

## Appendix B. Current Conditions Report





# **LincolnBikePlan** On-Street Bicycle Facilities Plan

## **Current Conditions Report**

June 2018







## **Current Conditions Report**



#### Prepared by:

Felsburg Holt & Ullevig 6300 South Syracuse Way, Suite 600 Centennial, CO 80111 303.721.1440

FHU Reference No. 117339-01 June 2018



## Table of Contents

	Page
Introduction	1
Lincoln's Bike History	1
Planning Context	1
Land Use and Demographics	1
Types of Bicyclists	3
Bicycle Activity	4
Bicycle Demand Assessment	5
Assessment of Bike Network	7
Existing Trail and On-Street Bike Network	7
Traffic Stress Analysis	7
Network Connectivity Analysis	
Safety Assessment	13
Programs, Policies and Partners	
Education, Enforcement, and Encouragement Programs	
Bicycle-Related Policies	
Partners	

## List of Figures

Figure 1: History of Bicycling in Lincoln	2
Figure 2: 2017 Lincoln Trail Counts	4
Figure 3: 2017 N Street Cycle Track Counts	5
Figure 4: Bicycle Demand	6
Figure 5: Existing Trail and On-Street Bike Network	8
Figure 6: Level of Traffic Stress (LTS) Results	10
Figure 7: Bicycle Network Analysis (BNA) Results	12
Figure 8: Citywide Bicycle Crash Locations and Type (2012 – 2016)	14
Figure 9: Downtown Crash Locations and Type (2012 – 2016)	15

### List of Tables

Table 1: Types of Bicyclists	З
Table 1. Types of Dicyclists	.5



## Introduction Lincoln's Bike History

The City of Lincoln has a strong tradition of supporting bicycle travel, not only for recreation but as a means of transportation. Milestone activities in Lincoln's bike history are depicted on **Figure 1**.

A *Mayor's Bicycle Advisory Committee* was first created in June 1971; the Committee consisted of 13 citizen members and nine agency representatives and was intended to: support bicycling, advocate bicycle safety, act as a liaison between City and bicyclists, advise and coordinate bicycle related activities of City agencies, and review proposed bike routes, projects, and legislation affecting bicycling.

Bicycling has been officially recognized as part of the transportation mix since June 1973. Bicyclists were given the same rights and responsibilities as motor vehicle operators and can be ticketed for traffic violations. Lincoln's grid street network forms the primary network for bicyclists as well as motor vehicles. Recognizing some streets are less stressful than others to travel on, the City developed a Bicycle Hazard Index in 1973. Together with 1970 Origin-Destination Census data, a low-stress network of signed on-streets routes connecting to schools and parks was developed. Many of those initial routes are still used today and are having their signing upgraded.

The City's first major off-street trail project, the Billy Wolff- Antelope Bikeway, was constructed in 1978 using FHWA Bikeway Demonstration Project Funds. The bikeway was one of only 50 projects selected out of 450 applications. Since the successful completion of that trail, the community has used private donations through groups, such as the Great Plains Trails Network (GPTN) and various public funds to provide the backbone network for bicycling across the City. Lincoln has taken advantage of the many miles of abandoned railroad corridors and stream banks to provide trails with fewer street crossings, flatter grades, and more pleasant travel. In recent years, Lincoln has implemented high quality on-



street bike facilities like the N Street Cycle Track, and recently launched BikeLNK, the bike share program.

#### Planning Context

The City of Lincoln-Lancaster County Comprehensive Plan and the Lincoln MPO 2040 Long Range Transportation Plan (LRTP), were adopted in December 2016 and January 2017, respectively. These two plans are foundational in setting the vision for land use and transportation in Lincoln. The Lincoln Bike Plan is being developed to build on and be compatible with both planning documents.

#### Land Use and Demographics

The Lincoln/Lancaster County Comprehensive Plan provides both a snapshot of a wide range of existing community metrics and a broad vision for the future of the community. Included within the plan are examinations of current and future demographics and land use; these components are important considerations for the Bike Plan as they relate to the makeup of potential bicyclists and identification of areas within the City where demand for bicycling will likely be focused.





#### Figure 1: History of Bicycling in Lincoln







The population of Lancaster County reached 285,000 in 2010, an annualized growth rate of 1.3% since 2000. Steady population growth has continued since, with an estimated population of approximately 306,500 in 2015. Continuing this growth rate forward to 2040 would bring the total population to 412,000. The growth rate of minority populations exceeded the overall rate between 2000 and 2010, and this trend is expected to continue. The fastest growing age group in Lancaster County is people 65 and older. Approximately 90% of the County's population lives within Lincoln's city limits; the City's population density of about 3,000 persons per square mile is expected to increase by 2040 due to expected changes in community demographics and housing preferences.

LPlan 2040 places an emphasis on mixed-use redevelopment or undeveloped and underdeveloped commercial land within the City to accommodate expected demographic shifts. It identifies the potential for 8,000 new dwelling units by 2040, with 3,000 of those located in Greater Downtown Lincoln. Most of the remainder will be located along "Mixed Use Redevelopment Nodes and Corridors" throughout the City. LPlan identifies 52 square miles of undeveloped land on the outskirts of Lincoln that are targeted for providing urban services by 2040.

#### Types of Bicyclists

A bicycle network needs to provide comfortable facilities for a large cross-section of people. The general population can be classified into four types of cyclists, as shown in **Table 1**, based on their skill levels and attitudes towards cycling. Research initially conducted by the Portland Bureau of Transportation and later applied on a national scale by Portland State University identified the portions of the population that fall within each category. This information provides valuable insight into what accommodations are necessary to attract the most riders. The percentage of the population in each category are national estimates but are likely reasonable representations of Lincoln's attitudes toward bicycling.

#### Table 1: Types of Bicyclists

	<b>"Interested but Concerned" Bicyclists</b> are typically the largest group of a population. They are interested in biking but are concerned about their safety. They do not like using routes without dedicated bicycle facilities because they are nervous about mixing with motorized vehicles. They primarily ride their bicycle for short trips and for recreational reasons. The addition of bicycle facilities that remove them from interacting with motorized vehicles would increase their likelihood of riding.	51–56% of the population
	<b>"Enthused and Confident" Bicyclists</b> are encouraged to bicycle by the availability of bicycle facilities. They will occasionally ride in traffic when bicycle facilities are not present but prefer to ride within their own facility. These riders may not always choose to bicycle but are comfortable doing so in many cases. Investing in additional bicycling infrastructure to improve safety and connectivity will lead to these riders making more bike trips.	5–9% of the population
	<b>"Strong and Fearless" Bicyclists</b> are bicycle enthusiasts who will ride their bicycle for any trip type, with bicycling being their primary commuting mode. Bicycling is part of their identity, and they will ride on nearly any roadway in any conditions.	4–7% of the population
<b>B</b>	<b>"No Way No How"</b> are people who have no interest in bicycling due to immense safety concerns, weather, topography, are unable, and/or simply lack interest.	31–37% of the population



#### **Bicycle Activity**

#### Mode Split

According to the latest available data from the US Census – American Community Survey (ACS), the average share of people in Lincoln commuting via bicycle was 1.7% from 2012 through 2016. Male workers, at 2.5%, were more likely to bike than females, at 0.8%. During that same time period, over 80% of workers drove alone, 9% carpooled, 1.3% used public transit, and 2.8% walked. The five-year average commute mode share for bicycling in Lincoln has seen a slight increase since 2009, gradually growing from 1.3% to 1.7%.

#### Trail User Counts

The City maintains a series of permanent and mobile bicycle counters along some of its major trails and the N Street Cycle Track. Trail user counts are important for identifying where bicycling activity is highest and where connections from on-street facilities to the trail network would be most beneficial. **Figure 2** below shows 2017 monthly counts along five major trails in Lincoln; totals are only shown for complete months of data. The two most heavily used trails were the north-south running Rock Island Trail and Billy Wolff Trail, which together saw an average of more than 40,000 riders per month from September through October.



#### Figure 2: 2017 Lincoln Trail Counts

Ridership on the N Street Cycle Track is recorded daily with a permanent counter. **Figure 3** presents both the monthly totals for 2017 and the average daily counts for each month. For the whole year, over 105,000 riders were counted on the cycle track. The highest traffic months were June, July, and September, when an average of over 350 riders per day were counted.



## LincolnBikePlan On-Street Bicycle Facilities Plan



#### Figure 3: 2017 N Street Cycle Track Counts

## **Bicycle Demand Assessment**

An important part of creating a bike network is to connect people to the places they want to go. The bike demand heat map shown on **Figure 4** was developed by overlaying nine factors to subjectively identify areas with "very low" to "very high" bike demand. Area of high bike demand represent areas of the community that are current or potential generators of bike trips. The following nine factors were used to create the bike demand heat map:

- Population density
- Employment density
- High concentrations of households without access to a car
- Proximity to trails, parks, and recreation centers
- Proximity to schools (elementary, middle and high school) and universities
- Proximity to StarTran bus stops
- Proximity to BikeLNK stations
- B3 zoning (corridor commercial)
- Proximity to public libraries







#### Figure 4: Bicycle Demand





## Assessment of Bike Network Existing Trail and On-Street Bike Network

Lincoln has an extensive off-street trail network. The trails serve both as recreational amenities and as transportation corridors for commuting and other utility-based biking trips. Lincoln's trail network (shown on **Figure 5**) includes nearly 250 miles of trails. Lincoln's on-street bicycle network (also shown on **Figure 5**), consists of a network of designated bike routes (streets that are signed as preferable routes for bicycling), four street segments with designated bike lanes (11<sup>th</sup> Street, 14<sup>th</sup> Street, 16<sup>th</sup> Street, and Vine Street), all within the Downtown and University of Nebraska-Lincoln (UNL) campus areas, with the exception of the 11<sup>th</sup> Street bike lane which extends to D Street south of Downtown. The N Street Cycle Track is a high-quality two-way bikeway that runs 17 blocks along the south side of N Street from 23<sup>rd</sup> Street to Arena Drive. Nebraska's first cycle track, the N Street Cycle Track was officially opened in April 2016.



#### Lincoln's Bike Network currently includes:



## Traffic Stress Analysis

#### Methodology

A traffic stress analysis can be used to classify streets and roads as "low stress" or "high stress" for bicycling. The classification uses characteristics of the roadway such as speed limits, the amount of motor vehicle traffic, and whether a dedicated bikeway is provided. Trails are typically classified as low stress. This classification is important because people have different levels of comfort interacting with motor vehicle traffic when they are biking or considering biking. The traffic stress analysis, when compared with the demand analysis, can highlight roadway segments in areas where demand for bicycling trips is high, but traffic stress is also high.

Research indicates that, while avid bicyclists are accustomed to interacting with motor vehicle traffic, most people have little tolerance for interacting with traffic while riding a bike and are very worried about being struck by a motor vehicle. In fact, these concerns discourage many people from trying biking in the first place.

The Mineta Transportation Institute (a California-based research institution) developed the Level of Traffic Stress (LTS) model to classify streets as high-stress and low-stress. High-stress streets may be suitable for some bicyclists, including those that are confident or very confident, Low-stress streets are suitable for almost everyone and in some cases are also suitable for children.







#### Figure 5: Existing Trail and On-Street Bike Network





As opposed to other methods to determine the suitability of streets for bicycling, the LTS method provides a greater weight to motor vehicle traffic speeds and volumes. While most people are comfortable bicycling on quiet streets, the LTS method requires physical separation between bicycles and cars when traffic levels and speeds exceed certain thresholds. This is important because separation from motor vehicle traffic may be the most important factor to consider to encourage more people to bicycle.

The method uses several base criteria for determining traffic stress (street width, posted speed limit, and presence of on-street parking) as well as additional criteria depending on facility type (bike lane width, traffic volume when streets do not have bike lanes, and number of driveway/street crossings for paths). Streets are rated on a scale from 1 to 4.

## LTS 1:

Low traffic stress; suitable for most all cyclists, including children.





Minimal interaction with traffic; suitable for most adult cyclists.

## LTS 3:

Exclusive riding zone or shared lane with low speeds; welcome to many current cyclists, but not to the "interested but concerned" population.





LTS 4: High traffic stress; only suitable for "strong and fearless" riders.

#### Analysis Results

There are many miles of low-stress streets and trails in Lincoln, as depicted on **Figure 6**. However, the vast majority of arterial streets —as well as most streets in downtown—are high stress, meaning they are uncomfortable for the average person to bike along or across. This creates gaps in connectivity across the city resulting in pockets or islands of low stress streets. For example, the neighborhood bounded by 33<sup>rd</sup> Street, South Street, and Antelope Creek has many low-stress streets, but it is entirely disconnected from the rest of the city because 33<sup>rd</sup> Street and South Street are high-stress, and the neighborhood does not have a connection to the Billy Wolff Trail.



LincolnBikePlan On-Street Bicycle Facilities Plan



Figure 6: Level of Traffic Stress (LTS) Results



#### Network Connectivity Analysis

#### Methodology

Low-stress connected bicycle networks have emerged as one of the most important parts of encouraging and supporting bicycling for people of all ages and abilities. For people to choose to ride a bicycle, they must feel comfortable at each step of their trip. One intimidating road segment or intersection can rule out an entire journey.

The Bicycle Network Analysis (BNA) is user-friendly tool to measure and communicate the connectivity of a community's low-stress bicycle network. The tool and its methodology identify areas of low connectivity, find gaps in the network, estimate connectivity improvements from specific projects, and measure progress in building a comfortable and complete bicycling network.

The BNA tool first calculates the Level of Traffic Stress for all streets to identify the community's low-stress street and bikeway network (as described in the previous section). It then evaluates every census block in the area to determine how well-connected the block is to other census blocks via the low-stress biking network. Two census blocks are considered connected if and only if there is an unbroken low-stress connection between them that does not require a trip more than 25% longer than the shortest car trip. Even a short stretch of stressful biking negates a potential connection.

The BNA score also summarizes the number and types of destinations available in each census block, including population, opportunities (jobs and education), core services, recreation, retail, and transit. Pairing this information with the knowledge of which census blocks are connected on the lowstress network, the BNA tool calculates a score for each census block by comparing the number and type of reachable destinations on the low-stress network to the destinations reachable by car within the same distance.

#### Analysis Results

The Bicycle Network Analysis (BNA) follows a "weakest link" philosophy: all it takes is one stressful section of roadway to cancel out an entire connection.



The BNA results for Lincoln are shown on **Figure 7**. Areas with higher scores have lower levels of disparity between the low-stress bicycle network and the overall street network. Areas with fairly sparse or disconnected street networks (such as the rural periphery) may have high scores if the existing streets are generally suitable for biking or if there are few nearby destinations within biking distance.

In Lincoln, the core of the city and especially neighborhoods next to the trail system tend to have better scores than many of the other neighborhoods. The area south of O Street on both sides of S. 56<sup>th</sup> Street scores especially well. There are several smaller pockets of low scores, including the portions of downtown that are more than one block from the N Street cycle track due to the high stress traffic scores of streets there. Other low-scoring areas include the airport, industrial areas, and areas along railroad, expressway, and creek corridors. These corridors act as barriers for biking because there are few low-stress crossings.







#### Figure 7: Bicycle Network Analysis (BNA) Results

A high BNA score represents an area that is well connected by the existing bicycle network, while a low BNA score represents a lack of connectivity and/or indirect routing compared to the overall street network.





## Safety Assessment

Crash data for the period of January 2012 through December 2016 was gathered for the city of Lincoln and analyzed. Over this 5-year period, 716 crashes involving bicycles were reported throughout the city (shown on **Figure 8**) with a significant number of these crashes occurring in the downtown area (shown on **Figure 9**). Locations that had five or more crashes reported during this 5-year period included 27<sup>th</sup> Street between W Street

& Apple Street, Capitol Parkway & 27<sup>th</sup> Street, Vine Street & 48<sup>th</sup> Street, and Normal Boulevard & South Street. Approximately 56 % involved a violation by the motor vehicle operator, 21% of these crashes occurred when a vehicle was turning right and collided with a bicycle. Approximately 27% involved a violation by the bicycle operator. In reviewing the street classifications, it was found that 83.6% involved an arterial street and 16.4% were on collector and/or local streets. Additionally, 77% of the collisions occurred during the daylight hours.

## **Programs, Policies and Partners** Education, Enforcement, and Encouragement Programs

*Bicycle Classes* - Bicycle safety presentations are offered for a wide range of grades at both public and private schools. Recently, a physical education class on pedestrian and bicycle safety behaviors including walking and bicycling on city trails was piloted at North Star High School for a PE credit towards graduation and is being considered for expansion to Lincoln North East High School this coming school year. For over 50 years, the Kiwanis Clubs of Lincoln have partnered with up to 20 elementary schools to provide bike rodeos every spring. In addition to schools; park and recreations centers, community learning centers, before- and after-school programs, worksites, churches, locally owned bike shops, and bicycle clubs have been active in promoting safe riding behaviors at health fairs, bike rodeos, neighborhood events, and through group rides. People of all ages are welcome at these events and are offered from March through November every year.

*Bike Lincoln* - The City's Bike Lincoln website provides resources relevant to bicycling in Lincoln. Included on the site is information about bicycle safety, bicycle programs & policies, and bike-related events, as well as a tool for planning a bike trip and educational videos about biking. Bike Lincoln also provides links to numerous other bicycle resources and local bike groups.

*National Bike Challenge* - This annual challenge sponsored by the League of American Bicyclists tracks travel by registered bicyclists in communities across the country. This is one of several biking recognitions that Lincolns has achieved that can help with grant applications for new bike trails and programs. In 2017, Lincoln won the community challenge.

*Bike to Work Week* - The City of Lincoln has partnered each year with local bike shops, BicycLincoln, the *Great Plains Trails Network*, and the Nebraska Bicycle Alliance to encourage residents to participate in *Bike to Work Week*, in mid-May. Several events are planned with a free kick-off rally on Friday morning with bagels, juice, and coffee for commuters on their way to work. Information on various rides and events are also made available.









#### Figure 8: Citywide Bicycle Crash Locations and Type (2012 – 2016)







#### Figure 9: Downtown Crash Locations and Type (2012 – 2016)





*Tour de Lincoln* - The Great Plains Trails Network and the City of Lincoln Parks & Recreation Department sponsor four weekly tours of Lincoln's trails network in May. Each event begins at 6:00 PM on Thursdays near the Jayne Snyder Trails Center in Downtown Lincoln and completes a circuit in a different quadrant of the City before returning to the Trails Center. The rides vary in length between 12 and 16 miles and riders of all skill levels are welcome.

*Trail Trek* - The Great Plains Trails Network (GPTN) organizes this annual fundraising event in June with multiple corporate sponsors to benefit Lincoln's trails network. The event, which is in its sixteenth year, begins in the

Haymarket area and has a variety of tours and distances from 10 miles to 100 meters to appeal to both novice and experienced riders.

*BikeLNK* – Lincoln recently launched BikeLNK, the City's first bike share program, following a collaborative planning effort between City staff, the University of Nebraska, and community leaders. BikeLNK provides citizens access to bicycles which they may check out at a docking station, ride, and leave at any other station. The system consists of 19 stations throughout downtown Lincoln and the University of Nebraska. Each 30 minutes of riding costs users \$3, though membership programs for frequent riders are available.



#### **Bicycle-Related Policies**

Lincoln enacted its first Complete Streets policy in 2013 to encourage implementation of Complete Streets designs that are safe and convenient for all users, regardless of age, ability, or mode. The policy states that applicable City departments must consider proper accommodation of all transportation modes for any project impacting public and/or private streets and recommends waiving or changing any other policies which contradict Complete Streets; an annual report detailing progress towards implementation of the policy is mandated. Several cases which would allow for a City department may exclude Complete Street accommodations from a project are described as well. The Executive Order which established this policy also established an interdepartmental Complete Streets Committee to discuss implementation, and \$50,000 has been designated annually for Complete Street projects from 2014/15 through 2019/20.

The National Complete Streets Coalition (NCSC), housed under Smart Growth America, puts out an annual list of the top Complete Streets policies across the nation and provides guidance on development & implementation. According to the NCSC, an ideal Complete Streets policy should include:

- 1. Vision and intent: Includes an equitable vision for how and why the community wants to complete its streets. Specifies need to create complete, connected, network and specifies at least four modes, two of which must be biking or walking.
- 2. **Diverse users**: Benefits all users equitably, particularly vulnerable users and the most underinvested and underserved communities.
- 3. Commitment in all projects and phases: Applies to new, retrofit/reconstruction, maintenance, and ongoing projects.
- 4. *Clear, accountable expectations*: Makes any exceptions specific and sets a clear procedure that requires high-level approval and public notice prior to exceptions being granted.





- 5. Jurisdiction: Requires interagency coordination between government departments and partner agencies on Complete Streets.
- 6. **Design**: Directs the use of the latest and best design criteria and guidelines and sets a time frame for their implementation.
- 7. Land use and context sensitivity: Considers the surrounding community's current and expected land use and transportation needs.
- 8. **Performance measures**: Establishes performance standards that are specific, equitable, and available to the public.
- 9. **Project selection criteria**: Provides specific criteria to encourage funding prioritization for Complete Streets implementation.
- 10. *Implementation steps*: Includes specific next steps for implementation of the policy.

As currently written, the Executive Order which enacted Lincoln's policy lacks several of these components. The policy lacks specifics about expectations, coordination with partner agencies, and appropriate design criteria & guidelines, and does not establish any performance measures or prioritization criteria for tracking implementation.

Chapter 10.48 of the Lincoln Municipal Code is dedicated to bicycle-related policies and regulations. Bicycle riders are granted the same rights, and are subjected to the same rules, as motor vehicle drivers, but several additional regulations specific to bicycles are included as well. The code allows for City Council to outlaw bicycling by resolution on arterial streets as deemed appropriate, bans bicycles from the sidewalks within a specified portion of downtown Lincoln, and states that cyclists shall operate as far to the right as possible when riding in a shared travel lane.

Bike riding on downtown sidewalks is currently banned in Lincoln. There have been ongoing conversations about eliminating the ban and allowing people to ride a bike legally on downtown sidewalks if the bike has a bell.

#### Partners

The City of Lincoln maintains relationships with several partner groups and agencies that support its bicycle community and efforts to improve the bicycle network. These partners include other government agencies, citizen groups, and private sector entities.

*Pedestrian Bicycle Advisory Committee* - This 14-member citizen advisory group provides advice and recommendations to the Mayor, City Council, and Parks and Recreation Department on the development and implementation of comprehensive plans for the bicycle and pedestrian network. They meet monthly and discuss pending projects.

*Great Plains Trails Network* - The Great Plains Trails Network is a group of citizens who advocate and support a network of trails in and around Lancaster County for jogging, biking, walking, and horseback riding. The network seeks the acquisition, development, and wide availability of trails by securing funding from public and private sources, working cooperatively with governmental agencies, lobbying for favorable legislation, and providing opportunities for persons to learn more about trails, their value, and appropriate use. The GPTN has been instrumental in the development of trails in Lincoln & Lancaster County, and supportive of acquiring land to connect existing trails, and assisted with improving trail monitoring, safety, and usage.





*BicycLincoln* - This advocacy group blog connects cyclists in the Lincoln area to share information and promote bicycling. It has been beneficial in informing cyclists of events such as the *National Bike Challenge* and *Bike to Work Week* and rallying support for bike-related causes. The group also maintains a list of bicycle-friendly businesses in Lincoln.

*Lower Platte South Natural Resources District (LPSNRD)* - The LPSNRD is one of 23 NRD districts in Nebraska. These districts are unique to Nebraska and were created by the legislature in 1972 with broad authority. They develop and execute plans, facilities, work and programs including Parks & Recreational Facilities, Erosion Control & Protection, as well as Floodwater & Sediment Damage Prevention to name a few. The LPSNRD has been one of the most supportive in the preservation of natural corridors such as along abandoned railroads. To date they are responsible for developing and maintain approximately 50 miles of recreational trails along four former railroad corridors:

- MoPac East Trail
- Oak Creek Trail
- Homestead Trail
- Salt Creek Levee Trail

*Bike UNL* - This registered student organization (RSO) at the University of Nebraska-Lincoln has the mission to empower bicycling and bicycle education in the UNL community. Bike UNL is composed of students of the University of Nebraska-Lincoln that believe in bettering the University through the support of bicycling. Their mission is to empower bicycling and bicycle education in the UNL community. They organize various group rides and social events around the campus and city.

