbg-state/)
State Legislation	Legislation dependent	Legislation dependent	State of Utah	State legislations can create laws that have dedicated bicycle funding components. Two examples of this are the Oregon "bike bill" which requires including bicycle and pedestrian facilities when any road, street or highway is built or rebuilt and the California Bicycle Transportation Account, which provides state funds to cities and counties wishing to improve safety and convenience for bicycle commuters. (http://oregon.gov/ODOT/HWY/BIKEPED/Pages/bike_bill.aspx and http://www.dot.ca.gov/hq/LocalPrograms/bta/btawebPage.htm)
State Funds				
Transportation Alternatives Program	Bicycle and pedestrian improvements	Funds can be used for construction, planning and design of on- and off-road facilities.	MAG and UDOT	MAG funds are distributed to projects during the Transportation Improvement Plan project selection process. Most TAP projects will have an 80/20 federal/local match split. Projects can include sidewalks, trails, bicycle facilities, signals, traffic calming, lighting and safety infrastructure, and ADA improvements. Rails-to-trails conversions are also allowed. The Recreational Trails Program is included in Transportation Alternatives, as is the Safe Routes to School program. (http://www.fhwa.dot.gov/environment/transportation_alternatives/)
Community Development Block Grants-Entitlement Communities Program	Street improvements	Best if benefits low- or moderate-income populations.	HUD and Local Government	Grantee is a principal city of a metropolitan statistical area, a city with a population over 50,000, or a county with a population over 200,000. Part of a Consolidated Plan. (http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/entitlement)

TABLE 15 FUNDING OPPORTUNITIES

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Surface Transportation Program	Bicycle and pedestrian improvements	Generally not used on local minor collectors with exceptions for bicycle/pedestrian walkways.	UDOT	Concept reports due to MPO for consideration of programming funds. (http://www.fhwa.dot.gov/map21/factsheets/tp.cfm)
Congestion Mitigation and Air Quality	Bicycle and pedestrian improvements	Reduce congestion or improve air quality in nonattainment or maintenance areas by shifting travel demand to non-automobile modes.	MAG	Projects must be included in the TIP. MAG call's for projects from local communities each year. (http://www.fhwa.dot.gov/map21/factsheets/maq.cfm)
Land and Water Conservation Fund	Bicycle and pedestrian trails, or acquisition of land for trails	Projects that create outdoor recreation facilities, or land acquisition for public outdoor recreation.	DNR	The Land and Water Conservation Fund (LWCF) provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities. The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources. 50/50 match is required, and the grant recipient must be able to fund the project completely while seeking reimbursements for eligible expenses. (http://stateparks.utah.gov/resources/grants/land-and-water-conservation-fund)
Federal Lands Access Program	Planning, engineering, construction, and other activities	Projects must be on, adjacent to, or provide access to federal lands.	UDOT	Fund is administered through UDOT in coordination with the Central Federal Lands Highway Division, which develops a Programming Decisions Committee. The Committee prioritizes projects, establishes selection criteria, and calls for projects. Next call for projects is anticipated for 2015. (http://www.cflhd.gov/programs/flap/ut/)
Rivers, Trails, and Conservation Assistance Program	Planning assistance for bicycle and pedestrian projects.	Staff support for facilitation and planning.	National Park Service	Projects need to be related to conservation and recreation, with broad community support, and supporting the National Park Service's mission. Applicants must submit National Park Service applications by August 1 annually, including basic information as well as letters of support. The local contact is Marcy DeMillion, at 801-741-1012 or marcy_demillion@nps.gov .

TABLE 15 FUNDING OPPORTUNITIES

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Passenger Enhancements	Sidewalk projects and bicycle infrastructure	Sidewalk must be within half mile and bike infrastructure must be within three miles of a transit stop	UTA	Funding can be completed in two ways – the lead agency will share in the cost of the construction, if the submitting agency has already done design and is planning to construct. If the project is on a priority sidewalk list for UTA, UTA will design and construct.
Private or Corporate Funds				
Cambia Health Foundation Children’s Health Program	Programs and possibly infrastructure	Projects must improve access to healthy foods, recreation facilities, and encourage healthy behavior for families.	Cambia Health Foundation	Grants are typically in \$50,000 - \$100,000 range. Focus is on programs. Contact foundation staff at cambiahealthfoundation@cambiahealth.org for additional information. (http://www.cambiahealthfoundation.org/programs/childrens-health)
Bikes Belong Foundation	Bicycle infrastructure	Projects must improve the cycling environment	Bikes Belong	Bike Belong have awarded 272 grants to non-profit organizations and local governments in 49 states and the District of Columbia, since 1999.
Community Fundraising	All	Small dollar amounts	Local agency or non-profit	Lead agency manages the details, marketing, and range of a community fundraising campaign. Successful examples include Softwalks' Kickstarter campaign for sidewalk amenities in New York City, and use of volunteer labor for trail construction in Springdale, Utah. Follow link below for more ideas. (http://www.bicyclinginfo.org/funding/sources-community.cfm)

Implementation

Crosswalk Decision Matrix

To assist Lindon in creating safe crosswalks, a crosswalk decision matrix has been created. Appendix D contains guidance for determining where and how to install crosswalks at uncontrolled locations. The crosswalk decision matrix is a toolbox of elements to improve pedestrian mobility, visibility, and safety at uncontrolled locations. It will assist Lindon in making decisions about where basic crosswalks (two stripes) can be marked; where crosswalks with special treatments, such as high visibility crosswalks, flashing beacons, and other special features, should be employed; and where crosswalks will not be marked due to safety concerns resulting from volume, speed, or sight distance issues. This toolbox provides guidance about the type of treatments appropriate on various streets and under various conditions. While the strategies in the toolbox reflect best

practices and local priorities, the toolbox guidance is not meant to replace engineering judgment. Each situation is unique and walking safety treatments must be selected on a case-by-case basis.

Monitoring

This section presents a framework for monitoring the success of implementation of the Plan through benchmarking progress, engaging local advocacy groups, and continuing to generate interest in bicycle and pedestrian issues once a master plan is complete. Evaluation and monitoring allow Lindon to track progress made as it implements the bicycle and pedestrian master plan. Three major components to monitoring bicycle and pedestrian planning efforts should follow plan adoption:

- Tracking progress on implementing planned projects and meeting the master plan’s stated goals;
- Monitoring needs for small-scale spot improvements on bicycle and pedestrian facilities; and
- Monitoring public sentiment and engagement in bicycling and walking issues.

TABLE 16 MONITORING ACTIVITIES

Monitoring Activity	Effort Required
Track plan implementation	Staff time to document projects and policies implemented
Volunteer reporting of maintenance needs	Staff time to receive input and respond to reports
Reactive maintenance	Staff time to respond to maintenance requests
Ongoing Advisory Committee	Staff time to establish policy framework creating an ongoing committee; identify avenue for receiving committee’s feedback; form a committee; and serve as staff liaison at meetings. Committee will set agendas and attend regular meetings.
Ensure project funding through inclusion in Capital Facilities Plan	Staff time to coordinate between planning and budget departments
Proactive maintenance of bicycle and pedestrian facilities	City and/or contractor staff to monitor needs, make needed repairs, plan for funding in municipal public works or operations budgets
Online reporting mechanism for maintenance and repairs	Development of web-based forum to receive public input, staff time to respond to reports
Ongoing local communication around bicycle and pedestrian issues	Maintaining project website, generating new content for website and other communication outlets, developing events to increase participation and enthusiasm, and creating a bicycling ambassadors program
Pursue outside funding for bicycle and pedestrian projects	Staff time to evaluate grant programs, prepare applications, and coordinate with funding agency representatives
Measuring progress by benchmarks	Before-and-after data collection and surveys, review of multiple datasets. Benchmarks could include: <ul style="list-style-type: none"> • Number of people bicycling and walking on off-street facilities • Mileage of on-street bicycle facilities • Percentage of households within ¼ miles of a bicycle facility • Number of pedestrians • Percentage of K-8 students biking and walking to school • Bike parking racks installed in the public right-of-way and with new development

TABLE 16 MONITORING ACTIVITIES

Monitoring Activity	Effort Required
Identify additional financing opportunities for bicycle and pedestrian projects, such as public-private partnerships or impact fees	Staff time to build partnerships, and potential need for outside consultant to identify defensible impact fees and ensure compliance with state and local laws.
Regular bicycle and pedestrian counts	Partner with local advocacy groups, boy scouts, schools, and MAG to conduct annual bicycle and pedestrian counts and an annual monitoring program that reviews and compares these counts. Additionally, Lindon can require that all traffic study counts include bicycles and pedestrians to estimate bicycling levels and changes in bicycling levels over time.
Bicycling and Walking Audits	Conduct bicycle and walking audits as part of outreach strategies for new development projects. A bike/walk audit leads stakeholders on a set course to discuss bicyclist/pedestrian safety concerns and strategies to improve safety.

Plan Implementation

Lindon should regularly revisit their bicycle and pedestrian master plan to review progress in implementing projects. Key review components are described below.

Implementing Projects

City staff should review project implementation within two or three years after plan completion, to document how many High Priority projects have been implemented or are in the process of being implemented, and whether new projects from the plan should be added to current implementation efforts. At five years following plan completion, staff members should again evaluate how many High Priority projects have been implemented. Staff members should not be unduly concerned if something less than 100% of projects have been implemented; however, if only minor progress has occurred since plan completion, an evaluation of possible obstacles might be helpful (see sidebar text on barriers to implementation).

Building Partnerships

Relationships with regional and local transportation agencies such as UDOT, UTA, Mountainland Association of Governments, and other organizations can be helpful for Lindon while attempting to build bicycle and pedestrian networks. Staff members should establish strategic working

Implementation Barriers

Here are some common barriers to implementation, and suggestions for overcoming them.

Low political support

- Engage local advocacy groups, such as PTA's or trail clubs, to show their support. Elected officials may be persuaded by their constituents.
- Take local leaders on a tour of an area that has implemented similar plans.
- Build momentum around a handful of low-risk, low-cost projects.
- Find a project champion within city staff, elected officials, or the business community.

Lack of funding

- Build bicycle and pedestrian facilities (bike lanes, sidewalks, sharrows, etc) into already-planned construction projects.
- Partner with other agencies – UDOT, UTA, MAG, or utility companies - to stretch available funds.

relationships with their counterparts and leadership at these agencies, and at adjacent municipalities. Building partnerships takes time and effort, however, and the results may take some years to come to fruition. Municipalities should take stock of their partnering efforts at the three- to five-year mark following completion of a bicycle and pedestrian master plan. Staff members should re-evaluate their strategies if partnering efforts do not result in some increase of political and agency support of bicycle and pedestrian issues – other strategies or methods of building support may be necessary.

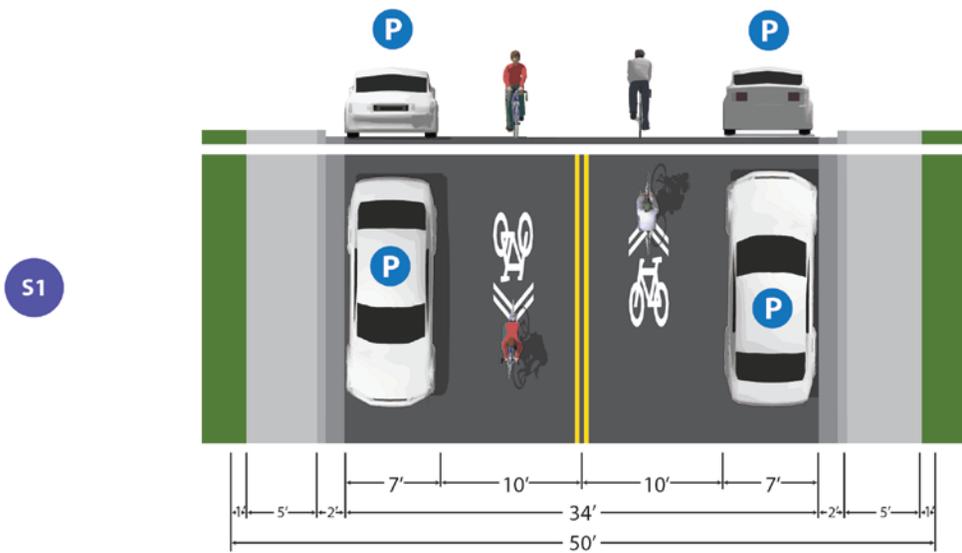
Online Monitoring Feedback

While most local and state transportation divisions have internal methods for monitoring transportation facility conditions, many have additional mechanisms for citizens to report problems. Several online options are available as well. For instance, Salt Lake City has a “Bicycle Route Maintenance Form” online, through which the public can identify cycling routes in need of maintenance work such as sweeping, pothole repair, pavement maintenance, or other problems. The form can be found online through the Salt Lake City Transportation Division website. Other cities, such as Portland Oregon, also seek online feedback on transportation conditions such as desired curb ramps, traffic safety concerns (i.e. speeding, crosswalk needs, visibility, or school zones), and street light problems. Portland’s online forms can be found through the Portland Bureau of Transportation website. Cities may also state timelines for responding to requests – within a day, several days, or a week – which demonstrates a commitment to the public’s traveling needs. Currently, several cities incorporate crowd-sourced or volunteered geographic information (VGI) into maintenance requests. Users can submit requests for repair by sending a GPS-marked photo through a smartphone application, categorizing the photo based on repairs needed (striping, sweeping, pothole repair, etc). Reno, Nevada is one example of a municipality engaging its citizens this way in monitoring for maintenance needs.

appendix a

recommended cross-sections

Shared Lane Markings

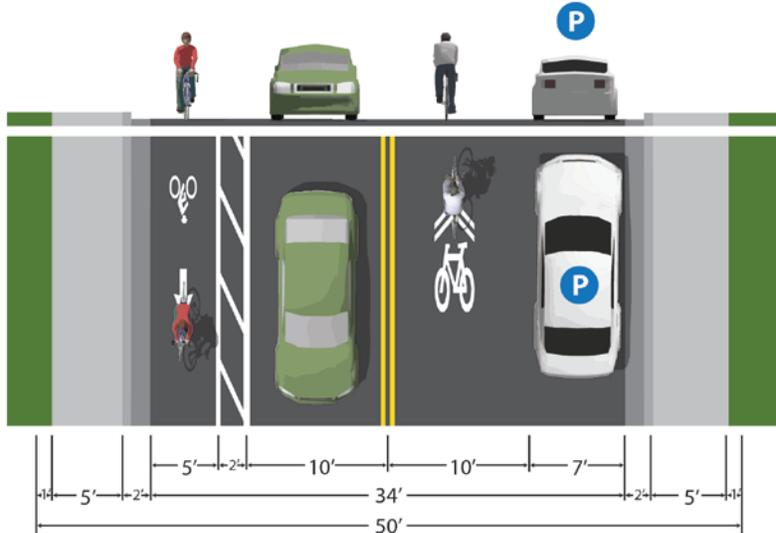


50' STREET CROSS SECTION

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

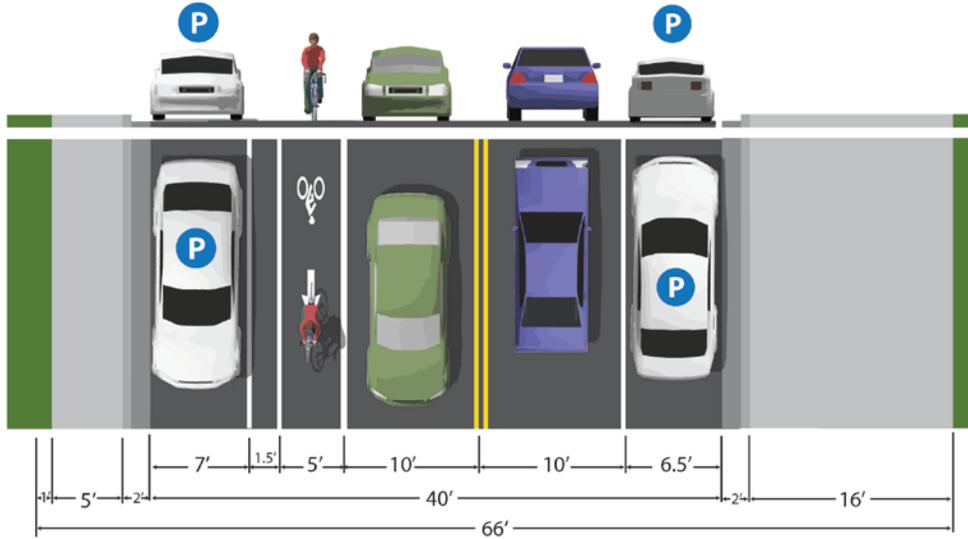
BIKE LANES AND BUFFERED BIKE LANES (cont.)

B3



*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

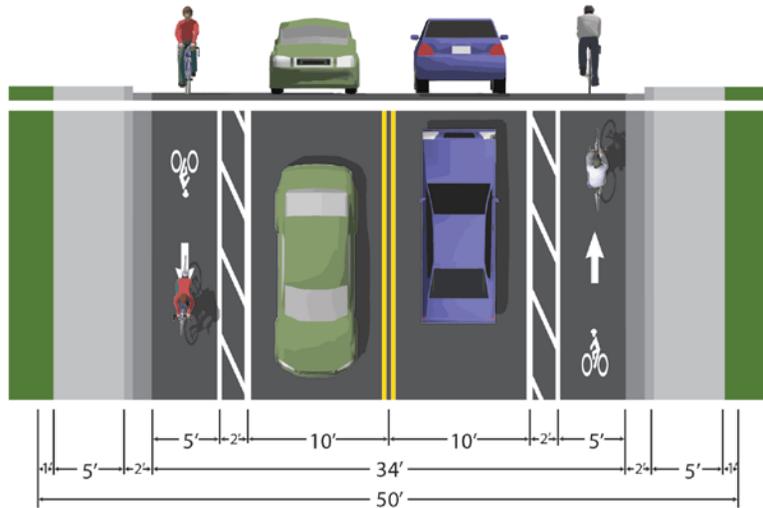
MB1



*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

Bike Lanes and Buffered Bike Lanes

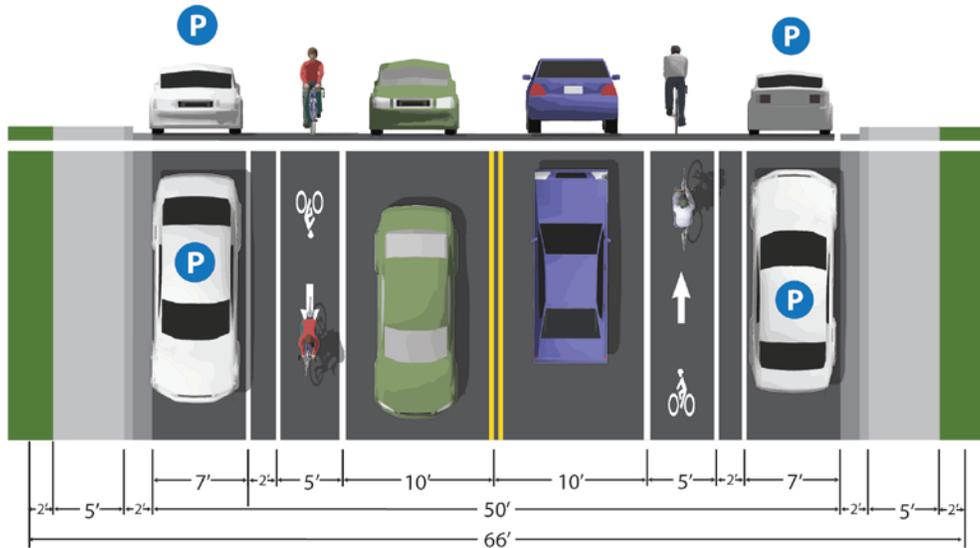
B1



50' STREET CROSS SECTION
BUFFERED BIKE LANES

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

B2

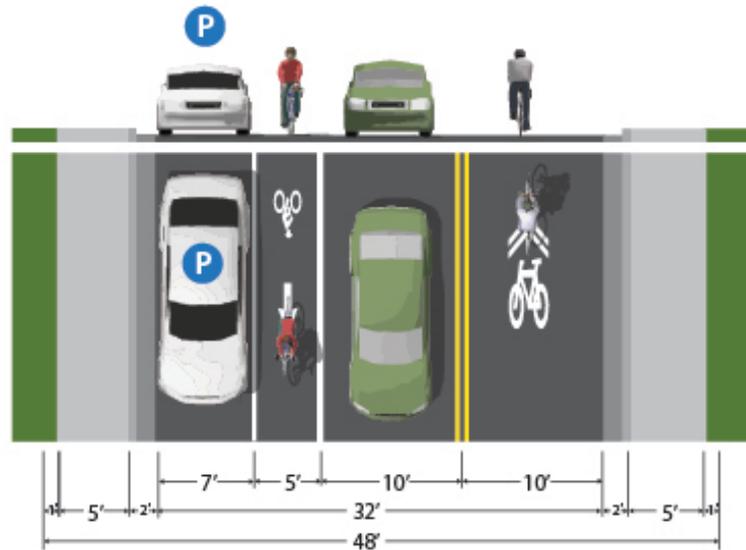


66' STREET CROSS SECTION
BUFFERED BIKE LANES

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

BIKE LANES AND BUFFERED BIKE LANES (cont.)

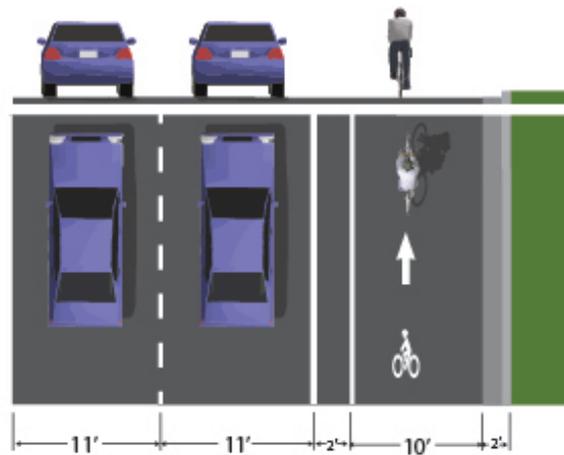
MB3



50' STREET CROSS SECTION
UPHILL BIKE LANE
DOWNHILL MARKED SHARED LANE

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

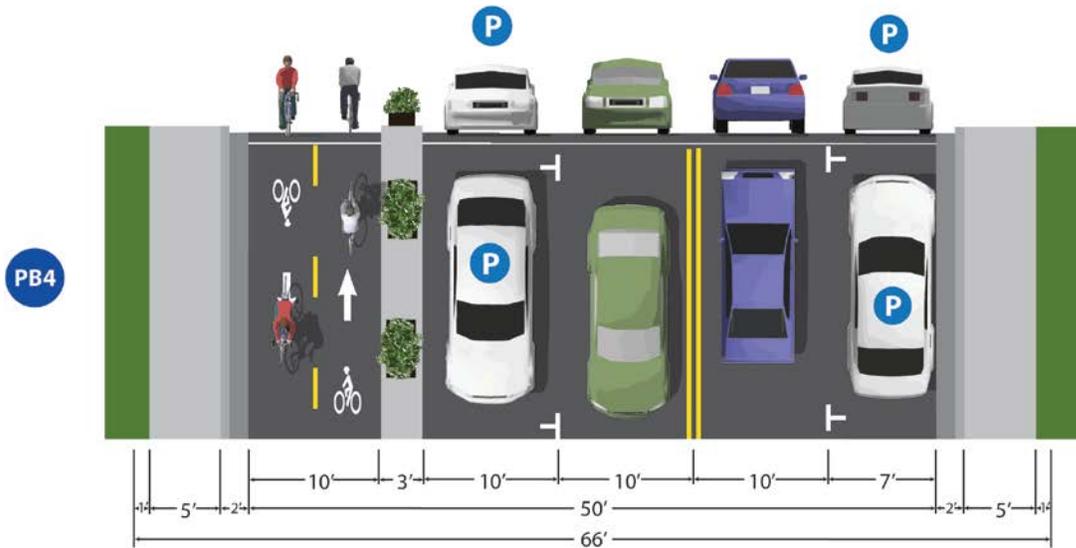
700



700 NORTH ONE-WAY CROSS SECTION
BUFFERED BIKE LANES

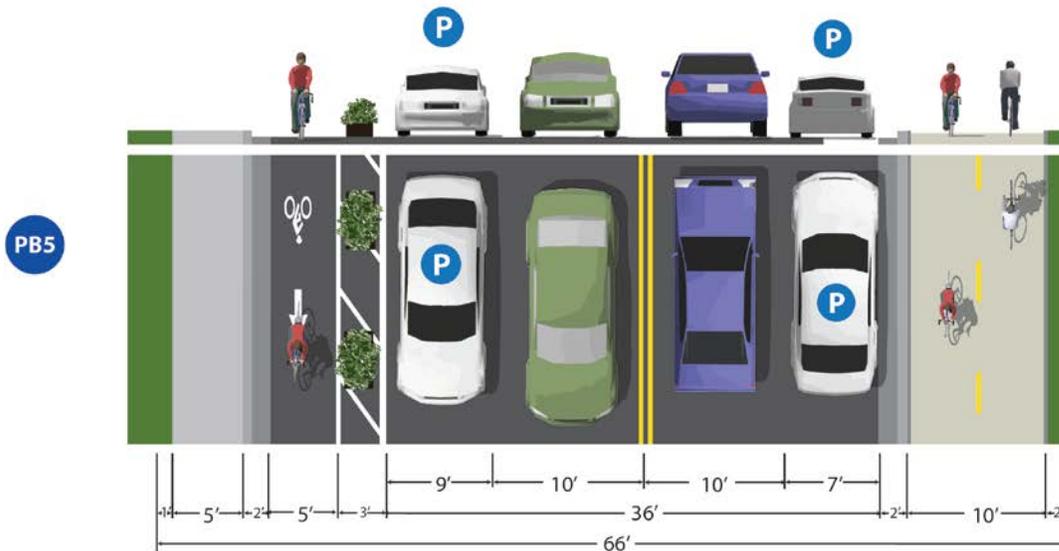
*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

Protected Bike Lanes (Cycle Tracks)



66' STREET CROSS SECTION
TWO-WAY PROTECTED
BIKE LANE (OR CYCLE TRACK)

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

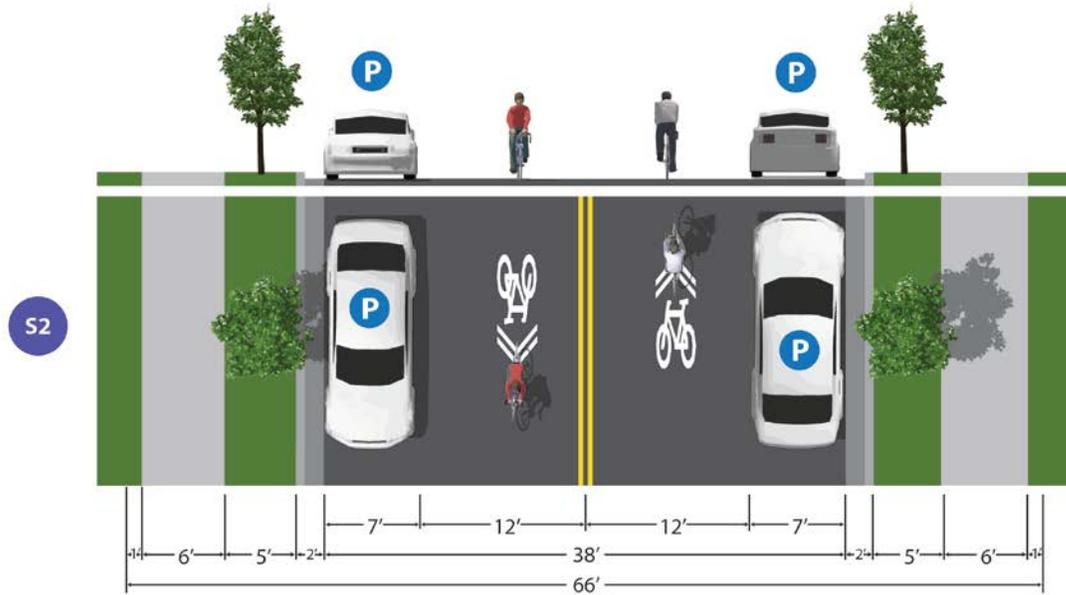


66' STREET CROSS SECTION
TWO-WAY SIDEPATH
ON 800 WEST (PHASE II)

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

Potential Future Cross-Sections

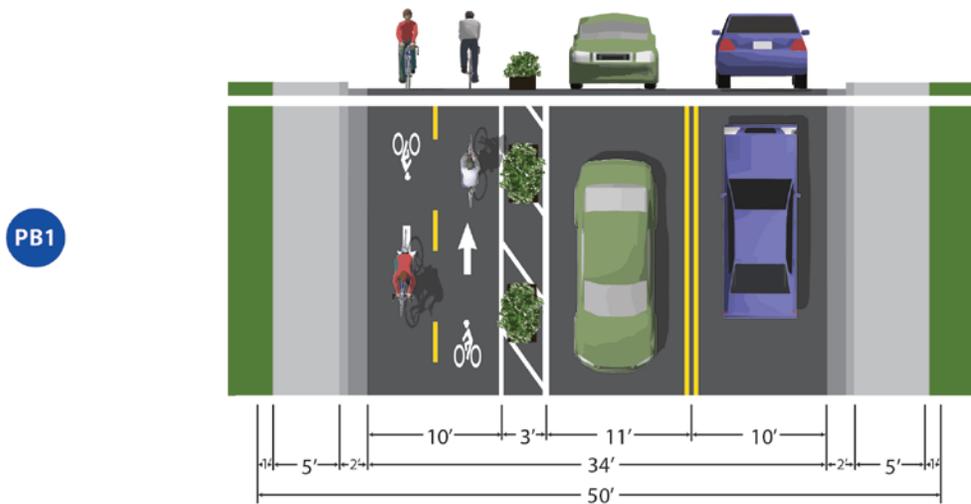
Shared Lane Markings



66' STREET CROSS SECTION

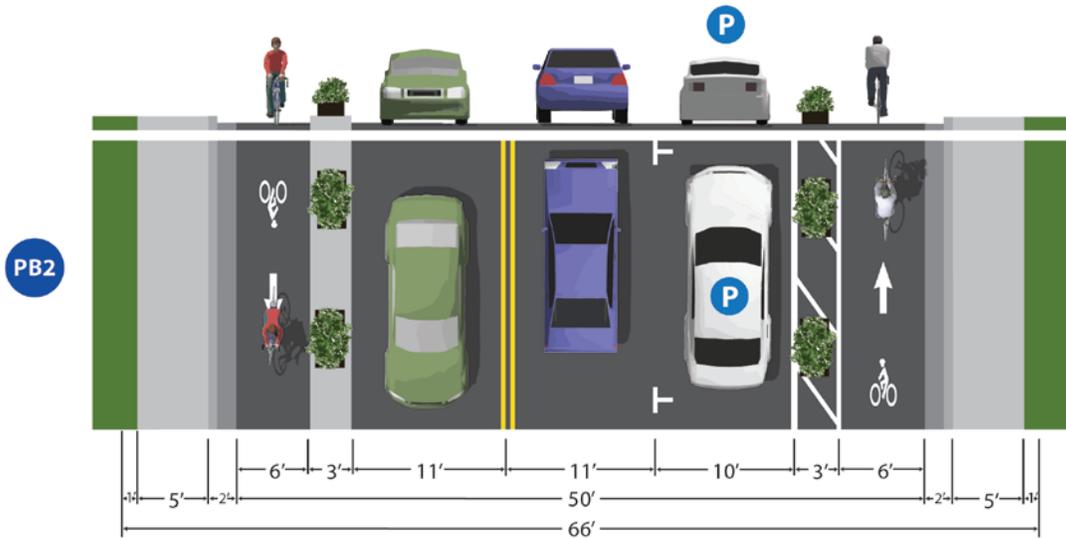
*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

Protected Bike Lanes (Cycle Tracks)



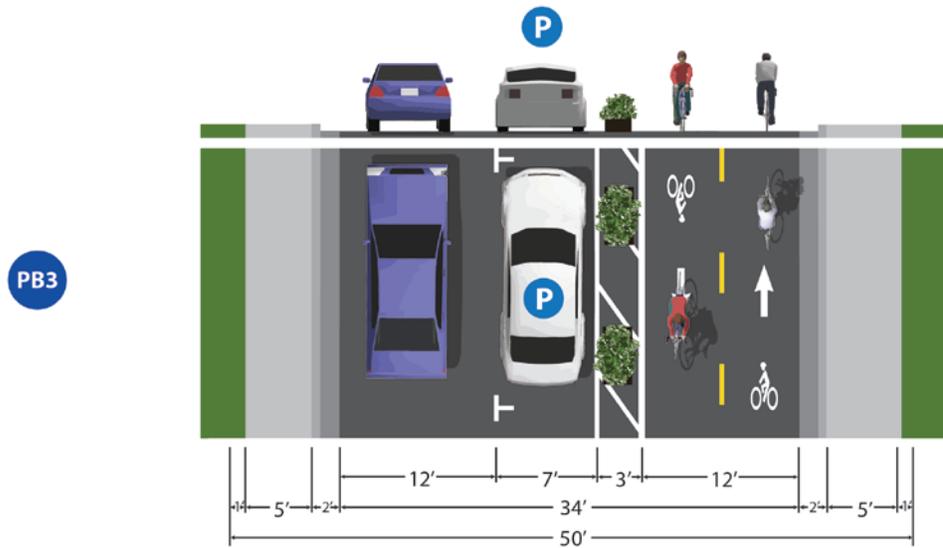
50' STREET CROSS SECTION
TWO-WAY PROTECTED
BIKE LANE (OR CYCLE TRACK)

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.



66' STREET CROSS SECTION
 ONE-WAY PROTECTED BIKE LANES (OR CYCLE TRACK)
 (TWO SEPARATION OPTIONS SHOWN)

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.



50' STREET CROSS SECTION
 TWO-WAY PROTECTED
 BIKE LANE (OR CYCLE TRACK)
 ON ONE-WAY STREET

*Sidewalks may need to be reduced to four feet to accommodate city facilities, especially where there are existing facilities and/or sidewalk.

appendix b

project scoring results

Bicycle Project Scoring

Table 1 High Priority Bicycle Projects

Bikeway	Type	From	To	Length	Public Support	Key Destinations	Proximity to School	Connection to				TOTAL	
								Adjacent Communities	Safety Concern	Construction Feasibility	Rehabilitation Project		
400 West	Buffered Bike Lane	North end of roadway	200 South	0.6 miles	0.10	0.50	1.00	0.00	0.00	1.00	1.00	0.00	4.60
400 West	Cycle Track	200 South	Southern City Limit	0.5 miles	0.50	0.75	1.00	1.00	1.00	0.50	0.50	0.00	5.25
240 West	Shared Roadway	200 South	Southern City Limit	0.4 miles	0.10	0.50	1.00	1.00	1.00	1.00	1.00	0.00	5.60
Locust Avenue	Buffered Bike Lane	Northern City Limit	400 North	0.6 miles	0.40	1.00	1.00	1.00	1.00	0.50	1.00	1.00	6.90
135 West	Shared Roadway	400 North	State Street	0.2 miles	0.40	1.00	1.00	0.00	1.00	1.00	1.00	0.00	6.40
Main Street	Buffered Bike Lane	Northern City Limit	Center Street	1.0 miles	0.40	0.75	1.00	1.00	1.00	0.50	1.00	0.00	5.65
200 East	Buffered Bike Lane	Northern City Limit	Southern City Limit	1.3 miles	0.10	0.75	1.00	1.00	1.00	0.50	1.00	1.00	7.35
400 East	Buffered Bike Lane	Northern City Limit	Southern City Limit	1.3 miles	0.30	0.75	1.00	1.00	1.00	0.50	1.00	0.00	6.55
1200 East	Buffered Bike Lane	Foothills	Southern City Limit	0.7 miles	0.00	0.50	0.00	1.00	1.00	1.00	1.00	1.00	5.50
400 North	Buffered Bike Lane	State Street	600 East	1.2 miles	1.00	1.00	1.00	0.00	1.00	0.50	1.00	1.00	7.50
400 North	Bike Lane/Shared Roadway	600 East	835 East	0.3 miles	0.30	0.50	1.00	1.00	0.00	1.00	1.00	0.00	5.80
Center Street	Cycle Track	State Street	Main Street	0.1 miles	0.10	0.75	1.00	0.00	1.00	1.00	0.50	1.00	6.35
40 South	Shared Roadway	400 West	State Street	0.5 miles	0.30	0.75	1.00	0.00	1.00	1.00	1.00	0.00	5.05
200 South	Buffered Bike Lane	2000 West	Geneva Road	1.1 miles	0.30	0.75	0.00	1.00	1.00	1.00	1.00	0.00	5.05
200 South ¹	Buffered Bike Lane	800 West	Dry Canyon Drive	2.9 miles	0.40	0.75	1.00	1.00	1.00	1.00	1.00	0.00	7.15

Table 2 Medium Priority Bicycle Projects

Bikeway	Type	From	To	Length	Public Support	Key Designations	Proximity to School	Connection to					TOTAL
								Connectivity	Adjacent Communities	Safety Concern	Construction Feasibility	Cost	
Heritage to Shoreline Trail Connection	Shared Use Path	Shoreline Trail	Lindon Heritage Trail/2000 West	0.5 miles	0.00	0.75	0.00	1.00	1.00	0.00	0.00	1.00	4.75
1550 West	Buffered Bike Lane	North end of roadway	200 South	0.3 miles	0.00	0.50	0.00	0.00	0.00	1.00	1.00	1.00	3.50
1700 West	Buffered Bike Lane	700 North	South end of roadway	0.5 miles	0.00	0.25	0.00	1.00	0.00	1.00	1.00	0.00	3.25
800 West Extension	Cycle Track/Shared Use Path	700 North	425 North	0.3 miles	0.90	1.00	0.00	1.00	0.00	0.00	0.50	0.00	3.40
800 West	Cycle Track/Shared Use Path	425 North	20 South	0.6 miles	0.90	1.00	0.00	1.00	0.00	0.50	0.50	0.00	3.90
Main Street	Buffered Bike Lane	State Street	Southern City Limit	0.2 miles	0.00	0.50	0.00	0.00	1.00	1.00	1.00	0.00	3.50
Dry Canyon Drive	Shared Roadway	Foothills	200 South	0.3 miles	0.00	0.25	0.00	1.00	0.00	1.00	1.00	0.00	4.25
425 North	Shared Roadway	800 West	State Street	0.6 miles	0.00	0.75	0.00	0.00	0.00	1.00	1.00	0.00	3.75
400 West Extension	Buffered Bike Lane	400 West	State Street	0.2 miles	0.10	0.75	1.00	0.00	0.00	0.00	1.00	0.00	3.85
390 North	Shared Roadway	400 North	Foothills	0.5 miles	0.00	0.50	0.00	1.00	0.00	1.00	1.00	0.00	3.50
200 North	Buffered Bike Lane	2000 West	East end of roadway	0.2 miles	0.00	0.50	0.00	0.00	0.00	1.00	1.00	1.00	3.50
Center Street	Buffered Bike Lane	1400 West	800 West	0.7 miles	0.00	0.75	0.00	0.00	0.00	1.00	1.00	0.00	3.75
100 South	Shared Roadway	800 West	400 West	0.5 miles	0.00	0.75	1.00	0.00	0.00	1.00	1.00	0.00	3.75
200 South	Buffered Bike Lane	Geneva Road	800 West	0.2 miles	0.40	0.75	0.00	0.00	0.00	1.00	1.00	0.00	4.15
400 South	Buffered Bike Lane	200 South	400 West	0.7 miles	0.10	0.75	1.00	0.00	0.00	0.50	1.00	0.00	4.35

Table 3 Low Priority Bicycle Projects

Bikeway	Type	From	To	Length	Public Support	Key Destinations	Proximity to School	Connection to				TOTAL
								Connectivity	Communities	Safety Concern	Construction Feasibility	
2000 West	Shared Use Path	700 North	Lindon Heritage Trail	1.5 miles	0.00	0.50	0.00	0.00	1.00	0.00	0.00	2.50
1400 West Extension	Buffered Bike Lane	700 North	500 North	0.3 miles	0.10	0.25	0.00	0.00	1.00	0.00	1.00	2.35
1400 West	Buffered Bike Lane	500 North	South end of roadway	0.5 miles	0.10	0.50	0.00	0.00	0.00	0.00	1.00	1.60
1200 West Extension	Buffered Bike Lane	700 North	Anderson Lane	0.3 miles	0.00	0.50	0.00	0.00	0.00	0.00	1.00	1.50
1200 West	Buffered Bike Lane	Anderson Lane	135 South	0.8 miles	0.00	0.50	0.00	0.00	0.00	0.00	1.00	2.50
Geneva Road	Shared Use Path	700 North	Southern City Limit	1.7 miles	0.10	0.75	0.00	0.00	1.00	0.00	0.00	2.85
800 West	Cycle Track/Shared Use Path	20 South	200 South	0.3 miles	0.90	0.75	0.00	0.00	0.00	0.00	0.50	2.65
700 North	Shared Use Path	Western City Limit	State Street	1.5 miles	0.30	0.50	0.00	0.00	1.00	0.00	0.00	2.80
500 North	Buffered Bike Lane	2000 West	Geneva Road	1.0 miles	0.00	0.50	0.00	0.00	0.00	0.00	1.00	3.00
400 North	Buffered Bike Lane	Western City Limit	2000 West	0.8 miles	0.00	0.50	0.00	0.00	1.00	0.00	0.00	1.50
Geneva/Park Connection	Shared Use Path	Geneva Road	Pheasant Brook Park	0.2 miles	0.10	0.75	0.00	0.00	0.00	0.00	0.00	0.85
1700 West Extension	Buffered Bike Lanes	1700 West	1400 West	0.5 miles	0.00	0.50	0.00	0.00	0.00	0.00	1.00	1.50
Vineyard Connector	Shared Use Path	Western City Limit	2000 West	1.2 miles	0.10	0.25	0.00	0.00	1.00	0.00	0.00	2.35
200 North Extension	Buffered Bike Lanes	200 North	1550 West	0.2 miles	0.00	0.50	0.00	0.00	0.00	0.00	1.00	2.50
180 North	Buffered Bike Lanes	1400 West	1200 West	0.2 miles	0.00	0.50	0.00	0.00	0.00	0.00	1.00	1.50
Western Coil Road	Buffered Bike Lanes	1400 West	1200 West	0.4 miles	0.10	0.25	0.00	0.00	0.00	0.00	1.00	2.35
135 South	Buffered Bike Lanes	1200 West	200 South	0.3 miles	0.10	0.25	0.00	0.00	0.00	0.00	1.00	2.35
Lakeshore Connection	Shared Use Path	Western City Limit	Lakeshore Trail	0.6 miles	0.30	0.75	0.00	1.00	0.00	0.00	0.00	2.05
Lindon Heritage Trail Connection	Shared Use Path	2000 West	Lindon Heritage Trail	0.3 miles	0.10	0.50	0.00	1.00	0.00	0.00	0.00	2.60

Pedestrian Project Scoring

Table 9 Near Term Pedestrian Projects

Roadway	From	To	Distance	Public Support	Major Roadway	Proximity to			Gap	Construction Feasibility	Total
						Schools	Park	Commercial Area			
800 West	100 North	Center Street	0.13 miles	0	0	2	1	0	1	1	5.0
400 West	Lakeview Road	40 South	0.57 miles	0.3	0	2	1	1	0	1	5.3
Locust Avenue/135 West	Northern City Limit	State Street	0.98 miles	0.5	1	2	1	1	1	0.5	7.0
Main Street	400 North	Center Street	0.57 miles	0.4	0	1	1	1	1	1	5.4
200 East (west side only)	400 North	Center Street	0.49 miles	0.4	0	2	1	1	0	0.5	4.9
200 East	Center Street	200 South	0.19 miles	0.4	0	2	0	1	1	1	5.4
400 East	400 North	Center Street	0.61 miles	0.1	1	2	1	0	1	1	6.1
400 East (east side only)	Center Street	200 South	0.19 miles	0.1	1	2	1	0	1	1	6.1
400 North	State Street	600 East	1.15 miles	1	1	2	1	1	0	0.5	6.5
Center Street	Main Street	200 East	0.17 miles	0	0	2	1	1	1	1	6.0
100 South	450 West	400 West	0.08 miles	0	0	2	1	0	1	1	5.0
200 South	70 West	State Street	0.15 miles	0.1	1	1	0	1	1	1	5.1

Table 10 Medium Term Pedestrian Projects

Roadway	From	To	Distance	Public Support	Major Roadway	Proximity to			Gap	Construction Feasibility	Total
						Schools	Park	Commercial/Area			
800 West	Center Street	200 South	0.18 miles	0	0	0	1	0	1	1	3.0
Main Street	Center Street	State Street	0.07 miles	0.3	0	1	1	1	0	1	4.3
200 East	Northern City Limit	400 North	0.47 miles	0.4	0	0	1	0	1	1	3.4
200 East (east side only)	400 North	Center Street	0.44 miles	0.4	0	2	0	1	0	1	4.4
300 East	50 South	100 South	0.09 miles	0	0	1	0	1	0	1	3.0
400 East (west side only)	Center Street	200 South	0.27 miles	0.1	1	2	1	0	0	0	4.1
500 East	Center Street	200 South	0.20 miles	0	0	1	1	0	1	1	4.0
700 North (north side only)	Western City Limit	1400 West	0.53 miles	0	1	0	1	0	0	1	3.0
700 North (south side only)	Western City Limit	1500 West	0.33 miles	0	1	0	1	0	0	1	3.0
700 North	Geneva Road	785 West	0.77 miles	0	1	0	0	1	0	1	3.0
Gillman Lane	Gillman Lane	State Street	0.29 miles	0.3	0	0	0	1	1	1	3.3
60 North	200 East	Approx. 0.04 miles east of 200 East	0.06 miles	0.4	0	2	0	1	0	1	4.4
Center Street	400 East	700 East	0.32 miles	0	0	2	1	0	0	0	3.0
Center Street	800 East	850 East	0.03 miles	0	0	1	1	0	1	1	4.0
40 South	400 West	State Street	0.94 miles	0	0	0	1	1	0	0.5	2.5
100 South	800 West	680 West	0.13 miles	0	0	0	1	0	1	1	3.0

Table 11 Long Term Pedestrian Projects

Roadway	From	To	Distance	Public Support	Major Roadway	Proximity to			Gap	Construction Feasibility	Total
						Schools	Park	Commercial Area			
1400 West	500 North	Western Coil Road	1.97 miles	0.1	0	0	0	0	0	0.1	
Gillman Lane	Gillman Lane	Lakeview Road	0.03 miles	0	0	0	0	0	1	1.0	
Main Street	600 North	550 North	0.07 miles	0.3	0	1	0	0	0	1.3	
150 East	Northern end of roadway	400 North	0.33 miles	0	0	1	0	0	0.5	1.5	
800 East	Center Street	Southern end of roadway	0.43 miles	0	0	1	1	0	0	2.0	
700 North (south side of roadway)	1500 West	1400 West	0.16 miles	0	1	0	0	0	1	2.0	
700 North	1400 West	Geneva Road	0.77 miles	0	1	0	0	0	1	2.0	
500 North	1500 West	Geneva Road	1.08 miles	0	0	0	1	0	1	2.0	
500 North	Geneva Road	800 West	0.23 miles	0	0	0	1	1	0	2.0	
200 North	400 East	425 East	0.03 miles	0	0	0	1	0	0	1.5	
180 North	1700 West	1400 West	0.99 miles	0	0	0	1	0	0	1.0	
10 North	Geneva Road	800 West	0.26 miles	0	0	0	0	0	1	1.5	
Center Street	725 East	850 East	0.25 miles	0	0	1	1	0	0	2.0	

recommended bicycle parking code

Bicycle parking generation recommendations were created based on the City's existing code and can be adopted as an ordinance. Incorporating such requirements into municipal code is one way to increase the supply of bicycle parking in Lindon. The same land use codes that the City currently uses for automobile parking were used to provide short- and long-term parking generation requirements and recommendations. Short-term parking is most appropriate when the parking duration will be less than two hours. If longer than two hours, long-term parking is recommended. Figure and table references in the below code reference the City ordinances and not this document.

Recommended Bicycle Parking Code

Section 17.18.120 Bicycle Parking

Purpose

Bicycle parking is required for all uses to encourage the use of bicycles by providing safe, convenient, and readily accessible places to park.

Definition

"Bicycle parking facility" or "bicycle parking space" means a space exclusively for the storage of bicycles. All bicycle parking facilities shall be dedicated for the exclusive use of bicycle parking and shall not be intended for the use of motorized two-wheeled or similar vehicles.

1. Bicycle parking required for new and existing uses.
 - a. Bicycle parking shall be provided for new development projects, additions to existing buildings, and new living units in existing buildings. Bicycle parking as prescribed hereafter shall be provided for activities occupying buildings, or portions of, which are constructed, established, wholly reconstructed, or moved onto a new lot after the effective date of the bicycle parking requirements, except to the extent that existing bicycle parking exceeds such requirements for any existing facilities. The required amount of new bicycle parking shall be based on the cumulative increase in floor area, or other applicable unit of measurement prescribed hereafter, after said effective date. If an existing building is altered or changed in occupancy so as to result in an increase in the number of residential living units, bicycle parking as prescribed hereafter shall be provided for the new units. Per Section 17.18.077, subsection 5, a 5% reduction in the minimum amount of vehicular parking may be permitted by providing bicycle parking and showering and changing facilities on the site that are additional to the requirements found in this section. Existing parking may be converted to take advantage of this provision as well.
2. Types of bicycle parking.
 - a. Required. Short-term Bicycle Parking. Short-term bicycle parking shall consist of a bicycle rack or racks and is meant to accommodate visitors, customers, messengers, and others expected to park not more than two hours.

- b. Optional. Long-term Bicycle Parking. Each long-term bicycle parking space should consist of a locker or a rack located within a locked enclosure, such as a secure room or controlled access area, providing protection for each bicycle from theft, vandalism, and weather. Long-term bicycle parking is meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours.
3. Number of bicycle spaces required (short term) and optional (long term).
- a. Table 17.1 shows the bicycle parking requirements for short term and recommendations for long term.
 - ~~A. In the CG, MC, PC 1&2 and R&B zones, a minimum of 2 bicycle parking spaces shall be provided for all uses, with additional bicycle parking spaces added at a ratio of 8% of the total number of required vehicular parking spaces up to 16 bicycle parking spaces per use. Non-residential uses in residential zones shall provide a minimum of 2 bicycle parking spaces. Additional bicycle spaces may be required for uses such as schools, institutional facilities, recreation center, or other uses where it is anticipated that larger numbers of bicyclists will be frequenting the facility.~~
 - ~~B. In the LI and III zones, a minimum of 2 bicycle parking stalls shall be provided for all uses with up to 50 vehicular parking spaces, and 1 additional stall being required for every 50 vehicular spaces thereafter.~~
 - ~~C. When there are two or more separate uses or buildings on a lot, the required bicycle parking for the site is the sum of the required parking for all required vehicular parking spaces.~~

4. Short Term Bicycle Parking Standards.

All new development where short term bicycle parking is required as stated in Section 3 above shall install bicycle parking spaces and associated bicycle racks as follows:

- a. Location. Short term bicycle parking shall be:
 - A. Outside a building and made available for employees, customers, or other visitors to the site.
 - B. At the same grade as the sidewalk or at a location that can be reached by an accessible pedestrian route; and
 - C. Within the following distances of the main entrance as follows:
 - i. Building with one main entrance. For a building with one main entrance, the bicycle parking must be within 50' of the main entrance to the building as measured along the most direct pedestrian access route. See Figure 5;
 - ii. Building with more than one main entrance. For a building with more than one main entrance, the bicycle parking must be along all facades with a main entrance, and within 50 feet of at least one main entrance on each facade that has a main entrance, as measured along the most direct pedestrian access route. See Figure 6;
 - iii. Sites with more than one primary building. For sites that have more than one primary building, but are not an institutional campus, the bicycle parking must be within 50 feet from a main entrance as measured along the most direct pedestrian access route, and must be distributed to serve all primary buildings. See Figure 7;
 - iv. Institutional Campus. On an institutional campus with more than one building or main entrance, the bicycle parking must be either:
 - Within 50 feet of a main entrance as measured along the most direct pedestrian access route; or
 - If the bicycle parking is more than 50 feet from a main entrance, it must be in a common bicycle parking location along a pedestrian access route.
 - D. ~~If a lot is adjacent to City trails and/or sidewalks that are part of the Parks and Trails Master Plan Map, the development is required to provide a reasonable access to the sidewalk or trail in order to promote bicycle use to the proposed facility.~~ (Explanatory note: 4.a.D seems out of place because it deals with access instead of bike parking. This section, if and when moved to another place in the City code, should reference the Bicycle and Pedestrian Master Plan instead of, or at least in addition to, the Parks and Trails Master Plan.)
 - E. Bicycle racks and spacing (see Figure 8). Bicycle parking and racks shall meet the following standards:
 - i. Definition. A bicycle parking space is the space that one bicycle typically occupies (e.g. a U-shaped bicycle rack has two bicycle parking spaces, one on either side of the rack).

- ii. Each required bicycle parking space must be at least 2.5 feet in width by 6 feet in length to allow sufficient space between parked bicycles.
- iii. The rack supports the bicycle frame at two contact points on the frame and allows the bicycle frame and one wheel to be locked to a bicycle rack with a high security, U-shaped shackle lock if both wheels are left on the bicycle.
- iv. A bicycle six feet long can be securely held with its frame supported so that the bicycle cannot be pushed or fall in a manner that will damage the wheels or components.
- v. The rack must be securely anchored.
- vi. Each required bicycle parking space must be accessible without moving another bicycle.
- vii. There must be an aisle at least 4 feet wide behind all required bicycle parking to allow room for bicycle maneuvering. Where the bicycle parking is adjacent to a sidewalk, the maneuvering area may extend into the sidewalk right-of-way.
- viii. The area devoted to bicycle parking must be hard surfaced.
- ix. The racks shall be located with at least 30 inches clearance in all directions from any obstruction, including but not limited to other racks, walls, and landscaping. Large retail uses such as supermarkets and grocery stores are encouraged to locate racks with a 36 inch clearance in all directions from any vertical obstruction, including but not limited to other racks, walls, and landscaping.
- x. Bicycle parking facilities shall not impede pedestrian or vehicular circulation.
- xi. Bicycle parking racks located on sidewalks should be kept clear of the pedestrian through zone and should maintain the sidewalk's ADA (Americans with Disabilities Act) compliance for wheelchairs and other mobility assistance devices.
- xii. Bicycle parking facilities within auto parking facilities shall be protected from damage by cars by a physical barrier such as curbs, wheel stops, poles, bollards, or other similar features capable of preventing automobiles from entering the designated bicycle parking area.
- xiii. Short-term bicycle parking facilities serving community activity centers such as libraries and community centers should incorporate weather-protective enclosures shielding the designated bicycle area from typical inclement weather when feasible.
- xiv. Bicycle parking facilities shall be located in highly visible well-lighted areas. In order to maximize security, whenever possible short-term bicycle parking facilities shall be located in areas highly visible from the street and from the interior of the building they serve (i.e. placed adjacent to windows).
- xv. The location and design of required bicycle parking shall be of a quality, character and color that harmonize with adjoining land uses. Required bicycle parking shall be incorporated whenever possible into building design or street furniture.
- xvi. If required bicycle parking is not visible from the street or main building entrance, a sign must be posted at the main building entrance indicating the location of the bicycle parking.

5. Long Term Bicycle Parking Standards.

Locations wishing to install long term bicycle parking should install bicycle parking spaces and associated bicycle racks as follows:

a. Location. Long-term bicycle parking should:

- A. Be covered and located on site or within two hundred (200) feet of the main building entrance. The main building entrance is defined as publicly accessible entrances and shall exclude gated private garage entrances, trash room entrances, and other building entrances that are not publicly accessible.
- B. Include a variety of rack types to accommodate different bicycle sizes, styles, and users.
- C. Meet the requirements outlined in Section 4.E, Lines i-x, xii, and xiv-xvi).

Ord. 2008-6, modified.

New or additional text, proposed changes to the content of the ordinance, explanatory notes, or changes in numbering or other formatting are shown in red.

Any changes to distances or design as part of this code language update should also be reflected in the Title 17.18 Figures.

TABLE 17.1 SHORT- AND LONG-TERM BICYCLE PARKING REQUIREMENTS

Land Use	Current Car Parking Requirement (in spaces)	Required Short-Term Bicycle Parking	Recommended Optional Long-Term Bicycle Parking
Single family residential dwelling	2 per dwelling	No spaces required	No spaces required
Accessory Apartments to single family dwellings	2 per apartment	No spaces required	No spaces required
Condominiums, town homes and Apartments	2 per dwelling	0.05 per bedroom, minimum of 2 total	0.5 per bedroom, minimum of 2 total; with private garage or private locked storage unit for each unit, none required
Group Quarters	1 per sleeping room plus parking for accessory use	0.05 per bedroom, minimum of 2 total	0.5 per bedroom, minimum of 2 total
Student Housing	1 per 2 beds	1 per 10 students of planned capacity, minimum of 2 total	1 per 5 students of planned capacity, or 1 per 10,000 sq ft, whichever is greater
Retirement Homes/Centers	1 per 2 beds	0.05 per bedroom, minimum of 2 total	0.05 per bedroom, minimum of 1 total
Residential Hotels	1 per sleeping room, plus parking for accessory use and employee parking	0.05 per bedroom, minimum of 2 total	0.05 per bedroom, minimum of 1 total
Mobile Home Park	2 per dwelling unit	No spaces required	No spaces required
Lodging	1 per bedroom, plus parking for accessory use	0.05 per bedroom, minimum of 2 total	0.05 per bedroom, minimum of 1 total
Manufacturing	1 per 750 sq ft of floor area	Minimum of 2 at each public building entrance	1 per 15,000 sq ft, minimum of 2 total
Transportation, Communication & Utilities	1 per 200 sq ft in commercial zone, or 1 per 750 sq ft in manufacturing zone	Minimum of 2 at each public building entrance	1 per 15,000 sq ft, minimum of 2 total
Wholesale Trades, Warehousing, misc. storage	1 per 500 sq ft in commercial zone, or 1 per 1000 sq ft in industrial zone	1 per 20,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Building Materials, Hardware, and Farm Equipment	1 per 200 sq ft in commercial zone, or 3 per 1000 sq ft in industrial zone	1 per 5,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
General Merchandise	1 per 200 sq ft	1 per 5,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total

TABLE 17.1 SHORT- AND LONG-TERM BICYCLE PARKING REQUIREMENTS

Land Use	Current Car Parking Requirement (in spaces)	Required Short-Term Bicycle Parking	Recommended Optional Long-Term Bicycle Parking
Retail Food	1 per 350 sq ft	1 per 2,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Automotive, Marine craft, aircraft - retail	1 per 250 sq ft of showroom and office space, plus 1 per employee	1 per 5,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Apparel and Accessories	1 per 200 sq ft	1 per 5,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Furniture, Home Furnishings and Equipment	1 per 1000 sq ft	1 per 5,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Eating and Drinking Establishments	1 per 3 seats, or 1 per 200 sq ft, whichever is greater	1 per 2,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Other Retail	1 per 350 sq ft	1 per 5,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Finance, Insurance, and Real Estate	1 per 275 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 10,000 sq ft, minimum of 2 total
Personal Services	1 per 200 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 10,000 sq ft, minimum of 2 total
Business Services	1 per 200 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 10,000 sq ft, minimum of 2 total
Repair Services	1 per 350 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 10,000 sq ft, minimum of 2 total
Auto Repair	1 per 300 sq ft excluding bay areas, plus 5 per single vehicle bay/shop	1 per 20,000 sq ft, minimum of 2 total	1 per 12,000 sq ft, minimum of 2 total
Professional	1 per 350 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 10,000 sq ft, minimum of 2 total
Call Centers, Computer Programming, Technology Centers, or similar high-density office uses	1 per 250 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 10,000 sq ft, minimum of 2 total
Hospital Services	1 per 450 sq ft	1 per 20,000 sq ft, minimum of 2 total	1 per 20 employees or 1 per 70,000 sq ft, whichever is greater, minimum of 2 total
Sanitariums, Convalescent and Rest Homes	1 per 3 beds, or 1 per 1500 sq ft, whichever is greater	0.05 per bedroom, minimum of 2 total	0.05 per bedroom, minimum of 1 total

TABLE 17.1 SHORT- AND LONG-TERM BICYCLE PARKING REQUIREMENTS

Land Use	Current Car Parking Requirement (in spaces)	Required Short-Term Bicycle Parking	Recommended Optional Long-Term Bicycle Parking
Contract Construction	1 per 200 sq ft in commercial zone, 1 per 500 sq ft in industrial zone	Minimum of 2 at each public building entrance	1 per 15,000 sq ft, minimum of 2 total
Government Services	1 per 250 sq ft	1 per 8,000 sq ft, minimum of 2 total	1 per 10 employees, minimum of 2 total
Nursery and Day Care	1 per employee plus 1 per 10 children at maximum capacity	1 per 5 students of planned capacity, minimum of 4 total	1 per 5 employees, minimum of 2 total
Grades K-8	2 per employee	1 per 10 students	1 per 10 employees
Grades 9-12	10 per teaching station	1 per 10 students	1 per 10 employees
Colleges and Trade Schools	15 per teaching station	1 per 5 students	1 per 10 employees
Dancing and Other Special Training Schools	1 per 200 sq ft	1 per 10 students	1 per 10 employees
Churches, Temples, and Synagogues	1 per 4 seats or 4 person seating capacity, based on fixed seating	Spaces to accommodate 5% of maximum expected daily attendance	1 per 20 employees, minimum of 2 total
Cultural, Amusement, and Recreation	1 per 3 1/2 (three and one-half) person capacity in the building or facility, based on maximum use of all facilities at the same time	1 per 10,000 sq ft, minimum of 2 total	1 per 10 employees, minimum of 2 total

crosswalk decision matrix

The crosswalk decision matrix is a toolbox of elements to improve pedestrian mobility, visibility, and safety at uncontrolled locations. It will assist Lindon in making decisions about where basic crosswalks (two stripes) can be marked; where crosswalks with special treatments, such as high visibility crosswalks, flashing beacons, and other special features, should be employed; and where crosswalks will not be marked due to safety concerns resulting from volume, speed, or sight distance issues. This toolbox provides guidance about the type of treatments appropriate on various streets and under various conditions. While the strategies in the toolbox reflect best practices and local priorities, the toolbox guidance is not meant to replace engineering judgment. Each situation is unique and walking safety treatments must be selected on a case-by-case basis.

Determining Where and How to Mark Uncontrolled Crosswalks

The first step in identifying candidate marked crosswalk locations at an uncontrolled crossing (without a stop sign or signal) is to identify the places people would like to walk (walking desire lines), which are affected by local land uses (homes, schools, parks, commercial establishments, etc.) and the location of transit stops. This information forms a basis for identifying pedestrian crossing treatment areas and prioritizing such treatments, thereby creating a convenient, connected, and continuous walking environment.

The second step is identifying the safest locations for people to cross. Of all road users, pedestrians have the highest risk because they are the least protected. National statistics indicate that pedestrians represent 14 percent of all traffic incident fatalities while walking accounts for only three percent of total trips.

Treatments at Uncontrolled Locations

This section presents best practices for the installation of marked crosswalks at uncontrolled intersection and mid-block locations.

When to Install Marked Crosswalks

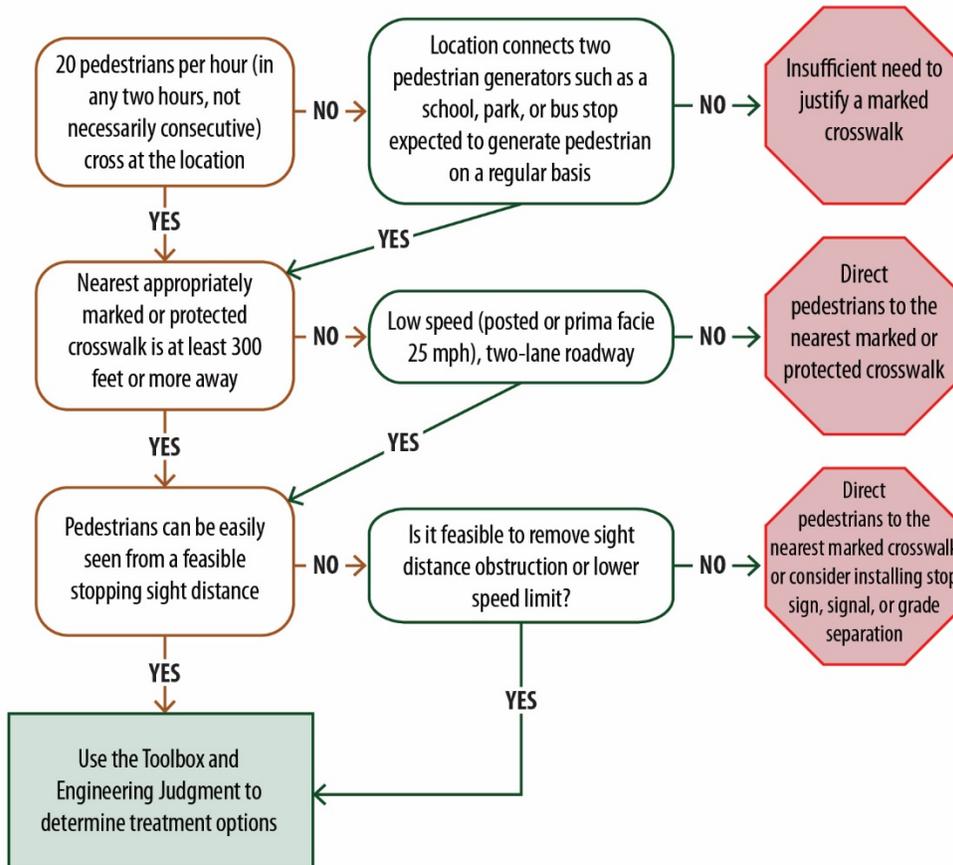
The following is the recommended practice for providing walking treatments at uncontrolled intersections and mid-block locations. The most common crosswalk of this type will be at intersections where a minor side street is stop controlled and a major street is uncontrolled.

Crossings should be marked where all of the following occur:

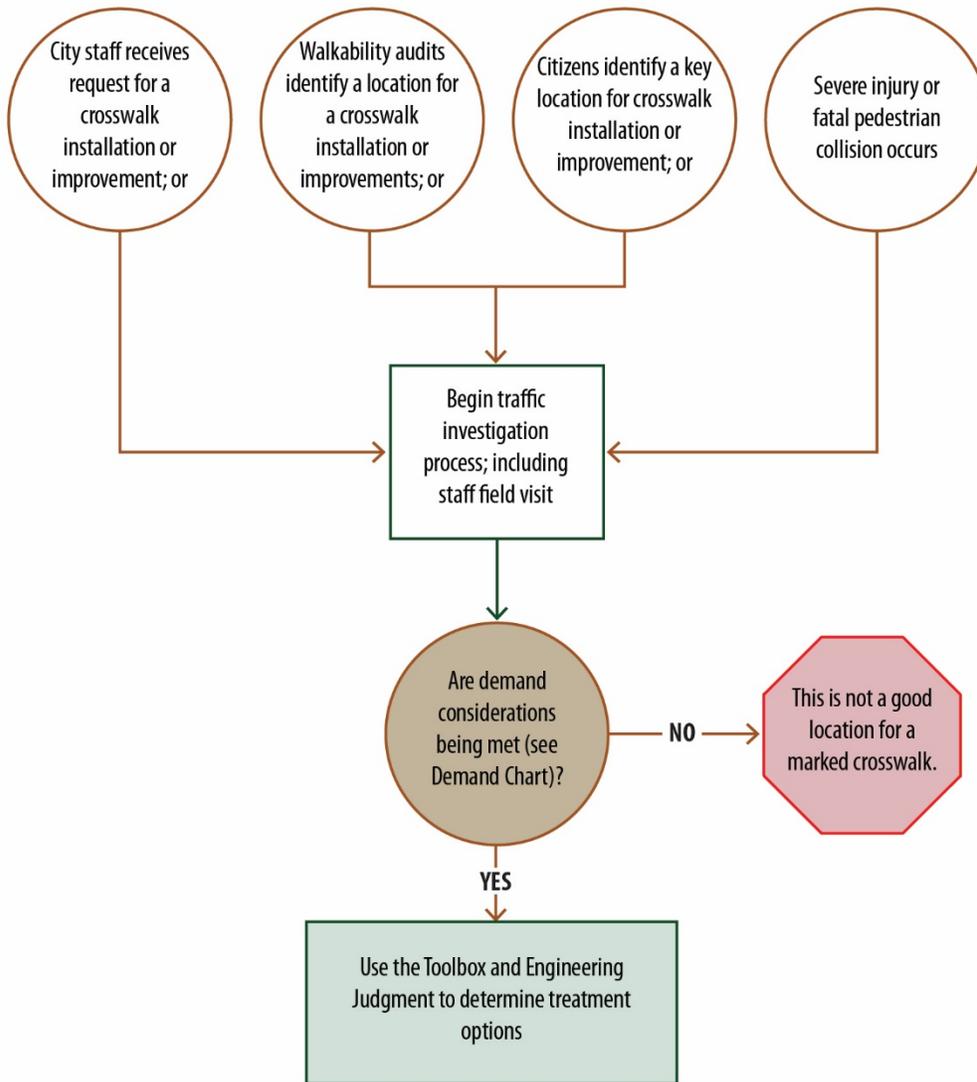
- Sufficient demand exists to justify the installation of a crosswalk (see Demand Considerations below)
- The location has sufficient sight distance (as measured by stopping sight distance calculations) and/or sight distance will be improved prior to crosswalk marking
- Safety considerations do not preclude a crosswalk

Demand Considerations

Uncontrolled and mid-block crossings should be identified as a candidate for marking if there is a demonstrated need for a crosswalk. The charts below provide a visual summary of the demand considerations, including suggested threshold values in some cases. Engineering judgment will ultimately be used to select locations appropriate for a marked, uncontrolled crossing.



Feasibility Analysis for Treatments at Uncontrolled Locations



Recommended Selection Process for Uncontrolled and Mid-Block Crosswalk Locations

Crosswalk Location and Tool Feasibility Analysis

The charts above describe the overall procedures from the moment City staff receives a request for a new marked crosswalk (or considers removing an existing marked crosswalk) to the installation of the treatment. As described, the first steps to determine the appropriate location and treatment for the crosswalk include a staff field visit.

Treatment Identification

Based on the results of charts above, this Toolbox may be used to identify potential treatments at a candidate crosswalk location. If a candidate uncontrolled location is determined to be appropriate for a marked crossing, the preferred treatments should be provided at the subject location, as appropriate.

Table 1 includes the list of preferred treatments for uncontrolled locations. Unless otherwise noted, these treatments are appropriate for all roadway cross-sections

Table 2 provides a summary of the enhanced treatments for uncontrolled crosswalks. Enhanced treatments should be selected based on site-specific characteristics and engineering judgment.

TABLE 1 PREFERRED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
Geometrics/ ADA Treatments	<p>Directional Curb Ramp with Truncated Domes</p>  <p><i>Image Source: City of Pasadena</i></p>	<p>Where right-of-way is available, directional curb ramps are installed at two per corner and guide pedestrians in to the crosswalk they would utilize to cross the street. Truncated domes provide a tactile signal to the visually impaired that they are leaving the sidewalk area. Exceptions for directional curb ramps may be allowed when physical considerations such as existing drainage or required turn radius deem infeasible. Selecting directional curb ramps as a preferred treatment does not call for retrofit of existing curb ramps, rather installation will be done opportunistically in scenarios such as grant funding, development review, new construction, and reconstruction.</p>
Striping	<p>High-Visibility Marked Crosswalk</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="505 1010 591 1209">  <p><i>Image source: www.walkinginfo.org/pedsafe/</i></p> </div> <div data-bbox="639 1016 927 1226">  <p><i>Image source: Fehr & Peers</i></p> </div> </div>	<p>High-visibility markings include a family of crosswalk striping styles such as the "ladder" and the "triple-four."</p>
Striping	<p>Advance Yield Limit Line (multi-lane roadways)</p>  <p><i>Image Source: City of Pasadena</i></p>	<p>Yield limit lines (also referred to as "sharks' teeth") are placed in advance of marked, uncontrolled crosswalks.</p>

TABLE 1 PREFERRED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

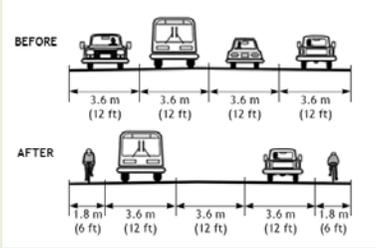
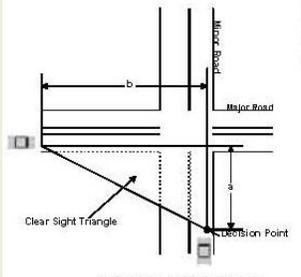
Type	Measure	Description
Road Diet	<p>Road Diet (multi-lane roadways)</p>  <p><i>Image Source: www.tfhr.gov/</i></p>	<p>The number of lanes of travel is reduced by widening sidewalks, adding bicycle and parking lanes, and converting parallel parking to angled or perpendicular parking. A road diet is recommended for consideration in all scenarios with four or more lanes of traffic and a daily traffic volume of less than 15,000 vehicles (ADT).</p>
Streetscape	<p>Pedestrian-Scale Lighting</p>  <p><i>Image source: www.ci.mil.wi.us</i></p>	<p>Pedestrian-scale lighting improves pedestrian visibility.</p>
Geometrics	<p>Removal of Sight Distance Obstructions</p>  <p><i>Image source: Nazir Lalani</i></p>	<p>If objects impede sight distance, this may result in an unsafe condition when motorists and pedestrians are unable to see each other. Items such as parked cars, signage, landscaping, fencing, and street furniture should be placed in a location that will not obstruct sight distance.</p>
Geometrics	<p>Refuge Island</p>  <p><i>Image Source: City of Pasadena</i></p>	<p>Raised islands are placed in the center of the roadway, separating opposing lanes of traffic with cutouts or ramps for accessibility along the walking path. Median refuge islands are recommended where right-of-way allows and conditions warrant.</p>

TABLE 1 PREFERRED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
Signage	<p>Advanced Warning Signs</p>  <p><i>Image source: http://mutcd.fhwa.dot.gov</i></p>	<p>High-visibility fluorescent yellow green signs are made of the approved fluorescent yellow-green color and posted at crossings to increase the visibility of a pedestrian crossing.</p>

TABLE 2 ENHANCED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
Geometrics	<p>Narrow Lanes</p>  <p><i>Image source: www.walkinginfo.org/pedsafe/</i></p>	<p>Narrow lanes have a calming effect and reduce the distance pedestrians must travel when crossing.</p>
Geometrics	<p>Curb Extensions</p>  <p><i>Image source: Fehr & Peers</i></p>	<p>Also known as a pedestrian bulb-out, this traffic-calming measure is meant to slow traffic and increase driver awareness of pedestrians. It consists of an extension of the curb into the street, making the pedestrian space (sidewalk) wider.</p>

TABLE 2 ENHANCED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
Geometrics	<p>Split Pedestrian Crossover (SPXO)</p>  <p><i>Image Source: www.tfhr.gov/</i></p>	<p>This measure is similar to traditional median refuge islands; the difference is that the crosswalks in the roadway are staggered such that a pedestrian crosses half the street and then walks toward traffic to reach the second half of the crosswalk. This measure must be designed for accessibility by including rails and truncated domes to direct sight-impaired pedestrians along the path of travel.</p>
Geometrics	<p>Raised Crosswalk</p>  <p><i>Image Source: www.saferoutesinfo.org</i></p>	<p>A crosswalk with a surface elevated above the travel lanes, attracting drivers' attention, encouraging lower speeds, and improving the visibility of pedestrians.</p>
Geometrics	<p>Pedestrian Overpass/ Underpass</p>  <p><i>Image source: omahamidcenturymodern.blogspot.com</i></p>	<p>This measure consists of a walking-only overpass or underpass over a roadway. It provides complete separation of pedestrians from motor vehicle traffic, normally where no other walking facility is available, and connects off-road trails and paths across major barriers. The device is recommended only where topography supports its use.</p>

TABLE 2 ENHANCED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
Signage	<p>In-Street Pedestrian Crossing Signs</p>  <p><i>Image source: www.seton.com</i></p>	<p>This measure involves posting regulatory pedestrian signage on lane edge lines and/or road centerlines. The In-Street Pedestrian Crossing sign may be used to remind road users of laws regarding right of way at an unsignalized pedestrian crossing.</p>
Signage	<p>Crosswalk Flags</p>  <p><i>Image source: Fehr & Peers</i></p>	<p>Brightly-colored removal flags are placed at crosswalks to increase pedestrian visibility and clearly communicate their desire to cross the street.</p>
Signal Treatment	<p>In-Roadway Warning Lights</p>  <p><i>Image Source: www.tfsrc.gov/</i></p>	<p>Both sides of a crosswalk are lined with pavement markers, often containing an amber LED strobe light. The lights may be push-button activated or activated with pedestrian detection.</p>

TABLE 2 ENHANCED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
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Flashing Beacons

Signal Treatment



Image source: tti.tamu.edu

Flashing amber lights are installed on overhead or post-mounted signs, in advance of the crosswalk or at the entrance to the crosswalk.

Stutter Flash (Rectangular Rapid Flashing Beacon)

Signal Treatment



Image source: mutcd.fhwa.dot.gov

The Flashing Beacon is enhanced by replacing the traditional slow flashing incandescent lamps with rapid flashing LED lamps. The beacons may be push-button activated or activated with pedestrian detection.

HAWK/ Pedestrian Hybrid Beacon

Signal Treatment

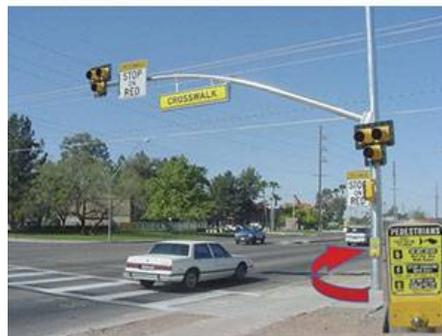


Image Source: www.tfhr.gov/

HAWK (High Intensity Activated Crosswalks) are pedestrian-actuated signals that are a combination of a beacon flasher and a traffic control signal. When actuated, HAWK displays a yellow (warning) indication followed by a solid red light. During pedestrian clearance, the driver sees a flashing red “wig-wag” pattern until the clearance interval has ended and the signal goes dark.

TABLE 2 ENHANCED WALKING TREATMENTS FOR UNCONTROLLED LOCATIONS

Type	Measure	Description
Signal Treatment	<p>Pedestrian Signal</p>  <p><i>Image source: Fehr & Peers</i></p>	Conventional traffic control devices with warrants for use based on the MUTCD.

Research on this topic has found that primary considerations for the provision of marked crossings at uncontrolled locations include traffic volumes, the presence of a median, number of lanes to be crossed, and posted speed limits. As indicated above, multi-lane locations, and locations that experience high travel volumes and speeds are candidates for enhanced treatments, as research has indicated that for uncontrolled locations the provision of signage and striping may be inadequate.

Safety effectiveness studies have been conducted for many of the devices in Table 2. Based on these studies, Table 3 provides the conditions under which the enhanced walking treatments for uncontrolled intersections should typically be applied. Level 1 represents a minor intervention, appropriate for situations with lower speeds and traffic volumes and high driver yielding rates. Higher levels represent more significant interventions, as may be needed on higher speed or volume roadways, wider roadways, and roadways where motorists are less likely to yield to pedestrians. Treatments may be combined with higher level treatments added to lower level treatments (i.e., flashing beacons with curb extensions).

TABLE 3 APPLICATION OF ENHANCED TREATMENTS FOR UNCONTROLLED LOCATIONS

Level 1: Basic		Level 2: Low Speeds <=30 MPH	Level 3: Higher Speeds > 30 MPH		Level 4: Higher Speeds (>30 MPH) and Volumes (12,000+ ADT)
All Widths	Two to Three Lanes Only	Two to Three Lanes Only	Two to Three Lanes Preferred	Four or More Lanes Preferred	All Widths
Narrow Lanes		Raised Crosswalk		Stutter Flash (RRFB)	Pedestrian Signal
Refuge Island/SPXO	In-Street Signs	In-pavement Flashers	Overhead/Post Mounted Flashing Beacon	Pedestrian Hybrid (HAWK) Beacon	Underpass/Overpass
Curb Extensions		Crossing Flags (with Level 1 treatments)			